Cutting Off "The Possibilities for Change":

Human Nature in Western Thought, Techno-Optimism and the Politics of Exclusion

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Abstract

Picture the modern human: intelligent, inquisitive, rational and ingenious; self-interested, entrepreneurial and competitive; technologically minded, capitalist and the master of the natural world. In this paper, I question the political and ethical implications of such views of human nature. Drawing on postmodern, poststructuralist, and New Materialist literature, I argue that the hegemonic Western framework of human nature, which I call the Modern Liberal Techno-Capitalist Subject (MLTCS), fosters political and ethical exclusions, marginalizing certain groups and reinforcing an anthropocentric worldview. First, I define and critique the Modern Liberal Subject (MLS), a broad onto-epistemological category in the Western canon reinforced by the nature-culture antithesis and the Subject-Object divides, legitimizing hierarchies that marginalize both certain human groups and the natural world. I then extend this critique to 'our' relationship with technology and capitalism, thereby challenging the deterministic logic of the MLTCS framework. In doing so, I explore alternative ways of understanding this relationship through the lens of cyborg politics and New Materialist epistemology. Moreover, I apply these critical frameworks to techno-optimist discourse, examining how the MLTCS is mobilized to justify unchecked technological and capitalist expansion as the only viable response to our changing world. Ultimately, this paper provides a conceptual foundation for interrogating how the MLTCS shapes contemporary political discourse. By problematizing its determinism and exclusions, this analysis opens space for rethinking human subjectivity, agency, and our entanglement with the broader world.

Acknowledgements

The lessons I've learned throughout this research about the iterative and co-constitutive making of the world make writing an acknowledgments section especially perplexing. This thesis would not exist were it not for a whole panoply of people, events, thoughts, and feelings that have inhabited my being. When I think back to the moment when I first embarked on this journey in January of 2024, I see an endless list of moments that poured into the making of this work. How am I supposed to acknowledge my past, my sister, that one conversation in the honours room, in class, that podcast I listened to on the bus or the ways the sunlight would hit my face on long walks—all at the same time?

But, in the interest of space, I'll try to keep it to the people I would be remiss not to mention. Like the many events, thoughts, and feelings that influenced this project, these people—each in different but equally powerful ways—shaped both the work and me along the way.

First, I want to thank all the professors and graduate students in this department I've had the pleasure of learning from. While this thesis is informed by every single theory course I've taken over my five years, three stand out.

First, a course with Noelle Jaipaul on the politics of outer space. While it may seem unrelated at first glance, it most definitely wasn't. Questions of human exceptionality, ingenuity, and destiny permeate our conceptions of space exploration, and those themes haven't left my thinking since then. So, thank you, Noelle, for your encouragement in the early stages of this project.

Next—and arguably the most influential course—was a seminar on Posthumanism and New Materialisms with my supervisor, Didier Zúñiga. It's wild to think that before that class, I had no knowledge of many of the ideas that now form the backbone of this thesis. Didier's support throughout the course and his careful guidance in our seminar discussions were invaluable to the direction this project ultimately took. Despite the complexity of the material, he created a space for deeply thoughtful conversations across disciplines. I'm still in awe (and endlessly thankful) that he chose to include Karen Barad's *Agential Realism* in that class… A heartfelt thank you to Didier for your unwavering support, patience, and encouragement as my supervisor. Working with you has changed the way I think about academia, politics, and what I'm capable of.

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Across these courses—and many others—I've had the incredible privilege of sharing ideas with so many imaginative, intelligent classmates. Thank you for creating such a welcoming space

for discussion—and disagreement. I think it's those times in conversation with you all that I'll miss the most about undergrad.

Speaking of disagreement, I also want to thank my intellectual opponents. Thank you for holding space for me. I've learned from those conversations that disagreement can be incredibly generative. So, thank you—for the respectful dialogue, the fun, and for indulging in my 'radical' takes—my "sparkle." Here's to hoping respectful dialogue remains possible for us all as we advance into a new chapter of our lives.

And finally, of course, I must thank my support system. Though it's shifted, grown, shrunk, and grown again—I wouldn't have it any other way. Every experience has taught me to be intimately aware of the gift that is connecting with another (non)human. Even when those connections aren't forever, the experiences are always transformative, always affective, and always modifying our "possibilities for change." I'm endlessly grateful to have been changed by so many over the course of this project and this degree.

Contents

Introduction: "The Possibilities for Change"

"What is at issue, rather, are the possibilities for the iterative reconfiguring of the materiality of human, nonhuman, cyborgian, and other such forms. Holding the category ''human'' (''nonhuman'') fixed (or at least presuming that one can) excludes an entire range of possibilities in advance, eliding important dimensions of the workings of agency" (Barad 2007, 182).

In late November of 2020, I was sitting in my childhood bedroom, surrounded by a sea of formula sheets, endless calculations, and crumpled tissues soaked with tears and snot. The first year of my undergraduate degree was spent in that room—I was a first-year engineering student taking her first term in the midst of a global pandemic, after all. On this particular day, I was attending a virtual "Meet the Disciplines" fair, an event where first-year students could ask questions about the various engineering disciplines in order to declare their preferred programs the following term.

The scene was rather pitiful. While the pages of mathematical formulas were expected, the tissues were not. Up until that day in November, I had been slowly grappling with a growing suspicion: I had made a mistake. A big one. That day, the suspicion crystallized into certainty.

Before pursuing a bachelor's degree in political science, I wanted to be an engineer. The Faculty of Engineering at the University of Alberta sold me a vision of my future that I very much wanted: to be a changemaker; to make the world a better place; and to make an impact. The whole world seemed to resound with an assured idea that engineers worldwide are engaged in "solving the world's greatest challenges and building a better future for society" (University of Alberta, n.d.). As a climate-anxious, white, middle-class girl of a mother who said she 'could be anything [she] wanted to be,' I felt becoming an engineer was how I would make use of the privilege I was awarded in life; I was going to help create the tools necessary to 'save' the planet.

But, as I sat in my room that cold November day, staring blankly at yet another video call, I realized that this future was not so straightforward.

The environmental engineer on my screen at this virtual fair echoed a sentiment I had been hearing from various other sources throughout the term—that "saving the environment" was not so easy to do as an engineer. The message was blunt—if you're already overwhelmed by your course load, then climate goals probably won't be enough to carry you through. Most people in engineering, I was told, are there because they enjoy math, solving technical problems, and maybe collaborating on a team. The deeper ethical stakes—like addressing climate collapse—are not what's expected to animate an engineer. In fact, I was essentially being told that being an engineer and doing technoscience rests on a belief in technological progress as an unquestioned good. Engineering, in this narrative, is about making things first, with politics being a distant second.

This realization left me with a deep sense of disconnect, prompting me to ask something more fundamental: why was engineering my first and only choice for contributing to climate solutions? How had I internalized the belief that the climate crisis could be engineered away?

Throughout my undergraduate degree in political science and this research project, I've learned that this assumption is deeply revealing. It speaks not just to how we in the West imagine solutions, but to the narrow framework within which we define what kinds of work, knowledge, and change are considered legitimate. In hindsight, choosing engineering as the path to "save the planet" wasn't just about wanting to help—it was also about accepting a larger cultural story about *who* gets to fix things, and *how*.

In thinking of a topic for this project, I was inspired by this experience and wanted to investigate what other ways of thinking might be available to us.

Techno-Optimism and Human Nature

The assumptions I held that pushed me towards engineering were contained in a general view shared in the West that I and others call *Techno-Optimism*. Techno-optimism, as I define it in this piece, is the view that technological innovation is the best and only way for humans to solve problems in society. Contemporary techno-optimists argue that it is only through unencumbered technological advancement that humans will be able to avoid climate collapse—or at the very least, survive it.

It is important to note that the kind of politics I advocate for in this paper is not fundamentally opposed to the use of technology in solving problems related to the climate crisis. In fact, as we will see, human technological use is, in some ways, central to the claims I make here. Instead, what I take issue with in this paper are the fundamental assumptions about human subjectivity that techno-optimists promote: techno-optimists argue that *it is in our very nature* to be technological, to modify the natural world, and to expand human potential. Thus, it only makes sense to make the changes required by climate change according to such a nature. As we will see, 'human nature' in this discourse is the rhetorical crutch techno-optimists lean on to push a politics of free-market techno-capitalism.

Marc Andreessen, an American venture capitalist, is a perfect archetype of this view. In a blog post he wrote in 2023 called the *Techno-Optimist Manifesto*, Andreessen repeatedly implies that his techno-capitalist project is aligned with human nature and thus must be obeyed. He laments those who argue for caution in technological development and technological solutions to climate change: "We are told to denounce our birthright," he writes, "our intelligence, our control over nature, our ability to build a better world" (Andreessen 2023). He argues that only through the free market will technology be able to truly 'save us,' claiming any constraint on innovation "is a form of murder" (Andreessen 2023). Techno-capitalism, for Andreessen, is the way we are to be truly human: "We believe technology makes greatness more possible and more likely. We believe in fulfilling our potential, becoming fully human—for ourselves, our communities, and our society" (Andreessen 2023).

Andreessen tries to paint this picture to include all humans, arguing that "the techno-capital machine works for [all of] us" (Andreessen 2023). However, just as Anna Grear (2015) has argued in criticizing the Anthropocene narrative, I wonder who is truly included in the human category here.

It is this aspect of techno-optimist discourse that I take issue with in this paper. In linking a view of our future to human nature, or "becoming fully human," techno-optimists are essentially saying other kinds of solutions and politics are not in line with the fundamental truths about a universal, unchanging humanity. This view is what I endeavour to critique here.

The Project

In this thesis, I explore how ideas of human nature in Western thought shape modern techno-optimist discourse. I examine how this way of thinking reinforces a view of the human as exceptional, and I ask what alternatives might exist for imagining human subjectivity and agency beyond this framework. My goal is to uncover the conceptual pitfalls and harmful determinism embedded in techno-optimism, and to argue that rethinking the human subject is crucial to addressing the climate crisis.

Before continuing, a note on the scope of this project. I do not aim to propose a new, definitive theory of human nature. In fact, offering another set of deterministic traits would contradict the critique presented in this piece. I also do not address the specific biological or social ways humans behave in different contexts—that question lies outside the focus of this work. Nor is this an exhaustive history of techno-optimism. Tracing its roots back through Western philosophy would require a much larger and more in-depth project—one more suited to graduate-level research. Instead, this is an exploratory piece. It is a first attempt at critique and a personal entry point into my thinking in this field of political theory.

This essay is divided into four sections: this introductory section, two sections of discussion, and a concluding section. In the first discussion section, titled "(Western) Human Nature as an Onto-Epistemological Category Predisposed to Political (De)Humanization," I describe the onto-epistemological underpinnings of Western views of human nature, ultimately describing a sort of general archetype of Western human subjectivity: the Modern Liberal Subject (MLS). The MLS is founded on the Subject–Object divide and Nature–Culture antithesis, two binaries that interlace and self-reinforce through various institutions in the Western canon—from the scientific method to political social contract theory.

This first section does not aim to provide an exhaustive account of the Western onto-epistemological tradition that underpins modern ideas of human exceptionality. A full exploration would require a much broader discussion of Western philosophical, theological, and psychological foundations. While I point to moments where deeper engagement with these fields would be valuable, my analysis remains focused. I concentrate specifically on how two key dualisms—the Subject–Object divide and the Nature–Culture antithesis—have shaped dominant views of human nature within the MLS. The section concludes with an engagement with New Materialist scholars, through which I explore critical alternatives for understanding the human category and subjectivity.

The second discussion section, titled "(Western) Human Nature as Predisposed to Techno-Capitalist Determinism," pushes the MLS into the 'practical,' examining how these conceptual dualisms come to serve two select political projects often associated with this view of human

nature: unchecked technological advancement and capitalist expansion. In this section, I examine the onto-epistemological assumptions underpinning modern techno-optimist discourses, uncovering how these discourses shape the West's current relationship with technology and markets. Through this analysis emerges yet another archetype of Western subjectivity, which I call the Modern Liberal Techno-Capitalist Subject (MLTCS). This section, much like the last, seeks to provide tools for critically engaging with this MLTCS and alternative ways of thinking about human subjectivity in the face of techno-capitalism.

I am certainly not the first to critique the dominant subject of Western philosophical and scientific traditions. Challenges to this narrow conception of the human are found across feminist, postcolonial, Indigenous, and critical disability scholarship—to name a few. What these critiques share is a deep concern with how the imposition of an archetypal 'human'—shaped and enforced by the intellectual and political violence in the West—has systematically excluded vast portions of human experience. As Grear writes, Western imperial expansion "marginalized or eradicated [lifeworlds]" across the globe, replacing them with "hierarchical interventions, ontologies and European epistemologies" (Grear 2015, 232). Similarly, Watson and Huntington (2008) argue that "the assumption of value-free knowledge allowed Euro-American governments to justify both physical and epistemic violence against Indigenous societies deemed primitive or inhuman" (Watson and Huntington 2008, 258).

Today, I contend that the proliferation of techno-optimism risks reproducing—and may already be reproducing—similar patterns of physical and epistemic violence amid the climate crisis. By positioning technological progress as neutral and universally beneficial, it continues the legacy of erasing alternative ways of knowing, relating, and being at a time when increased creativity and inclusivity in coming to solutions are indispensable.

Now, the rhetorical power of rationalizing or naturalizing Western political projects has long been observed, but as Michel Foucault (1982) asks, "[w]hat to do with such an evident fact?" (Foucault 1982, 779). Throughout this paper, I draw on exciting innovations in political theory that argue that technoscience need not impose such violent conceptual dualisms. Along with the longstanding tradition of scholars I draw from, I attempt to expose, as Donna Haraway (1988) puts it, "how meanings and bodies get made," specifically the human subject in my case, "in order to build meanings and bodies that have a chance for life" (Haraway 1988, 580).

This is not simply about critiquing representations of human nature. As Karen Barad (2007) reminds us, "[m]attering is simultaneously a matter of substance and significance" (Barad 2007, 3). Meaning and materiality are deeply entangled—how we speak about the world shapes how we act within it, and the shape of the world influences what we can know and say. The politics I propose, then, are not abstract. They have real, material consequences, especially when taken seriously in the context of climate change.

This may seem like just words on a page, but I've come to understand that words are alive in the making of worlds—just as much as the world is alive in the making of words. Ironically, in this sense, my dream has come true. I am, in a way, an engineer. An engineer of worlds. Political theory, I've realized, is a kind of technology—one that has the potential to iteratively (de)construct

the world and shape it in a way that keeps open the “possibility of change” (Barad 2007, 34) and the emergence of new ways of being.

Section 1: (Western) Human Nature as an Onto-Epistemological Category Predisposed to Political (De)Humanization

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The term *human nature* is contested at the best of times. Yet, in the West, we seem comfortable invoking it. After all, is it not *natural* for humans to question their thoughts? Is it not *natural* for us to use reason—the foundation of science and philosophy—to understand our most fundamental *nature*? And, by extension, to organize our societies accordingly?

These questions, and many like them, are central to this section. However, my focus is not on assessing the validity of their possible answers. Questions about the specific context-dependent biological or social ways humans operate are best addressed by other scholars. Instead, I examine the assumptions underpinning these inquiries: Why do we assume that humans have a knowable, universal and static nature? What about our self-perception grants us this privileged viewpoint? And what possibilities do we exclude when we accept this perspective uncritically?

These questions are, of course, incredibly complex, and I do not intend to answer them exhaustively here. To facilitate a more focused critique of the modern techno-optimist frameworks we will examine later, I will narrow my attention to a specific conception of the human that dominates the Western canon. My analysis will center on a view of human nature within Western cultural and philosophical traditions, which I will refer to as the Modern Liberal Subject (MLS).

Briefly, this perspective posits that humans are inherently distinct from and above animals and the rest of nature, possessing uniquely human qualities such as rationality, language, and culture. At the same time, it assumes that certain *natural* traits are deterministic—suggesting that, through either the adoption or rejection of such traits, individuals can embody varying degrees of human-ness, paradoxically aligning with their natural course while simultaneously *transcending nature* itself.

The central target of my critique of the MLS is its reliance on and reinforcement of what many scholarly traditions call the *nature-culture antithesis*. Simply put, this is the idea that humans and *nature*—or the *rest of nature*—are fundamentally opposed epistemic categories (Soper 1995, 42). This assumption, which posits a separation between humans and nature, is operationalized in the empirical and social sciences through what might be called the *Subject-Object divide*. This divide strictly distinguishes a thinking subject from the object of observation, treating them as two inherently separate entities.

The Subject-Object distinction, along with broader linguistic representations of nature, has been widely challenged (Kuhn 1962; Foucault 1970; Derrida 1967; Latour 1993; Soper 1995; Haraway 1985, 2006; Barad 2007; Bennett 2009; Kohn 2013). Broadly speaking, the tension in the literature can be framed as follows: while scholars like Soper argue that this distinction remains fundamental to any discussion of nature in relation to humans (Soper 1995), New Materialist thinkers such as Barad, Kohn, and Haraway reject the binary altogether. They contend that these

divisions fundamentally misrepresent the entangled relationships between humans and nature—or, indeed, matter itself. In my analysis, I will engage with both perspectives in examining human nature and the MLS.

Before proceeding, it is important to acknowledge the limitations of this analysis. This section will not engage with the contested concept of nature or attempt to redefine human nature. Nor will it provide a comprehensive history of the Subject-Object divide or the nature-culture Antithesis in the Western canon. Instead, my focus here is to establish the conceptual and argumentative framework for examining how the notion of human nature embedded within the MLS manifests in modern techno-optimist discourses, political projects and institutions.

The central argument of this section is twofold. First, I argue that the onto-epistemic use of human nature in the conceptualization of the MLS is problematic due to its unchecked determinism. Second, I contend that the uncritical rhetorical invocation of the MLS in past, current and future political projects inevitably leads to the political and ethical devaluation not only of certain groups of humans but also of the rest of the natural world. While the broader implications of this latter point will not be fully explored here, it is crucial to recognize how political and ethical exclusions shape our "possibilities for change"—especially in the face of climate collapse. This issue will, of course, be addressed in the final section of the larger paper.

The Modern Liberal Subject

First, I will define the MLS in detail. While my focus in the larger paper is on a specific conceptualization of human nature—particularly the techno-optimist subject I will critique in later sections—the MLS is a broader onto-epistemological category that I will explore here.

My use of *onto-epistemological* to describe the MLS is intentional. The perpetuation of the MLS in scientific and social science contexts implies both an ontology—a conception of what exists in the world—and an epistemology—how we can know and understand what exists. This onto-epistemology is embedded in its very name: the MLS is *modern* because of its ontology, generally known as the nature-culture antithesis, and it is a *liberal subject* because of its epistemology, the Subject-Object divide. First, we turn to ontology.

MLS Ontology: The Nature-Culture Anthesis

The ontology of the MLS should be familiar to Western thinkers. Originating in early Greek atomistic metaphysical frameworks and further elaborated during the Enlightenment, the MLS postulates that "the world is composed of individuals with separately attributable properties" (Barad 2007, 138). These individuals need not be human; Democritus, the founder of this atomistic metaphysics, conceived even the smallest entities as separate, each "individually determin[ed] [by] inherent properties" (Barad 2007, 138). Crucially, in the Western tradition, the form and qualities of these individuals were often attributed to a deity—most commonly, the Christian God—who was seen as the ultimate author of the universe, a kind of cosmic clockmaker (Soper 1995, 43).

Yet, despite political and theological shifts, a core thread persisted: the atomization of the world into discrete individuals with determinate properties.

Following Carolyn Merchant's critique in *The Death of Nature* (1980), this shift might be described as the *mechanization of nature*. In the absence of a Deistic conception of cosmic order, she argues, Enlightenment philosophers perceived a state of disorder that they sought to resolve (Merchant 1980, 202). The "mechanical philosophy" that resulted "achieved a reunification of the cosmos, society and the self in terms of a new metaphor–the machine" (Merchant 1980, 202). Within this framework, scientific inquiry was conceived as the study of nature's individual mechanistic parts, each possessing distinct qualities that, when analyzed together, could explain larger phenomena. As Merchant outlines, five core assumptions underpinned this worldview: (1) matter is composed of particles, (2) these particles form the universe in a natural order, (3) knowledge about this order can be abstracted from nature, (4) such knowledge is independent of its context, and (5) understanding is achieved through mathematical analysis and the manipulation of discrete data points (Merchant 1980, 230).

The emphasis on individuals with deterministic properties carried through to Western Enlightenment humanism, where the focus shifted from particles to humans as the central point of inquiry. The Enlightenment, an 18th- to 19th-century European intellectual movement, was characterized by a departure from Christian doctrine in the study of natural and social phenomena towards an all-encompassing "rationalization of social and cultural life," encouraged by post-Reformation skepticism toward religious authority (Conrad 2012, 1005). René Descartes, often regarded as the father of Enlightenment humanism, argued that amid the uncertainties of perception, "the only certain truth is human existence" (Watson and Huntington 2008, 258). His famous dictum—*I think, therefore I am*—introduced what became known as the *Cartesian subject*, which established humans as ontologically distinct from other entities, particularly the rest of nature, due to their unique rational, inquisitive and self-reflexive essence (Soper 1995, 25).

This landmark ontological shift prompted the development of Enlightenment humanism; the central examination humans and social life outside of religious paradigms so as "to fashion a plausible account of the earliest periods of human social life, for which no documentary or other material evidence exists" (Palmeri 2016, 1). Of course, anthropocentrism of this kind predates the Enlightenment and can be traced to various religious traditions, most notably Christianity, which in *Genesis* positions humans as both part of nature and apart from it due to their special relationship with God (Bristow 2023). However, the concern here is not with the religious foundations of humanism but rather with how the human-nature dichotomy is applied beyond religious doctrines. It is this conceptualization of human nature in the *modern* (secular) and *liberal* (post-Enlightenment) era that is of interest.

The general ontological framework underpinning the MLS is one that positions humans in opposition to nature due to their supposed unique essence. In line with the atomist paradigm, human nature was also considered diametrically opposed to nature, possessing an essence distinct from and unlike the natural world. Just as the 'mechanization of nature' imposed order on a newly disordered world in the absence of a Deistic paradigm, mechanistic thinking became the dominant

framework for maintaining social stability as the Divine Right of Kings came under scrutiny during the social and political revolutions that shook parts of Europe at the time (Merchant 1980, 203). Like matter, humans were conceived as independent actors with inherent natures that could be understood in isolation and, in turn, dictated their behaviour within the broader mechanism of society.

The social contract tradition emerged from this view of human nature, suggesting that by understanding how humans behave in a 'state of nature'—a world without social institutions—a social contract could be constructed to promote peace and support human flourishing (Ritchie, Hodwitz, and Karst 2022, 53). Within this mechanistic paradigm, civilization was seen as an external force acting upon, shaping, or promoting human nature according to its characteristics and discrete parts (Soper 1995, 31).

Notably, this uniquely human essence—the ontological separability of humans and nature—is, somewhat paradoxically, referred to as human nature. As Soper explains, "Speaking of 'human nature,' we are not necessarily implying that human beings participate in the 'nature' we ascribe to animality. On the contrary, it might be said, we are precisely designating those features which are exclusive to them, and mark them off from 'nature'" (Soper 1995, 25–26). Within the ontological position of the MLS, then, human nature exists *outside* of nature; our nature is understood as fundamentally distinct from that of the rest of the animal world. This framework often defines human nature by explicitly rejecting behaviours associated with animals. Enlightenment thinkers such as Immanuel Kant (2002) advanced the idea that humans are by nature intellectual, introspective, rational, and moral beings—implying that any behaviour deviating from this is contrary to human nature itself (Soper 1995, 45).

Paradoxically, while 'the rest of nature' is thought only to be able to act according to its 'nature,' human nature under this framework does not dictate human behaviour in the same way. This paradox becomes especially pronounced in the Enlightenment, with philosophers like John Stuart Mill (2002) who argued that humans must obey their distinctly human nature to be moral or fully human while also asserting that any project that does not involve humans "struggl[ing] against nature" is "irrational and immoral" (Purdy, 13). This view simultaneously claims that human nature is neither deterministic nor intrinsic—since this would reduce humans to mere objects of their nature—yet insists that it is still something humans naturally possess.

Thus, the contested nature of the human category ultimately complicates conceptions of human nature. The MLS posits that humans are exceptional and distinct from the rest of nature *precisely because they are, by nature, unnatural.* Thus, the human subject is seen as neither subject nor subjectified by nature in the same way as other entities. These paradoxes will be explored further in later sections. First, however, we turn to how the nature-culture antithesis shaped the *practice* of the MLS's ontological position—the epistemology of the Subject-Object divide.

MLS Epistemology: Subject-Object Divide

Again, the Subject-Object divide should not be unfamiliar to Western thinkers. Just as the nature-culture antithesis separates humans from nature based on their supposed inherent properties, the

Subject-Object divide distinguishes the thinking observer—the subject—from an immutable object, whether living or inanimate. As it has already been eluded to, humans are typically considered subjects—often the only subjects within nature—while the rest of nature is viewed as an unthinking object or as mere phenomena, "that present [themselves] to thought, but [are] incapable of thought [themselves]" (Soper 1995, 42). This relationship is one-dimensional: the subject defines, represents, or modifies the object, while the object remains passive.

Since the Enlightenment-era Scientific Revolution, this distinction has been widely regarded as the foundation of Western scientific practice (Soper 1995, 43). The human scientist observes immutable natural phenomena and records their findings. The Subject-Object relationship is central to claims of objectivity because it presumes a clear epistemic divide: the subject (observer) actively examines an inert object (observed). If this divide did not exist—if the object were aware of the relationship and could influence the subject or the results—it would undermine the observer's ability to faithfully represent the object, as such modifications could occur without the subject's awareness. This relationship is made possible by the mechanization of nature we discussed above—the "conception of [nature] as inorganic, fundamentally mathematical, and hence objectively quantifiable" (Soper 1995, 43). Thus, the fusion of ontology and epistemology within the MLS is indispensable. As Soper notes, "For Nature to be conceived as Object, it must already be opposed to the mental—as that which differs from the Subject in not possessing mind, spirit or soul" (Soper 1995, 43). In this sense, science is an objective process through which scientists observe phenomena, removed from what they observe entirely

However, this view of the subject's position and role remains contested. Barad argues that the subject within the framework of the Subject-Object divide still maintains center stage. They contend that the apparatuses of measurement—be they telescopes, microscopes, or mathematical formulas—are explicitly designed for human use, regardless of how minimal the human role may be said to be in relation to the vastness of what they observe:

> "Though a mere speck, a blip on the radar screen of all that is, Man is the center around which the world turns. Man is the sun, the nucleus, the fulcrum, the unifying force, the glue that holds it all together. Man is an individual apart from all the rest. And it is this very distinction that bestows on him the inheritance of distance, a place from which to reflect—on the world, his fellow man, and himself. A distinct individual, the unit of all measure, finitude made flesh, his separateness is the key." (Barad 2007, 134)

While Barad, as a seminal thinker in the New Materialist tradition, rejects anthropocentric claims of objectivity, their critique of the Subject-Object divide reminds us that, despite the Subject-Object divide's claims to decenter the human from an active role in nature, humans still remain at the center of this epistemological method. Bridging the onto-epistemological gap I have outlined, Barad ultimately concludes that, within the Subject-Object divide—and for our purposes, the

MLS—“representationalism, metaphysical individualism, and humanism work hand in hand, holding this worldview in place” (Barad 2007, 134).

Of course, many other scholars in the field of Science, Technology, and Society (STS) have critiqued Western science for positioning the human in such a way, arguing that it misrepresents the complex interplay between the observer, the observed, and their context (Kuhn 1962; Haraway 1988; Latour 1991; Barad 2007). For our purposes, it is essential to clearly define the role of the human subject within the MLS and the forces that act upon it. This is the discussion I now turn to.

Contested Nature of the ‘Subject’

Before continuing, it is worth emphasizing how difficult discussions about human nature become when we consider human subjectivity, freedom, and agency—whether as part of or separate from nature. As we have seen, human nature within the MLS does not adhere to a singular, fixed definition of the human in relation to their nature. As Soper puts it, "the conception of what is proper to human nature is thus arrived at both in approval and in rejection of what is thought ‘spontaneous’ or ‘instinctual’" (Soper 1995, 28). This "self-induced multiple personality disorder," Haraway (1988) argues, stems from a kind of "epistemological electroshock therapy" we endure whenever we attempt to interrogate the very terms we use to describe ourselves (Haraway 1988, 587).

At its core, the tension lies between humans *as subjects* and humans *as objects* of nature: Is human nature, like the rest of nature within the ontology of the MLS, a passive, objective truth that can be studied and quantified like the properties of waves in a body of water? Is human nature entirely subjective, asserting a kind of human exceptionalism in which nothing influences the individual beyond their own agency? Or is it a complex entanglement of subject and object, where boundaries are continuously reconstituted through practice? I am, of course, inclined toward the latter. First, let us explore these tensions in greater depth.

For Michel Foucault, a poststructuralist, the term ‘subject’ has two meanings: "subject to someone else by control and dependence” and as a term “tied to [our] own identity by a conscience or self-knowledge" (Foucault 1982, 781). Both definitions, he argues, "suggest a form of power which subjugates and makes subject to" (Foucault 1982, 781). While this framework is useful, Foucault’s concept of subjectification in relation to power does not seem fully equipped to describe the epistemological Subject-Object divide we have been examining. Barad, a posthumanist, offers a deeper intervention that will be particularly fruitful in this discussion.

According to Barad, poststructuralists like Foucault fail to account for the Subject-Object divide due to their "offending human[ism]," which is ultimately "linked to a failure to account for the practices through which boundaries are produced, including an examination of how the constitutive exclusions of boundary-making practices matter" (Barad 2007, 168). In short, Barad argues that the subject and object are not merely positions of subjectification (or objectification) in relation to power; rather, they exist in a constant relationship of becoming: "It is through specific

agential intra-actions that differential sense[s] of being [are] enacted in the ongoing ebb and flow of agency" (Barad 2007, 140).

This concept forms the foundation of Barad's *agential realist* framework, which I will discuss later on. First, however, it is worth examining how Barad conceptualizes the MLS within the nature-culture antithesis and the Subject-Object divide. Simply put, Barad's agential realist account occupies a position between two extremes concerning the human-nature relationship. On one end of the spectrum lies a "geometry of absolute exteriority," in which cause (the subject) and effect are entirely separate and opposed. On the other end is a "geometry of absolute interiority," which instead "collapses the two" polarized ends of the first geometry in an idealistic manner (Barad 2007, 177), ultimately "reducing the effect to its cause" (Barad 2007, 176).

As I will demonstrate next, these dichotomous categories are not mutually exclusive within the MLS. Instead, the framework simultaneously positions humans as both pure cause and pure effect in its conceptualization of human nature. By outlining precisely how the MLS maintains both a geometry of absolute exteriority and absolute interiority, it will become clear why the boundary-breaking approaches advocated by many New Materialist scholars are necessary to avoid the political and ethical devaluation inherent in this conceptualization of human nature in the West.

MLS as Geometry of Absolute Exteriority

According to Barad, holding cause and effect as separate in a "geometry of absolute exteriority" is the "condition of objectivity" that scientist like Albert Einstein upheld (Barad 2007, 173). Much like the Subject-Object divide, absolute exteriority "guarantees ontological separability and consequently secures the condition for the possibility of objectivity" (Barad 2007, 173–74). In the context of human nature, the MLS assumes that to objectively observe our nature, certain discrete, quantifiable characteristics must be observable from an external standpoint. Within this framework, human nature is seen as immutable and unavoidable, dictating behaviour.

The most extreme determinist arguments within this paradigm claim that specific biological traits—such as head shape, brain size, or skin colour—determine one's nature (Soper 1995, 57). The ethical implications of such eugenic views are profound, as extreme objectification of certain humans based on biology leads to dehumanization through false equivalencies between morphological or phrenological variations and differences in character (Soper 1995, 57).

At the core of this issue lies an apparent paradox between observer and observed. The extent to which humans are considered external or transcendent while also being objects of observation within this *humans-as-object* framework varies. The paradox of being both subject and object simultaneously has puzzled philosophers since Descartes, though I will not engage in these debates further beyond acknowledging their relevance to ideas about human nature.

A geometry of exteriority is also present in the MLS even when explicitly *natural* elements are not at play. Barad argues that cultural constructivism still maintains a relation of exteriority between an agentive culture and a passive human subject: "In the inscription model of constructivism, culture is figured as an external force acting on passive nature" (Barad 2007, 176).

This perspective underpins the view, outlined by Soper, that our nature can be negatively repressed by culture and that civilization should be structured in alignment with our natural inclinations. In this view, nature is "itself a source of wisdom and moral guidance" (Soper 1995, 29). This perspective also informs sociobiology, which posits that all social behaviours—whether collective or individualistic—can be explained by the "underlying 'competition for genetic inheritance'" (Soper 1995, 58). Consequently, the idea that cultural institutions should reflect, or can be made to reflect, our natural behaviour appears across the political spectrum (see Gaus 1983).

However, Barad argues that this geometry of absolute exteriority collapses when constructivists acknowledge any notion of a human nature that can be observed and influenced by culture: "There is an ambiguity in this model as to whether nature exists in any prediscursive form before its marking by culture," they write, "if there is such an antecedent entity, then its very existence marks the inherent limit of constructivism" (Barad 2007, 176). Soper similarly observes that even cultural relativists within this framework make "covert gesture[s] to that out of which [their cultural] construction[s] [are] construct[ed]" (Soper 2001, 59). "A realist concept of nature," she writes, "is in this sense a repressed ontological presumption of much that passes for constructivism" (Soper 2001, 59).

MLS as Geometry of Absolute Interiority

In a geometry of absolute interiority, cause and effect, culture and nature, matter and language all collapse into one another (Barad 2007, 176), positing a 'nature' that is no other than a projection of 'culture'.

Proponents of this view argue that only our 'higher nature' is "appropriately and fully reflected in those achievements of 'civilization' that distance us from the sinfulness, naivety, or crudity of 'nature'" (Soper 1995, 28–29). Paradoxically, this perspective also includes those who emphasize the evolutionary excellence of humanity. As Dobzhansky (1956) writes, "Judged by any reasonable criteria, man represents the highest, most progressive, and most successful product of organic evolution" (Dobzhansky 1956, 86). Within this view, humans have not only evolved biologically but have also initiated "a new, specifically human, phase of the evolutionary process" (Dobzhansky 1956, 137). He continues:

> "This new evolution, which involves culture, occurs according to its own laws, which are not deducible from, although also not contrary to, biological laws. The ability of man to choose freely between ideas and acts is one of the fundamental characteristics of human evolution. Perhaps freedom is even the most important of all the specifically human attributes" (Dobzhansky 1956, 137).

Dobzhansky seems to be outlining a kind of 'higher nature,' which Soper describes as a distinctly human tendency toward "dynamic and constantly innovative forms of cultural transcendence" (Soper 2001, 62). However, this view presents a fundamental paradox: To what extent is this supposed transcendence not, as Dobzhansky himself suggests, rooted in a natural order in which

humans possess determinate qualities? This contradiction is what Soper calls "the paradox of humanity's simultaneous immanence and transcendence" (Soper 1995, 49).

Some may critique this view as inherently anthropocentric and argue that it reproduces the Subject-Object divide I have been discussing. However, Soper and Frost and Coole (2010), do not find this to be the case. Rather, they argue that even those who fear that representations of 'nature' are anthropocentric must acknowledge that their own epistemic coherence "relies on an acknowledgment of human exceptionality" (Soper 1995, 40). When we speak about matter as something that exists in and of itself yet can be understood through human representations, we implicitly recognize our distance from it (Frost and Coole 2010, 1–2). As Soper notes, "Nature is that which Humanity finds itself within, and to which in some sense it belongs, but also that from which it also seems excluded in the very moment in which it reflects upon either its otherness or its belongingness" (Soper 1995, 49). While I do contend that this kind of observation is important, I argue that Soper's reliance on the human and natural categories as inherently separate can easily fall into the dualisms and paradoxes surrounding views of human exceptionality, as in the MLS.

Thankfully, New Materialist scholars, most explicitly Barad, have attempted to develop frameworks that navigate between our materiality and emergent human properties while avoiding the paradoxes embedded in the humanist views of the MLS (Barad 2007; Bennett 2009; Kohn 2013; Coole and Frost 2010; Haraway 2006). Given the number of contradictions within the MLS's conception of human nature, it seems self-evident that only an alternative onto-epistemology can adequately account for human nature. I will briefly examine three challenges to the onto-epistemological framework of the MLS.

Challenging the Modern Liberal Subject

The first challenge comes from Barad's New Materialist framework, known as Agential Realism. Tracing a posthumanist account of Niels Bohr's philosophy-physics, Barad constructs a framework that explicitly addresses the paradoxes that arise from the nature-culture and Subject-Object divides.

Bohr, in his time, posed a "radical challenge not only to Newtonian physics but also to Cartesian epistemology and its representationalist triadic structure of words, knowers, and things" (Barad 2007, 138). Central to his analysis was the concept of the apparatus, which did not simply refer to the instrument of measurement but also to the phenomenon being observed. "Theoretical concepts [for Bohr] are not ideational in character but rather specific physical arrangements" (Barad 2007, 139). For example, position is not an inherent property of independent objects; rather, it gains meaning only in the specific material and immaterial context in which it is observed. For Bohr, "apparatus cannot be attributed to some abstract, independently existing object but rather is a property of the phenomenon—the inseparability of the object and the measuring agencies" (Barad 2007, 139).

However, Barad critiques Bohr's failure to define the external boundary of the apparatus—where the role of the human observer begins and ends. This limitation prompts Barad to depart from Bohr and formulate their own agential realist account.

Within this framework, the relationship between nature and culture, subject and object, is understood as intra-actions rather than interactions. Intra-actions constitute "exteriority within phenomena" (Barad 2007, 177), meaning "there is no geometrical relation of absolute exteriority between a 'causal apparatus' and a 'body affected,' or an idealistic collapse of the two" (Barad 2007, 177). Instead of strict boundaries between subject and object, "intra-actions enact specific boundaries, marking the domains of interiority and exteriority" (Barad 2007, 181). Unlike Bohr's account, which maintains a separation between the observer and the observed, Barad integrates the human observer and their context into the phenomenon itself:

> "Humans do not merely assemble different apparatuses for satisfying particular knowledge projects," Barad argues, "they themselves are part of the ongoing reconfiguring of the world. The particular configuration that an apparatus takes is not an arbitrary construction of 'our' choosing" (Barad 2007, 171).

This is not to say that humans play no role in the reconfiguration of boundaries; rather, in this framework, boundaries are never static (Barad 2007, 171). Just as "objects are not already there [but] emerge through specific practices" (Barad 2007, 157), "human subjects do not exist prior to their 'involvement' in natural cultural practices" (Barad 2007, 171).

This involvement is performative—it enacts the ontological positions we hold. However, this performance is not simply a matter of representations or discursive practices. "Unlike representationalism, which positions us above or outside the world we allegedly merely reflect on, a performative account insists on understanding thinking, observing, and theorizing as practices of engagement with, and as part of, the world in which we have our being" (Barad 2007, 133).

Thus, the knower and the known exist in a continuous relationship of mutual reconfiguration—one that need not involve Western scientific or social studies practices, let alone language. Watson and Huntington (2008) describe one such epistemological framework that radically departs from the MLS.

In describing the epistemological relationship that some Indigenous Huslia people have with a moose while hunting, Watson and Huntington argue that knowledge acquired through intuition in such encounters comes "from an act of becoming: 'becoming-animal'" (Watson and Huntington 2008, 264). Much like in Barad's account, this form of subjectivity arises through performance: "The hunter could feel the moose because he had to think as one; not a stable identity, not a literal becoming, but an identity erupting through the performance of the hunter's practice" (Watson and Huntington 2008, 264). As a result, they conclude, "this subject is not consciously rational" (Watson and Huntington 2008, 263). Knowing, in this framework, does not always emerge from humanist apparatuses of measurement. It can arise entirely outside the MLS's rationalist paradigm.

In this sense, language is not needed for the hunter to create knowledge; it is something that is communicated otherwise, an idea that gives nonhumans agency in knowledge creation. In his seminal anthropological work, *How Forests Think* (2008), Eduardo Kohn challenges even the most humanist epistemological assumptions, particularly representationalism. Through a direct engagement with semiotics in the Amazonian rainforest, he argues that "all living beings sign. We humans are therefore at home with the multitude of semiotic life" (Kohn 2008, 42).

In describing the relationships between icons, indexes, and symbols, Kohn demonstrates that symbolic reference—the use of language—is just one semiotic modality within a broader, mediated yet unbroken chain of meaning-making. This chain is neither linear nor hierarchical; instead, semiotic processes are "ongoing relational processes" (Kohn 2008, 30) and thus cannot be confined to specific events, sounds, or even minds. Meaning-making is not the exclusive domain of any single part of the semiotic chain; it exists in the whole of it.

This directly challenges the MLS assumption that knowledge creation, and more specifically language, happens exclusively in the mind. "Signs don't come from the mind," Kohn asserts. "Rather, it is the other way around. What we call mind, or self, is a product of semiosis" (Kohn 2008, 34). The self, whether human or nonhuman, is created and perpetuated through semiosis, its ability to understand signs and produce new ones, shaping both its future and that of others. In Kohn's words, "selves are waypoints in a semiotic process" (Kohn 2008, 34).

Human exceptionality in knowledge creation is thus nullified: "Our exceptional status is not the walled compound we thought we once inhabited" he writes (Kohn 2008, 42). Our self-imposed position as subjects in a world of objects, as beings radically separate from nature, "what we've taken to be the human condition—namely, the paradoxical, and 'provincialized,' fact that our nature is to live immersed in the 'unnatural' worlds we construct—appears a little strange" (Kohn 2008, 42).

Kohn goes even further, suggesting that feelings of panic and anxiety stem from "symbolic thought run wild" (Kohn 2008, 49), caused by our disconnection from the material and ecological realities that ground our symbolic thought. "In the realm of the symbolic," he explains;

> "the separation from materiality and energy can be so great and the causal links so convoluted that reference acquires a veritable freedom. And this is what has led to treating it as if it were radically separate from the world" (Kohn 2008, 56).

Barad's account complements Kohn's framework well: "In traditional humanist accounts, intelligibility requires an intellective agent (that to which something is intelligible), and intellection is framed as a specifically human capacity," Barad argues, "but in my agential realist account, intelligibility is an ontological performance of the world in its ongoing articulation. It is not a human-dependent characteristic but a feature of the world in its differential becoming. The world articulates itself differently" (Barad 2007, 149). This articulation does not stem from a privileged human position: "Knowing is not about seeing from above or outside or even seeing from a

prosthetically enhanced human body," Barad writes, "knowing is a matter of intra-acting" (Barad 2007, 149).

Again, while I do not explicitly aim to provide an alternative framework for considering human nature, I find it necessary to engage with these challenges to thoroughly highlight the "epistemic violences" (Watson and Huntington 2008, 277) that unexamined agential cuts, in Barad's language, can produce. I will now address specific violences the MLS is prone to producing.

Determinism and Political (De)humanization

In all configurations of human nature within the MLS described above, the strict divides between humans and nature, subject and object, give rise to deterministic claims about the fundamental truth of our nature. Determinism is the idea that one thing will always lead to another—that outcomes are fixed by prior conditions. As we have already seen, determinism is a fundamental tenet of the atomistic and mechanistic paradigm within the MLS: entities possess distinct qualities that determine outcomes, which can then be observed, quantified, and extrapolated to explain larger phenomena.

For example, we often say that the structure of chemical compounds is determined by their electromagnetic nature—how many electrons, protons, and neutrons they have (Kronfeldner 2023, 38). This kind of determinism seems ethically unproblematic in chemistry. However, when applied to human behaviour—whether through cultural norms or biological configurations—determinism takes on a different meaning. Defining how humans operate in deterministic terms essentially defines their "possibilities for change" (Barad 2007, 45).

While poststructuralist thinkers like Kronfeldner, in her "post-essentialist, pluralist, and interactive picture" of human nature (Kronfeldner 2023, 9), have developed frameworks to account for the vast entanglements that shape human behaviour, this is not my aim. Instead, I seek to show how the MLS perpetuates determinism, ultimately leading to dehumanization.

Within the MLS framework, causation is central, especially in discussions of human nature. The tension between determinism and human transcendence, or free will, animates many of these debates. Hacker warns that a major pitfall of such theories is their tendency to treat causation as "conceptually homogeneous, and hence seek to reduce all forms to a single form" (Hacker 2011, 89). In reality, he argues, causation—both as a concept and in practice—is "unruly, multifaceted, and frayed at the edges" and must therefore be handled with care (Hacker 2011, 89). Barad's concept of agential cuts echoes this idea:

> "Objectivity means being accountable for marks on bodies," they write, "that is, specific materializations in their differential mattering. We are responsible for the cuts that we help enact not because we do the choosing (neither do we escape responsibility because 'we' are 'chosen' by them), but because we are an agential part of the material becoming of the universe" (Barad 2007, 178).

Crucially, intra-actions do not determine possibilities or necessarily constrain them. Instead, "possibilities aren't narrowed in their realization; new possibilities open up as others that might have been possible are now excluded: possibilities are reconfigured and reconfiguring" (Barad 2007, 177). In this sense, agency, within the agential realist framework, is never wholly denied to any entity in intra-actions. What is reconfigured is not agency itself, but rather the possibilities of the real—of what will come to matter (Barad 2007, 177).

This is the ultimate epistemic violence committed by the MLS: the systematic and repeated reconfiguration of possibilities, reducing a multitude of meanings into a single, static categorization of the world into rigid human-nature and Subject-Object dichotomies. The political and ethical implications of this will now be examined.

'Human Nature' as a Normative, Ethical and Political Concept

Determinism is fundamental to normative claims of human nature as a "moral group." Kronfeldner (2023) argues that, as a moral group, membership in humanity is "determined by a set of traits that [a] group at a certain time regards self-referentially and discursively as necessary and sufficient for being a person" (Kronfeldner 2023, 5). This is what she calls the "classificatory nature" of these concepts of humans. When determinism is involved—the idea that the "set of traits" required for group membership is directly causally related to behaviour—the classificatory aspect of human nature becomes contrastive, creating boundaries between groups (Kronfeldner 2023, 3). These boundaries are normative in that the set of traits does not just describe how humans can act but determines how they *should* act if they are to be considered a part of 'humanity.'

Within the MLS, human nature is thus not a neutral descriptor—it is a normative concept, one that carries profound ethical and political weight in its application. In both the geometry of absolute interiority and exteriority discussed earlier, the MLS posits that humans possess an immutable essence. But any claim to the substance of such an essence is never innocent; it always unfolds within a field saturated by power, contestation, and struggle.

In fact, those who do not possess characteristics within the MLS framework are necessarily excluded from 'humanity.' According to Haslam (2006), this is called "mechanistic dehumanization" (Haslam 2006, 258); the other is treated like an object, unable to change their behaviour even though humans are presumed capable of doing so. Membership in humanity is determined by one's ability to meet the standard or archetype of a human, which exists entirely outside of nature, as achieving the idealized, absolute human transcendence. Those deemed to be acting in "natural" ways are thus considered "inhumane." This represents an animalistic form of dehumanization (Haslam 2006, 258).

This is precisely why the MLS cannot be disentangled from the logics of imperialism and domination more broadly. To define 'the human' in rigid, essentialist terms is always to draw a boundary—one that includes some and excludes others. It is to assert a hierarchy under the guise of universality, and to use that assertion as justification for violence, dispossession, or neglect. The

very act of defining human nature becomes a political act—one with deeply material consequences.

Of course, the dehumanization outlined above has profound ethical and political implications for certain groups of humans. For example, during the Enlightenment, those considered rational were believed to rise above their "animalistic" passions, adopting "civilized" behaviours, institutions, and ambitions, and thus became the philosophical and scientific subjects of the era. In contrast, those labeled as "animalistic"—driven by instinct rather than reason—were devalued, dehumanized, and seen as lacking true "humanity." Under this paradigm, those who became dehumanized included women, gender or sexual non-conforming individuals, people/persons with disabilities, and all non-white people from other cultures. As Hull has noted: "The normal state for human beings is to be white, male heterosexuals. All others do not participate fully in human nature" (Hull 1986, 7). The deeper implications of this patriarchal masculine aspect of the MLS will be explored in the following section.

Issue With (De)humanization

Crucially though, the posthumanist accounts outlined above prompt me to take issue with such uncritical invocations of the human category itself. In fact, when we speak distinctly of dehumanization as an ethically corrupt practice, are we not perpetuating the human-nature antithesis critiqued earlier? As Hodson, Macinnis, and Costello (2014) note, "given that perceived human superiority over animals lends credence to the ideation of an ‘animal-like’ outgroup member, attempts to prevent dehumanization, we argue, may ultimately hinge on our human-animal relations" (Hodson, Macinnis, and Costello 2014, 106). Dehumanization is only ethically or politically significant if human separability from nature is upheld. In fact, they argue, we may need to face an uncomfortable truth: "Psychologically exploiting any potential differences and ‘distance’ between humans and animals can give legitimacy and fuel to the concept of dehumanizing (and ultimately devaluing) human outgroups, giving social meaning to the concept ‘less than human’" (Hodson, Macinnis, and Costello 2014, 86).

In the context of techno-optimist discourse surrounding our climate change future, this dual devaluation of life is crucial to examine. If, by perpetuating a vision of human nature that ultimately not all humans achieve—specifically the self-interested, economically rational, and technologically inclusive subject I turn to now in the next section—techno-optimists are simultaneously devaluing the rest of nature as inherently inferior to human wants and needs. The potential for widespread, real material harm as the climate crisis worsens is alarmingly high if these frameworks continue to dominate popular discourse and practice. This issue will be discussed in the following sections.

Now, we move on to observe exactly how the MLS manifests within modern Techno-Optimist discourses.

Section 2: (Western) Human Nature as Predisposed to Techno-Capitalist Determinism

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Through various western scientific, economic and cultural norms and institutions, the Modern Liberal Subject (MLS)—as described in the first section—imposes a narrow conception of human nature. In doing so, those who deviate from this framework—whether those said to be non-rational and closer to nature (gender non-conforming individuals, women and many indigenous cultures) or the non-individualistic (non-Western subjects)—are dehumanized; their exclusion from political and ethical life justified to varying degrees. While the ethical implications of human-to-human dehumanization are evident, we have also seen how the MLS inadvertently restricts the potential participation of the non-human world. Through its onto-epistemological assertions—namely, the nature-culture antithesis and the Subject-Object divide—the MLS perpetuates the notion of human exceptionality.

Thus, there is an unequal and epistemically violent relationship between the MLS and the material world. What remains to be seen, however, is how the MLS fares within what it considers the purely 'human' realm. How are its defining attributes—freedom, individuality, and rationality—affected by technology and markets, what I call Techno-Capitalism? In other words, to what extent does the MLS have agency over the systems, apparatuses, and gadgets through which it guarantees its mastery of the natural world? Does the MLS truly 'master' the world through technology, or does technology impose its own determinations on the MLS?

In this section, I will first define the hegemonic stories told about the MLS and Techno-Capitalism, particularly as it manifests in techno-optimist discourses. The subject of these discourses—what I call the Modern Liberal Techno-Capitalist Subject (MLTCS)—remaining free, rational and self-interested, essentially integrates technology and markets into his 'nature' and his definition of human exceptionalism. The human nature of the MLS described in section one thus takes on a more expansive definition in the MLTCS: human nature is said to be expressed through technological use and market mechanisms.

I will then examine two distinct camps of literature that have critically engaged with the MLTCS and proposed avenues for resistance. The first group, whom I call the Determinists, take a pessimistic view of techno-capitalism and humans. Generally, this group argues that modern technology and markets are totalitarian in their objectification of humans, making emancipation within such relationships impossible. If they do propose a form of resistance, it is often in the form of radical rejections of techno-capitalism and an appeal to some external, "authentic" human experience beyond techno-capitalist society. This implies that these thinkers view an advanced technological society as inherently deterministic of human possibility—hence the name, *Determinists*.

The second group, whom I will call the Opportunists, reject such determinism. While they do not fully embrace the optimistic narrative of the MLTCS, they conceive of an ethics that acknowledges the emancipatory possibilities embedded within modern proliferation of technology. Unlike the Determinists, they see techno-apitalism not as a monolithic force but as a fluid constellation of more-or-less oppressive actions, knowledge, and material arrangements. This perspective liberates them from the rigid determinism of the first group. For the Opportunists, subjectivities born out of technological entanglements can, under the right conditions, be emancipatory—hence their name. However, they argue that we have an ethical responsibility to be critically aware of and accountable for the types of subjectivities we perpetuate, whether actively or passively.

As iterated in the previous section, I do not attempt in this piece to propose a framework for understanding human nature that can fully account for the oppressive forces of techno-capitalism. In fact, such a project would be, in a sense, antithetical to my aims. Much like Donna Haraway's cyborg politics—on which this critique heavily draws—it is the "'intimate experience of boundaries'" (Haraway 1991, 624) that animates this analysis, not the experience of an entire system of oppressive forces. For Haraway's cyborg, having "'a political language to ground one way of looking at science and technology'" in order to "'act potently'" is itself a myth (Haraway 1991, 624). Embracing the in-betweenness of human/nature, nature/culture, human/technology, and can only mean embracing a partial knowledge of what 'is' and what could be and not striving for full theory or framework (Haraway 1988).

Thus, rather than offering a complete political-ethical framework, I aim to interrogate the "banal facts" (Foucault 1982, 799) and the "conceptual needs" (Foucault 1988, 788) of MLTCS. In other words, I endeavour to examine the onto-epistemological assumptions underpinning modern techno-optimist discourses in order to uncover what partial understandings of our relationship with technology and markets I might uncover. This section, much like the last, seeks to provide tools for critically engaging with this MLTCS and alternative ways of thinking about subjectivity, this time in the context of the seemingly distinctly 'human' worlds of technology and the market.

The central argument here is twofold: First I will argue that, in its reliance on the onto-epistemological separations that grant humans exceptional freedom and rationality, the MLTCS is predisposed to deterministic thinking about human possibilities for emancipatory politics and ethics in a tecno-capitalist society. Whether through the hegemonic techno-optimist narrative that embraces technology and markets as natural extensions of human nature, or through the pessimistic view shared by the Determinists that humans are incapable of resisting techno-capitalist oppression, the MLTCS will always fall into harmful determinism.

Second, I argue that both of these deterministic views profoundly limit the Western world's "possibilities for change." Neither exhibits the necessary creativity to conceive of an ethical political project that does not exclude certain humans and non-humans from our future—especially in a climate-changed world.

First, we will investigate exactly what the MLTCS entails.

The Modern Liberal Techno-Capitalist Subject

In what follows, I will outline the hegemonic story of the MLTCS about technology, markets and human subjectivity. In these narratives, technology is defined as the various tools, apparatuses, and devices created by humans to pursue specific goals.

Of course, technology can also be understood in a much broader sense—as the techniques and knowledge that have shaped human experience for millennia. Theorists have argued in this vein that the use of technology itself is an inherent part of being alive in the world (Stiegler 1998; Weber 2016; Ingold 2021; Kohn 2013). I do not intend to affirm or deny the validity of these claims, as such a definition of technology would require a much broader study of tool use and knowledge formation across species and time. Instead, the hegemonic story I will outline here understands technology in its modern form: as the complex devices that have emerged from the Industrial Age to the present.

Markets, on the other hand, can be more concretely defined. In their modern sense, markets are various sites of organized exchange of goods and services, premised on a self-interested, profit-seeking seller and an equally self-interested and free buyer. In an idealized market system, prices are determined by supply and demand, theoretically granting both buyers and sellers equal agency in market transactions (Beistegui 2018, 41).

The purpose of this section is to outline how both technology and markets emerge as natural progressions from the MLS's onto-epistemological stance—one that envisions the subject as a naturally free, rational individual with the exceptional power to change *his* circumstances. By virtue of this 'natural' state, the MLS becomes the MLTCS; *he* adopts Techno-Capitalist structures as a logical reaction to *his* natural state.

Before we continue, it is important to note that the MLS in this section will be purposely referred to using masculine pronouns. This is a critical choice; not only do many of the theorists that hold the onto-epistemological underpinnings of the MLTCS use the masculine pronoun to describe 'humanity' as a whole, the subject I describe and critique here is inherently opposed to characteristics that are feminized—irrationality, closeness with nature, emotionality, intuition (see Merchant 1980). Along with Grear (2015), I argue that oppressive Western ideas of masculinity and patriarchy are essential parts of modern imperialist capitalist development, and thus central to the MLTCS (Grear 2015, 232).

Now, we will examine how technological innovation is integrated into the MLTCS's 'nature.'

Technology and Human Freedom

A foundational belief in the MLTCS's conception of technology is that the latter remains a neutral instrument through which humans can exercise their 'natural' freedom. As numerous thinkers have pointed out (Haraway 1985; Ellul 1980; Winner 1980; Grant 1976; Agamben 2009; Botin 2015), the general assumption is that technology is controlled by human intellect: "he can impose any value, any meaning upon it" (Ellul 1980, 437), and "it is up to human beings in their freedom to

meet [this] situation and shape it with their 'values' and their 'ideals'" (Grant 1976, 421). Of course, many of these same theorists—especially George Grant (1976) and Langdon Winner (1980)—reject this notion, arguing instead that technology contains within it an inherent politics or purpose, which is obscured by claims of neutrality.

What remains at stake, even in these critiques, is the idea that regardless of the intended purpose of a given technological invention, humans—through their natural freedom—can modify these purposes. This occurs either by rejecting certain technologies in favour of new ones more aligned with their 'values and ideals' or by repurposing technologies in ways beyond their original design, possibilities that stem from human creativity and individual freedom.

Thus, for the MLTCS, technological use is inherently liberatory. In fact, it is seen as part of human transcendence. Agamben (2009), who is otherwise skeptical of technology's supposed liberatory potential, sees technology as the means through which 'the human' first separates itself from 'the animal.' In his analysis of the 'apparatus' and its role in subjectification, he asserts that "through these apparatuses, man attempts to nullify [his] animalistic behaviours" (Agamben 2009, 17). Marcuse (1964) argues that this transcendence is synonymous with 'progress,' wherein technological advancement ultimately culminates in "the possibilities of ameliorating the human condition" (Marcuse 1964, 455). The underlying thread here is the belief that humans have the potential to transcend nature. Because humans are considered exceptional, they are positioned as fundamentally distinct from 'natural objects'—defined by their ability to dominate and control them through technology. This, in turn, drives the impulse to extend technology and mechanization throughout the social body. As Marcuse succinctly states: "essentially the power of the machine is only the stored-up and projected power of man. To the extent to which [society is] conceived of as a machine and mechanized accordingly, it becomes the potential basis of a new freedom for man" (Marcuse 1964, 450).

We have much of the Enlightenment tradition to thank for this equation of human freedom and transcendence with technology. Generally, the Enlightenment was characterized by a belief in some form of natural freedom, often tied to divine law, that humans must strive for (Bristow 2023). While thinkers like Jean-Jacques Rousseau found this freedom to be limited by institutions and technologies (Bristow 2023), for John Locke, technological use is a natural condition of human experience and is the only avenue towards this ultimate freedom. Murray Rothbard (1974) articulates this Lockean view plainly:

> "Man is born naked into the world, and needing to use his mind to learn how to take the resources given him by nature, and to transform them into shapes and forms and places where the resources can be used for the satisfaction of his wants and the advancement of his standard of living" (Rothbard 1974, 13).

Here, the impulse toward the "transformation of resources"—which necessarily implies technological innovation—is framed as a natural inclination of the human mind, a mind that is

free, ingenious, and self-interested. As we saw in the previous section, human nature—here understood as synonymous with freedom.

More broadly, this conception of human freedom serves as the foundation for many forms of liberalism that persist today, including classical liberalism, libertarianism, and even liberal democracy (Gaus 1983; Luke 1996). While modern liberalism incorporates elements of collectivity, Gerald Gaus (1983) notes that within this framework, "men are essentially independent, private, and competitive beings who see civil association mainly as a framework for the pursuit of their own interests" (Gaus 1983, 7).

Thus, in the view of the MLTCS, rejecting the naturalness of human technological use limits human freedom and is thus irrational, deluded, or even a limitation of the very definition of humanness (Agamben 2009, 16; Haraway 1991, 623). It is no wonder then that the non-subjects of the Western Enlightenment—women and essentially all cultures dominated through Enlightenment imperialism—are excluded from shaping technoscience practice in ways that depart from this view of the human today; without appealing to this notion of human transcendence through technoscience, these groups are not considered to practice the 'real,' 'objective' and 'rational' form of technoscience of the West.

Central to this conception of freedom and rationality is the use of markets to fairly distribute the fruits of technological transcendence throughout the social body. This is the idea to which we now turn.

The Market and Human Rationality

The expression of this 'natural' human freedom through technology is accompanied by a corresponding 'free market' rationality. Given that man, by his nature, has the ability to appropriate resources through the use of technology—technology that he himself creates and governs—he inevitably encounters, in social contract with others, the derivative necessity for 'property rights' and a 'market' to sustain his freedom when it comes into contact with the freedom of other free, rational, and technological men (Rothbard 1976, 14). The market thus becomes "a place and a mechanism of truth-formation" (Beistegui 2018, 41). Informed by the natural condition of human freedom, the mechanisms of the market produce an emergent truth: that "the price reflect[s] a certain relation between the cost of production and the extent of demand" (Beistegui 2018, 41).

It is important to note that this 'market rationality' holds weight only within the onto-epistemological assumptions of the MLS. If human subjects (not all, of course, but those who align with the MLS) are exceptionally free and separate from nature, their domination of the natural realm—through the appropriation of resources and the control of nature in the creation of productive technologies—becomes inevitable. The market, then, emerges as a natural institution (Luke 1996, 5). When one MLS subject encounters another's freedom to appropriate resources and use technology, a means of maintaining individual freedom—and by extension, individual interests—is required: hence, the market.

Supply and demand are also understood as natural in this framework, insofar as suppliers are naturally free to produce more or fewer goods through technological means, and buyers are

naturally free to demand more or less from their suppliers. The emergent rationality is thus one of mutual recognition—individuals acknowledge each other as free, self-interested subjects and rationally accept the market as the only mechanism capable of securing their futures in the face of competition (Luke 1996, 5).

Once again, we have the Enlightenment to thank for this logic. An incalculable number of thinkers in the Enlightenment tradition have connected human freedom with market rationality, including Adam Smith, John Locke, John Stuart Mill, and Frederich Hayek. As Beistegui explains:

> "Inasmuch as, through the exchange mechanism, the market is able to link production, needs, offer, demand, value, and price, it constitutes a place of truth; it is governed by a specific form of rationality, which the Physiocrats and early political economists referred to as a 'natural order,' akin to the physical world, ruled by immutable laws, and which neoliberal economists eventually referred to as 'market efficiency'" (Beistegui 2018, 41–42).

In fact, Bristow argues that the Enlightenment is characterized by the interrelation of the rise of the MLS with capitalism, making market rationality a fundamental part of Enlightenment thought (Bristow 2023).

Thus, the modern era is undeniably linked to this 'market rationality.' While not the originator of the term, Mark Fisher (2009) refers to this reality as 'Capitalist Realism.' Rather than being the result of a deliberate effort on behalf of corporations or the state to impose this 'market rationality,' Fisher argues that "it is more like a pervasive atmosphere... conditioning not only the production of culture but also the regulation of work and education, and acting as a kind of invisible barrier constraining thought and action" (Fisher 2009, 16). This "business ontology" has, in his view, permeated the entire social body, creating a world "in which it is simply obvious that everything in society, including healthcare and education, should be run as a business" (Fisher 2009, 17). As we will see, climate solutions have also been co-opted into this business ontology.

Technology, Markets and 'Humanization'

There is a persistent throughline in both technological and market naturalism: that they render humans exceptional from the rest of 'nature.' Both technology and markets presuppose a sphere of action and realization of human transcendence for the MLTCS, one through his technologies, the other through his free exchange of private goods. While the very premise of human exceptionalism was critiqued in the first section, the idea that these ways of interacting with the world—through technology and markets—grant humans transcendence remains important to analyze. The category of 'human,' is thus said to include an affinity for and acceptance of all technological advancement and market liberalism. As Agamben argues, "apparatuses are not a mere accident in which humans are caught by chance, but rather are rooted in the very process of 'humanization' that made 'humans' out of the animals we classify under the rubric Homo sapiens"

(Agamben 2009, 16). In other words, this view of the human equates technological manipulation of the world with the 'modern' or 'enlightened' human category.

Many theorists have suggested that the MLS's adoption of technology, as well as a certain market rationality, is shared across the political spectrum to varying degrees (Grant 1976; Marcuse 1964; Ellul 1967; Foucault 1982; Gaus 1983; Haraway 1991; Luke 1996). Whether Marxist, Stalinist, liberal, neoliberal, or fascist, Grant argues, "their common assumption [is] the dependence of the achievement of a better society in the future upon the mastery of the human and the non-human by technological science. And that assumption comes forth from a series of deeper assumptions concerning what is" (Grant 1976, 426)—namely, the assumptions of human freedom, rationality, and self-interest that permeate western thought.

But to what extent does the Western view of human nature shape not only the justification of techno-capitalism but also its critiques? While many reject the subjectification of humans in the face of techno-capitalism, their arguments often remain entangled in the very frameworks they seek to resist. Next, we will examine two groups that critique the MLTCS: the Determinists, who see little to no possibility for resistance within the system; and the Opportunists, who navigate a more ambivalent stance—both critiquing and strategically embracing subjectification.

The Determinists

First, the deterministic group. In my analysis, this group consists of five theorists, each expressing varying degrees of pessimism: Michel Foucault (1982), Giorgio Agamben (2009), George Grant (1976), Herbert Marcuse (1964), and Jacques Ellul (1967; 1980).

While I do not intend to provide a full account of each thinker's argument, they share a common view of systems and power—some explicitly critiquing techno-capitalism, others not—that leaves little to no room for resistance. The minimal forms of resistance they offer all appeal to an existence radically outside of power, technology, or markets. In other words, for these thinkers, resistance entails some degree of complete separation from systems of power or techno-capitalism. As we will see, this ultimately reproduces the dualisms of the Modern Liberal Subject—natural/artificial, authentic/inauthentic, nature/culture, subject/object—the ethical and political implications of which will be discussed later.

First, let us take a closer look at their arguments.

Subjectification In the Techno-Capitalist Apparatus

For the Determinists, the western world is one in which technology and markets are integrated into every facet of human society, most notably the state apparatus. This high degree of dependence on markets and technology revolves around their ability to, as Foucault puts it, ensure our salvation (Foucault 1982, 784).

In the modern liberal state, he writes, "the word 'salvation' takes on different meanings: health, well-being (that is, sufficient wealth, standard of living), security, protection against accidents" (Foucault 1982, 784). In assuring 'salvation,' the modern state departs from the kind of

sovereignty it had before the eighteenth century, notably the sovereign's monopoly on violence. The very act of governing for Foucault implies ensuring the people's salvation.' As Beistegui recounts:

> "To govern now means to administer and manage, to monitor and supervise, to support and sustain human beings as living entities, or as a population. This new kind of power, which Foucault defines as "biopower;' doesn't simply replace sovereign power, but overlaps with it and complicates it. Where sovereign power was seen as the right to 'take life and let live;' biopower can be seen as the power that rules over life itself, invests it, governs it, manages it." (Beistegui 2018, 33)

Thus emerges Foucault's concept of liberal governmentality. In satisfying the needs of the population, the state governs, manages and monitors life and is said to thus "structure the possible field of action of others" (Foucault 1982, 789). The state (or—if we stay true to Foucault's argument—the multiple surfaces, disciplines or apparatuses where power manifests, see Foucault 1982, 792) thus guides the 'conduct' of the human in a more or less coercive way through this biopower; this sustaining, managing and supervising of life (Foucault 1982, 789).

While Foucault's critique is narrowly focused on state power, I still find his contributions generative to this conversation about techno-capitalism. As the state becomes increasingly intertwined with the market and thus manages the means of subsistence, this 'biopower' becomes a matter of techno-capitalism just as much as a matter of state power.

Marcuse argues in this vein, adding that dependence on the techno-capitalist state to provide the means of subsistence essentially nullifies human freedom: "A comfortable, smooth, reasonable, democratic unfreedom prevails in advanced industrial civilization," he writes, "a token of technical progress" (Marcuse 1964, 449). For Marcuse, the goal of the technological society, or "the end of technological rationality" (Marcuse 1964, 450) tends towards a kind of complacent totalitarianism: ""totalitarian" is not only a terroristic political coordination of society" he writes, "but also a non-terroristic economic-technical coordination which operates through the manipulation of needs by vested interests" (Marcuse 1964, 450). In other words, the market and the techno-capitalist apparatus do not just supply our needs but inform our wants, our desires for material goods and technologies, which constitutes this totalitarian form of domination.

Subjectification for the Determinists is thus total but non-violent thanks to the association of human need for subsistence with total dependence on the techno-capitalist state. This group argue that this 'unfreedom' runs much deeper than a simple dependence, though; a certain subject is created in these circumstances, conditioned and constrained by the mechanisms of techno-capitalist integration into all facets of human society. Thus, while those in the Foucaudian tradition might argue that subjectification is much more diffuse or localized in specific areas of technological life, it is a deeper sense of identity and being that is at stake for Agamben, Marcuse and Ellul.

For Agamben, subjectification is part and parcel with apparatus and is becoming increasingly severe in the new age of widespread technological integration (Agamben 2009, 15). Inspired by Foucault, Agamben defines an apparatus as "literally anything that has in some way the capacity to capture, orient, determine, intercept, model, control, or secure the gestures, behaviours, opinions or discourses of living beings" (Agamben 2009, 14). Apparatuses stand in contrast to living beings, which, when subjected to apparatus, produce "a third class, subjects" (Agamben 2009, 14). In "the relentless fight between living beings and apparatuses" (Agamben 2009, 14), subjectification is a process that living beings—of course, here explicitly only humans—undergo perpetually and increasingly so in the techno-capitalist society. Thus, desubjectification is also an essential part of apparatus: a new subject is only created by rejecting some other form of being (Agamben 2009, 21). The implications of this stark division between living beings, apparatuses and subjects and Agamben's view of possible resistance will be explored below.

What is important to note in Agamben's view is that, as he sees it, this reciprocal process of subjectification and desubjectification is becoming so frequent in our technological age, that, when the subject is reconstituted after capture by yet another apparatus—potentially the hundredth in the same day—it is only partially made, taking on a "larval or, as it were spectral form" (Agamben 2009, 21). Subjectivity in the Techno-Capitalist apparatus is not being diffused or "wavering and losing its consistency" though (Agamben 2009, 15). For Agamben, subjectivity under apparatus always constitutes a kind of false identity, a "push[ing] to the extreme the masquerade that has always accompanied every personal identity" (Agamben 2009, 15).

Marcuse takes a slightly different route, instead equating techno-capitalist subjectivity with a loss of one's ability to conceive of meaningful alternatives. Being so intensely dependent on the state for satisfaction of one's vital as well as social needs, humans are expected to self-objectify to the technological logic:

> "Independence of thought, autonomy, and the right to political opposition are being deprived of their basic critical function in a society which seems increasingly capable of satisfying the needs of the individuals through the way in which it is organized. Such a society may justly demand acceptance of its principles and institutions, and reduce the opposition to the discussion and promotion of alternative policies within the status quo." (Marcuse 1964, 449)

This 'unfreedom' thus reduces human possibilities for independent thought to almost nothing. For Marcuse, the control exerted by the Techno-Capitalist state thus happens in the "'inner' dimension of the mind," making critical, emancipatory thinking essentially non-existent (Marcuse 1964, 452).

Ellul, arguably the loudest and in a sense foundational voice for this kind of dystopian technological determinism (Botin 2015, 214), considers subjectification to what he calls a "technological ethics" or 'Technique' to be an inescapable part of existing in the technological society (Ellul 1980, 439): "The transformation of natural law into technical law" he writes, "is

accompanied by the shaping of the human being; he is adapted and made to harmonize with what is to be" (Ellul 1967, 218). The technological ethics that guides this adapting "demands a certain number of virtues from man (precision, exactness, seriousness, a realistic attitude, and, over everything else, the virtue of work)" (Ellul 1980, 439), essentially, I will add, an adoption of the virtues of the MLTCS—rationality and individuation. Economic technique, especially invokes the MTCS, imposing efficiency and individuation onto all: "No efficiency is possible for economic technique in the absence of exact calculation of average human production costs and human profit-making ability. Man is capital, and he must become perfectly adapted to this role" (Ellul 1967, 224).

Both Ellul and Grant take the final step, going further than the rest, arguing that techno-capitalism is essentially autonomous. Ellul regards it simply "as an 'organism' tending toward closure and self-determination: it is an end in itself" (Ellul 1980, 430). In a highly integrated technological society, each element "is first adapted to the technological system" and is awarded its functionality only in accordance with the rest of the technological ontology—rationality, efficiency—" far more so than in respect to a human need for a social order" (Ellul 1980, 430). Grant describes this as "the tightening circle in which more technological science is called for to meet the problems which technological science has produced" (Grant 1976, 432). For Ellul, this process of "tightening determinations" (Grant 1976, 422), leaves the autonomy of Techno-Capitalist development above epistemology (i.e. scientific discovery for the sake of understanding the world), ideology (i.e. the influence of political projects or social orders), and even capital, which of course informs the possibility of technology to grow, but does not prevent the technological ethics from capturing and directing the market fully (Ellul 1980, 435).

While Ellul, Grant and Marcuse blame the proliferation of technological society on a turn towards a totalizing ontology of rationality or efficiency, Foucault, Agamben (and to an extent Ellul) point to a kind of transformation of a more antiquated form of religious power—for Foucault it is Pastoral Power, for Agamben Christian *Oikonomia*, and for Ellul it is Middle Age Spirituality—into modern technique. Generally, they argue that capacity of the religious apparatus to have "knowledge of the conscience and an ability to direct it" (Foucault 1982, 783), link this process of subjectification to 'salvation' (Foucault 1982, 783; Ellul 435) and separate the notion of being—the authentic and essential experience of existing—from practice—the ways in which one acts or organizes (Agamben 2009, 11). This is what makes the application of the idea of 'salvation' through techno-capitalism in the modern era so potent.

For the Determinists, subjectification in the Techno-Capitalist state is thus said to be total—reaching into the innermost parts of our minds—yet non-violent; individualizing yet homogenizing, shaping all humans in its image (Grant 1976, 427; Foucault 1982, 783). These contradictions inform how these thinkers conceive of possible avenues for resistance; notably as some form of existence radically separate from Techno-Capitalist subjectification. This is what we turn to now.

Resistance as an Appeal to a Non-Artificial Existence

The Determinists—being, of course, deterministic of human possibilities in the face of techno-capitalism—don't see many avenues for emancipation. As mentioned above though, resistance for this group revolves around an ontological assumption that there exists some outside, authentic and untouched existence outside of techno-capitalist subjectivity. Whether this existence or reality is radically separate from technological society—in the case of Grant and Ellul—or a sort of awkward in-between, where the oppressive force of techno-capitalism does not hold much weight without the ontological existence of a free and authentic human existence—here in the cases of Marcuse, Agamben and, most notably, Foucault—all of these positions contain the same dualisms present in the MLTCS and the MLS more broadly.

My purpose thus in engaging with these thinkers is to argue that not all critics of the MLTCS avoid the harmful dualisms presented in the first section; those nature/culture, subject/object, authentic/inauthentic divides that constitute modern liberal ontology. The next group, the Opportunists, reject these dualisms, instead navigating a space where they simultaneously critique and embrace mutual subjectification within techno-capitalism. First though, I will elaborate on the specific forms of resistance the deterministic group proposes, critically analyzing the ways in which these dualisms appear and essentially render their views of the possibility for emancipation impossible.

To begin, Ellul and Grant seem to be the most pessimistic of the group, finding little to no avenues for resistance. Ellul, in regarding technique as a totalizing force that remakes individuals in the image of rationality and efficiency, argues that "man's primordial functions of creating, praying, judging disappeared in the rising tide of [technique]" (Ellul 1967, 223). While explicitly referring to a 'primordial' form of human existence here, he argues that technological society even subjectifies the hopes of man (Ellul 1980, 430), redirecting these primordial and thus 'natural' activities of humans into the service of techno-capitalism. The idea of emancipation within the technological society is not a return to this 'authentic' human existence for economic man, it is instead "concentrated entirely on ousting the bourgeoisie and making money" (Ellul 1967, 221). This very explicit appeal to an 'outside' to technological society, Ellul even acknowledges here, renders any chance of emancipation essentially impossible.

Grant takes a similarly radical approach to the possibilities for emancipation. In his critique of the notion that technology is a neutral instrument through which humans can freely choose to enact their 'values' and ideals', he argues that a technological ethic has inadvertently captured society, making it impossible for technology to be neutral (Grant 1976, 427). While this critique does not at first glance imply an outside, a further examination of Grant's position reveals a contradictory stance: Grant argues that, in subscribing to this technological ethics, humans are ignoring an ethics, a "traditional 'good' which was not created but recognized" (Grant 1976, 427), a 'good' that is 'constant and external' (Grant 1974, 430). For Grant, this 'good' is a Christian theological ethics that exists beyond human intervention: "Those of us who are Christians have been told that there is something 'beyond' [technological ontology]" (Grant 1976, 434). Grant

argues “the job of thought of our time is to bring to light” this fact that is obscured by technological ethics (Grant 1976, 433).

Now, although Grant seeks to challenge the assumption that technology is neutral, exposing the underlying ontological position of the MLTCS within techno-capitalism, his reliance on an external source of ethics inadvertently asserts an ontological assumption of its own; that there is a divide between authenticity and artificiality, human and divine, nature and culture that renders all resistance within technology impossible without appealing to this outside.

Although Ellul and Grant do not explicitly argue that emancipation is impossible, Marcuse does. He contends that true emancipation from the existing "modes" of technological society would require essentially a full rejection of the state apparatus as a mode of assuring “economic, political and intellectual liberties” (450). This is because, Marcuse argues, the social body can longer be responsible for exercising their liberties in the face of a state that simultaneously manufactures and assures its needs. As Marcuse explains:

> “The question of what are true and false needs must be answered by the individuals themselves but only if and when they are free to give their own answer. As long as they are kept incapable of being autonomous, as long as they are indoctrinated and manipulated (down to their very instincts), their answer to this question cannot be taken as their own” (Marcuse 1964, 451).

The issue here again is in its appeal to a radical outside of technological society. Only in full negation of the technological ethics that informs the efficiency of the state—in other words its “modes”—is emancipation possible according to Marcuse (Marcuse 1964, 450).

Finally, Agamben and Foucault, while in line with Marcus's pessimism about the extent to which subjectification within the Techno-Capitalist apparatus disallows any genuine thoughts of resistance, they appeal instead to an outside that is slightly less explicit and more intimately bound with the expression of subjectifying power.

Agamben argues that resistance must take the form of profanation “the counter-apparatus that restores (...) what had [been] separated and divided,” (Agamben 2009, 19), here referencing the separation between living beings and a non-spectral form of subjectivity under apparatus. As we saw before, Agamben holds a stark division between living beings, or substances, and apparatuses, arguing that in the interactions between these two, a third group emerges, subjects (Agamben 2009, 14). The issue of the modern age however is that the reconstitution of a new subject, though a living beings’ previous subjectivity being negated through a process of desubjectification, is never complete. Like Marcuse then, Agamben argues that in modern techno-capitalist society, spectral subjectivation is unavoidable making emancipation also essentially impossible. As he writes;

> “[The problem of the profanation of apparatuses] cannot be properly raised as long as those who are concerned with it are unable to intervene in their own processes of subjectification, any more than in their own apparatuses, in order to then bring to light the Ungovernable,

> which is the beginning and, at the same time, the vanishing point of every politics" (Agamben 2009, 24).

Thus, while resistance from subjectification is theoretically possible for Agamben (i.e. through a complete reconstitution of an 'authentic' subject through the mutually dependent process of subjectification-desubjectification), it is not in the cards in the modern age.

Foucault's framework, being an immense inspiration for Agamben's investigation of apparatus, is thus aligned with this view. Foucault's resistance starts with an acknowledgment of the mutual relationship between resistance and oppression:

> "[F]reedom may well appear as the condition for the exercise of power (at the same time its precondition, since freedom must exist for power to be exerted, and also its permanent support, since without the possibility of recalcitrance, power would be equivalent to a physical determination). The relationship between power and freedom's refusal to submit cannot, therefore, be separated" (Foucault 1982, 790).

Interestingly, this resistance is not an appeal to an "essential freedom" for Foucault, "it would be better to speak of an agonism" (Foucault 1982, 790). In other words, just as power does not exist without "free subjects (...) who are faced with a field of possibilities in which several ways of behaving, several reactions and diverse comportments, may be realized" (Foucault 1982, 790), resistance or a state of emancipation does not exist without the exercise of power.

At first glance, this union of resistance and power may seem like a promising possibility for thinking about emancipation in our Techno-Capitalist world. However, an important aspect of Foucault's idea of resistance and apparatus is missing. For him, technological advancements are only able to contribute to the individualizing character of the apparatus, or the disciplines (Foucault 1982, 788). As Botin points out, Foucault's possibilities for resistance revolve around humans ability "autonomously, or 'with the help of others' (humans)" gain technical knowledge "in order to unravel the potentials of how technology intersects with humans" (Botin 2015, 219), or in Foucault's words, "to promote new forms of subjectivity through the refusal of [the] kind of individuality which has been imposed on us for several centuries" (Foucault 1982, 785).

Thus, in the face of the individualizing power of techno-capitalism, Foucault argues that technology or apparatus itself must be examined from *without*, essentially as an object of study, to potentially avoid its oppressive force. In his view of resistance, Foucault is appealing to a form of freedom that is outside of the techno-capitalist apparatus. The fact that the existence of a 'free subject' able to choose their reactions unencumbered by layers of power is the theoretical basis for his definition of power aligns him with hegemonic views of the MLS around human exceptionality. Freedom, even the agonistic kind described by Foucault, I argue, is a myth perpetuated by the idea that humans are exceptionally intelligent, rational beings that, through such intelligence and rationality, can overcome the intimate subjectivities that the rest of the natural world is subjected to. This view is shared by the next group, the Opportunists, of whom I turn to now.

The Opportunists

While they share many of the same concerns as the Determinists—notably in observing the increasingly complex matrix of forces, powers and subjectivities emerging out of the modern technological age—the Opportunists, as per their name, attempt to imagine what new opportunities for emancipation within such tightening determinisms. Within this analysis, this group is composed of Karen Barad (2007) and Donna Haraway (1991; 2003).

To reiterate, my intention in pitting these two groups against each other is to show how pervasive the MLS and its onto-epistemological assumptions are in the modern philosophical tradition. While the authors discussed in the Determinists' section reject the subjectification that hegemonic systems of power impose on the possibilities for action of human beings, they all adhere to some version of the MLS in their view of emancipation as 'freedom from' relationships of subjectification. As Luke (1996) points out, modern liberalism is characterized by an ironic emphasis on "'freedom from" relations" or "from dependence upon the wills of others" (Luke 1996, 4) with the exception of "those relations that the individual enters voluntarily with a view to his own interest" (Luke 1996, 5). In this sense, the Determinist group remains captured by the MLS in their critique of the MLTCS, leaving us with no clear path towards an open politics and ethical framework to combat techno-optimist discourses which premise this whole discussion.

This is where the Opportunists come in, opening up the field of possibilities for an emancipatory politics of ethical multiplicities of subjectification and dependance.

Apparatus, Subjectivity and Ethics in a Co-Constitutive World

Unlike the Determinist group, the Opportunists challenge the very premise of techno-capitalism or other integrated systems of power to impose a unitary or totalitarian subjectivity onto humans. Discussed in the previous section, Barad's material-performative account of apparatuses lends itself well to this kind of critique.

In reworking Bohr's vision of the apparatus, Barad offers a radically different account of subjectivity. While apparatus for the Determinist group, especially Agamben and Foucault, constitutes specific objects, structures or institutions that shape human possibilities, Barad's apparatus is far more expansive. For Barad, "apparatuses are the material conditions of possibility and impossibility of mattering" (Barad 2007, 148), making them "open-ended practices" (Barad 2007, 170) rather than unitary centers of oppressive power. 'Matter' has two meanings that come together in Barad's account; first material reality itself; and second the process through which something comes to have significance in and on the world; how it comes to matter. For Barad, matter itself comes into being through the same process in which it comes to matter:

> "In an agential realist account, matter does not refer to a fixed substance; rather, matter is substance in its intra-active becoming—not a thing but a doing, a congealing of agency. Phenomena—the smallest material units (relational ''atoms'')— come to matter through this process of ongoing intra-activity" (Barad 2007, 151).

Thus, for Barad, it is not human institutions, practices or relationships that are at the centre of apparatus, it is matter(ing) itself. Without getting too lost in Barad's prolific writing, it's important to note that for matter (stuff) to matter (gain significance), certain boundaries must be enacted (Barad 2007, 152). Barad argues that "apparatuses are [those] boundary-making practices" through which "phenomena become determinate and that particular articulations become meaningful" (Barad 2007, 148). They call each enactment of a boundary an "agential cut" (Barad 2007, 140).

Apparatuses do not enact agential cuts separate from or on top of the persons, conceptions, animals—in short, matter—like in the Determinists account. Instead, the very notion of causality is reworked in Barad's agential realist account (Barad 2007, 177). "Causality does not take sides in the traditional debates between determinism and free will" they write,

> "[rather,] intra-actions always entail particular exclusions, and exclusions foreclose the possibility of determinism, providing the condition of an open future. But neither is anything and everything possible at any given moment. Indeed, intra-actions iteratively reconfigure what is possible and what is impossible—possibilities do not sit still" (Barad 2007, 177).

In other words, while apparatuses, which may include certain boundary-making practices within technological or capitalist systems, do certainly enact cuts that alter possibilities, it is never in the totalizing way that many of the Determinists' take and that subsequently prompt them to appeal to an essential freedom on the outside of apparatus. Instead, Barad offers us an account that leaves room for resistance within *and with* apparatuses. "Possibilities aren't narrowed in their realization;" they explain, "new possibilities open up as others that might have been possible are now excluded: possibilities are reconfigured and reconfiguring" (Barad 2007, 177). Barad's account radically recenters any critiques of techno-capitalism away from an anthropocentric dream of freedom from apparatus towards a co-constitutive emancipatory politics *in tandem* with apparatus since we *are* apparatus ourselves.

This account even puts into question Foucault's reliance on human relationships as the basis for expressions of power and resistance. Resistance in the face of oppressive agential cuts—that is, cuts that cut off the possibilities of a large group of entities in a repeated, uncritical and thus unethical way—is not in opposition to the 'other,' but together with the rest of material becoming: "Indeed, ethics cannot be about responding to the other as if the other is the radical outside to the self. Ethics is not a geometrical calculation; ''others'' are never very far from ''us''; ''they'' and ''we'' are co-constituted and entangled through the very cuts ''we'' help to enact" (Barad 2007, 178-179). Agency to contribute to the enacting of boundary cuts—to make matter matter in a way it did not before— flows from all matter. This open becoming is the basis of ethics and politics for Barad:

> "Particular possibilities for (intra-)acting exist at every moment, and these changing possibilities entail an ethical obligation to intra-act responsibly in the world's becoming, to contest and rework what matters and what is excluded from mattering" (Barad 2007, 178).

The overall argument Barad provides is that subjectivity is implicated in all aspects of the reconfiguration of the world. It is inescapable, and a good chance that it is! Without a co-constitutive becoming, the world would be inert, predictable and bland, with humans at the center of a world of increasingly determinate number of systems and institutions. In the context of techno-capitalism, it is this "vitality and liveliness of intra-activity," "the world's effervescence, its exuberant creativeness" (Barad 2007, 177) that provides us with a strong basis for emancipatory politics and ethics. Regardless of how all-encompassing techno-capitalist development and integration into our lives, bodies and minds may seem, the infinite number of reconstitutions of what matters at any given moment, after any given agential cut, makes it so the possibilities for resistance "can never be contained or suspended" (Barad 2007, 177); "Agency never ends; it can never 'run out.'" (Barad 2007, 177).

Barad offers a strong basis for thinking about human subjectivity outside of anthropocentric dualisms and determinism and instead within an ethics of responsibility. The MLTCS or the MLS more broadly do not take responsibility for the cuts they enact on bodies, both human and nonhuman. Instead, they let those cuts define them and their and others' possibilities: nature/culture, subject/object, resistance/oppression, human/technology.

While not explicitly Barad's aim, their framework invites thinking about this last cut; human/technology. As we've seen, the MLTCS embraces the supposed 'naturalness' of techno-capitalist technologies as intrinsic to the human condition. Yet, at the same time, it maintains a clear boundary between humans and technology, refusing to transgress the dualisms it rests upon: humans as subjects, technology and nature as objects. But, even as the Determinists point out, this boundary is becoming less and less potent as machines, algorithms and software continue to enclose our lives. So how do we proceed into an ethics of open-ness into systems designed to shape behaviour, limit possible solutions, in Barad's language—cut?

Enter Donna Haraway's (in)famous cyborg. Writing in the 1990s, at the beginning of the first wave of the Digital Age, Haraway attempts to paint a picture of what emancipation could look like under increasingly potent forces of techno-military-capitalism.

Haraway argues that "high-tech culture" offers a multitude of challenges to the human/machine, machine/nature dualisms found within the MLTCS (Haraway 1991, 623). These dichotomies "have been cannibalized" by, what she calls, "the informatics of domination" (Haraway 1991, 615). Subjectification seems unruly: "It is not clear who makes and who is made in the relation between human and machine" (Haraway 1991,623). However, while Haraway shares the fears of the Determinists about the "recrafting [of] bodies" by technique (Haraway 1991, 615), she rejects the notion that the only "ideological space opened up by the preconceptions of machine and organism" must be technological determinism (Haraway 1991, 612). In fact, she

argues that telling this kind of story is a choice we make; a choice we can make to use different stories, metaphors or characters (Haraway 2013, 138).

This is the essential use of the cyborg in her thinking. Whereas resistance in the Determinists accounted for above "depends on the ["Western" humanist"] myth of original unity, fullness, bliss" (Haraway 1991, 611), cyborg stories—intimate and fraught connections between humans and machines—"[skip] the step of original unity, of identification with nature in the Western sense. This is its illegitimate promise that might lead to subversion of its teleology as Star Wars" (Haraway 1991, 611).

In other words, cyborgs for Haraway represent subversive ways to question and resist paradigms of MLTCS exceptionality:

> "Perhaps, ironically, we can learn from our fusions with animals and machines how not to be Man, the embodiment of Western logos. From the point of view of pleasure in these potent and taboo fusions, made inevitable by the social relations of science and technology, there might indeed be a feminist science" (Haraway 1991, 620).

Importantly, these "taboo fusions" are only taboo within the MLTCS. Thus, in embracing "noise and advocate pollution, rejoicing in the illegitimate fusions of animal and machine," this cyborg politics offers real grounds for resistance (Haraway 1991, 622). If technology, markets and the MLS are made to divide, monitor and shape us in their image, as the Determinists argue, should we not find emancipation exactly in the cracks and crevices of these new surfaces of fusion? In the cyborg?

"Feminist cyborg stories," Haraway famously writes, "have the task of recoding communication and intelligence to subvert command and control" (Haraway 1991, 622). She thus invites us to "network," to weave our way in between the boundaries of machine/human, human/nature, subject/object and see what can be found (Haraway 1991, 619). It is important to note that, in encouraging this fusioning work, Haraway shares Barad's view of intra-action and the co-constitutive nature of the world. Reality—or what comes to matter—is multiple and iterative for Haraway. Categories are made by relations and do not preexist them. She writes:

> "Reality is an active verb, and the nouns all seem to be gerunds with more appendages than an octopus. Through their reaching into each other, through their "prehensions" or graspings, beings constitute each other and themselves. Beings do not preexist their relating's. "Prehensions" have consequences. The world is a knot in motion" (Haraway 2003, 6).

Thus, in line with Barad, ethics for the cyborg is about being responsible for boundary-making practices. Much like the rest of materiality, machines also don't preexist context and relationality and thus cannot be separated from a wider net of co-constitutive subjectivity. In fact, our increasingly intimate relationship with techno-capitalist mechanisms reinforces our ethical

responsibilities in boundary-making, Haraway says: “We can be responsible for machines; they do not dominate or threaten us. We are responsible for boundaries; we are they” (Haraway 1991, 624). In embracing a cyborg ontology—in willfully inhabiting the in-between of human and machine—we cannot look on at the oppressive boundaries as if we have no stake in the game. As Marianne DeKoven (2006) puts it, cyborg identity is a “disruption of rigid separating boundaries, a disruption that, at the same time, leaves intact the irreducible otherness necessary to what we now call ethics” (DeKoven 2006, 1695).

Being a cyborg in some sense means embracing techno-capitalist subjectification as a position of resistance rather than something inhibiting a return to an original state of ‘authenticity’ or ‘innocence’: “Cyborg writing is about the power to survive, not on the basis of original innocence, but on the basis of seizing the tools to mark the world that marked them as other” (Haraway 1991, 621).

Resistance as Embracing a “Frictioned” Cyborg Politics

This is the element that truly divides the Determinists from the Opportunists: While subjectification—the idea that interacting with some apparatus, person or entity might modify our possibilities for action—is unwanted, even feared by the latter, the former embraces it as a form of resistance.

However, it is important to note that the Opportunists do not dream of a one-to-one transfer of normal capitalist technoscience practices into the hands of, say, feminists. A cyborg politics is not an identity politics, even if multiplication of diversity is its end (Latimer 2017, 49). A cyborg that uses the tools of western capitalist technoscience uncritically becomes the cyborg of western techno-capitalist fantasy, the final abstraction of human transcendence through technology, a seamless life of efficiency, abundance and awesome power. This cyborg is “the final imposition of a grid of control on the planet, about the final abstraction embodied in a Star Wars apocalypse waged in the name of defence, about the final appropriation of women’s bodies in a masculinist orgy of war” (Harraway 1991, 613).

This is not the Opportunists’ cyborg. While they do not deny that using machines and doing technoscience enmeshes one in a matrix of “capitalism and division” (Latimer 2017, 249), they do not take the contradictory act of embracing such a reality as a starting point for resistance to be a weakness. Cyborg politics thrives on contradictions, pollution and ambiguity. To try and erase this tension, even in the interest of inclusion or diversity within the capitalist technoscience apparatus, is antithetical to cyborg politics. Crip techno-scientist and critical disabilities scholar Aimi Hamraie (2017) argues similarly, that without sustaining the “friction” inherent in appropriating technologies or ways of being that are made to categorize and homogenize we “risk depoliticizing and oversimplifying the material, epistemic, and technological force” of said technology (Hamraie 2017, 102). Thus, a cyborg politics must embrace contradiction, holding both sides of western dualisms up in unison and trying to inhabit the space in-between.

This is not a forced union, though. As seen above, both Barad and Haraway already consider the nature of agency, becoming and subjectivity to be multi-dimensional. What they, and

I, are trying to advocate instead is a kind of epistemology, a knowledge-making practice. Having not chosen to have to inhabit a cyborg identity, Haraway argues that embracing such an identity awards us "a figure for living within and honoring the skills and practices of contemporary technoculture without losing touch with the permanent war apparatus of a non-optional, post-nuclear world and its transcendent, very material lies" (Haraway 2003, 11). In epistemologically holding space from both sides of the multiple dualisms, these 'material lies', of western epistemology, cyborg technoscience becomes "alert to the emergent historical hybridities actually populating the world at all its contingent scales" (Haraway 2003, 11) and thus, emancipatory.

Cyborg politics and epistemology thus enables us to live within systems of techno-capitalist control while simultaneously being open and alert to "the world's intra-active dynamism" (Barad 2007, 179). In such a position, "the possibilities for change" (Barad 2007, 179) are constantly evolving.

When staring down the metaphorical barrel of impending climate collapse and the immense changes that such a position will require, I'd much rather be an Opportunist.

Conclusion: "A New Sense of Aliveness"

"There is a vitality to the liveliness of intra-activity, not in the sense of a new form of vitalism, but rather in terms of a new sense of aliveness. The world's effervescence, its exuberant creativeness, can never be contained or suspended" (Barad 2007, 177).

When I finally decided to leave the engineering program, I felt hopeless. For almost all of the following year, I couldn't shake a feeling of being stuck. Yes, the anxiety from the fact that I had no idea what to do next (made worse by worsening climate conditions around the globe and the mental health struggles I had accumulated up until that point) may have been to blame, but there was a weight and a frustration I couldn't name at the time. Now with distance (and this research under my belt) I can see it more clearly.

An Apolitical, Rigid Category

That same sense of stuckness is alive in how I now view techno-optimism. As seen in the first section of this essay, techno-optimism is a worldview grounded in rigidity, a refusal to see beyond certain foundational assumptions: the dualisms of nature versus culture, subject versus object or the separation of human beings and 'nature' from the technologies we build. This rigidity is by design, though. Maintaining the illusion of 'objectivity,' technoscience presents its conclusions as neutral, necessary outcomes—as if they are self-evident truths rather than contingent, value-laden and context-dependent conclusions.

As we have seen, this appeal to objectivity is related to the rigid notion of causality at the heart of Western science, where individual particles, containing discrete characteristics, come together to interact, and separate, changed to varying degrees but remaining self-contained individual entities. This view of causality posits a straight line from input to output: if A exists or happens, then B must follow. Causality of this quality is useful to western scientists, however. As Merchant argues in *The Death of Nature*, this mechanization of nature makes it easier to measure, control, and manipulate natural phenomena (Merchant 1980, 202). Nature became a machine, made up of discrete particles, each quantifiable and observable from an imagined position of objectivity. Humans, seen as distinct from this 'nature,' could then study and master it.

When this mechanistic view is turned back toward humans themselves, the same assumptions can be applied. People are said to have a fixed 'human nature'—a set of inherent traits that, once defined, could be studied, predicted, and controlled. This way of thinking underpins much of western medicine, the social contract tradition and, notably, imperialist logics: if humans are naturally X, then a good society must be structured to accommodate, bolster or restrain that nature.

This view of human nature is embedded in an onto-epistemology I refer to as the MLS. As *modern*, human nature is cast as radically distinct from the rest of 'nature'; as *liberal*, it is presumed fundamentally free—able to transcend nature by virtue of this freedom; and as the sole *subject*

within nature, this archetypal human is uniquely equipped to control and master the world, relying on foundational assumptions of linear causality. The MLS, in this way, operates as a rigid and exclusionary category. Those who do not embody its discrete, essentialized qualities—the traits that render one fully 'human'—are positioned outside the boundaries of humanity and, in effect, dehumanized.

Crucially, the MLS presents itself as an apolitical truth—a given about human nature, rather than a constructed worldview. Power, domination, coercion, compliance, resistance—all are conveniently bracketed out of any conversation about human nature. In their place, we get a tidy causal narrative, definitive characteristics, and inevitable outcomes, which together relieve us of the burden of engaging with the messy, contested terrain of politics.

This claim to apoliticity is precisely how the MLS legitimates its political projects. As I've argued, the MLS morphs into the MLTCS as a natural extension of its premise: that human beings are inherently free, exceptional, and destined to master their environment. Techno-optimists are steeped in this vision of human nature. They argue that techno-capitalism is not just a viable system but the only one compatible with who *we* 'really' are. If we are naturally free, self-interested subjects—capable of modifying our surroundings and exerting control over the rest of 'nature'—then technological innovation becomes the obvious vehicle for progress. It promises to boost productivity, expand human reach, and enable the distribution of its spoils through supposedly neutral market mechanisms, which simply reflect the nature of equally free and self-interested individuals. In this frame, techno-capitalism isn't a political choice—it's a logical, even inevitable, expression of human nature.

The Politics of Exclusion

As it has been noted throughout this essay, the fact that techno-optimists push their politics of free market techno-capitalism under the guise of an apolitical human nature is what I take issue. Of course, the ethical implications of how this view of human nature is prone to excluding some from the human category are rather clear (see Hodson, Macinnis and Costello 2014). However, as I have alluded to throughout, this view of human nature has a much broader effect of committing and sustaining epistemic violence. As Enrique Galván-Álvarez (2010) reminds us, epistemic violence goes beyond the exercise of force in service of a political agenda. What makes it especially coercive is its enforcement at the level of knowledge itself:

> "It is not only through the construction of exploitative economic links or the control of the politico-military apparatuses that domination is accomplished," he writes, "but also and [...] most importantly through the construction of epistemic frameworks that legitimise and enshrine those practices of domination" (Galván-Álvarez 2010, 12).

In this light, the version of human nature promoted in techno-optimist discourse does more than justify a political project—it sanctifies it. It embeds systems of domination within a supposedly neutral or natural worldview: the domination of the natural world through Western technoscience

and the subjugation of certain human groups through the mechanisms of market capitalism. By presenting these hierarchies as natural consequences of 'human nature,' techno-optimism disguises domination as destiny.

Regardless of the fact that techno-optimists argue that theirs "is a material philosophy, *not* a political philosophy" (Andreessen 2023), we've seen throughout this piece that onto-epistemologies are far from abstract—they have concrete political, material consequences. When it comes to determining who qualifies as fully 'human,' the epistemic violences described here manifest in what can only be called *a new eugenics*, embedded within contemporary climate politics. Today, the effects of climate change are not distributed equally, nor are the solutions. In the West, techno-optimist fixes—electric vehicles, massive 'green' infrastructure projects, carbon capture schemes—dominate political agendas. According to the logic of the MLTCS, these solutions are framed as neutral, but in reality, they sustain the same extractive, capitalist systems that created the crisis. They prioritize the survival and comfort of those already positioned within the techno-optimist archetype of 'human nature'—the Western, modern, liberal, techno-capitalist subject. Meanwhile, more holistic and explicitly political solutions—such as radical economic restructuring, land reparations, or enforceable global climate justice frameworks—are sidelined or dismissed as "impractical" or "too divisive." This exclusion is not accidental. It reflects the deeper, systemic logic embedded in the techno-optimist view of human nature: those deemed outside the techno-optimist subject—particularly women (Altson 2014) and communities in the Global South (Roberts and Parks 2007)—are less deserving of protection and investment because of this distance from onto-epistemological framework that, in essence, created these climate technologies. The logic of techno-capitalism dictates that only those who contribute to the system—through labor, capital, or the creation of technological solutions—deserve access to its benefits. Those who can pay, or who are seen as 'productive' in techno-capitalist terms, are prioritized. Those who cannot—or who are not seen as fitting this mold—are left behind. In this way, climate policy in a techno-optimist world becomes a vehicle for a systemic eugenics, determining who gets to survive and thrive in a warming world—and who does not. Ultimately, the techno-optimist worldview naturalizes a deeply exclusionary and divisive politics under the guise of neutrality and progress.

This techno-optimist framing not only obscures its own political stakes but also sets the stage for a harsher reality: when survival is perceived to be at risk, any veneer of ethical universality collapses. As Hodson, MacInnis, and Costello (2014) observe, in moments of extreme threat—such as wartime—ethical considerations give way to raw in-group and out-group dynamics: "Despite modern norms and laws governing the ethics of warfare, the lives of "others" are generally considered less valuable than those of the ingroup" (Hodson, Macinnis and Costello 2014, 90).

While Marc Andreessen—the archetypal techno-optimist discussed in the introduction—does not currently frame his worldview in explicitly in-group/out-group terms, he nonetheless draws a sharp line between techno-optimists and it's 'enemies': "The enemies [of techno-optimism] are not bad people," he claims, "but rather bad ideas" that lead dissenters to "hold mistaken values, values that are damaging to both themselves and the people they care about"

(Andreessen 2023). He argues for a kind of reeducation of dissenters, a reeducation based essentially on the characteristics of the MLTCS described above; essentially a reeducation campaign on *what it* means to be human. What may now appear as self-aggrandizement—a kind of arrogance disguised as benevolence—risks solidifying into a far more materially violent division as climate collapse intensifies. I argue that as the realities of climate collapse intensify, this ideological boundary—between those who accept and embody the techno-optimist view of human nature and those who reject or do not fit into it—has the potential to harden into something far more materially violent.

Put plainly: if ethical consideration continues to be reserved for those who fit within the boundaries of the human, and if resources, space, and survival itself become increasingly scarce, then I do not find it difficult to imagine a future in which those who fail to meet the standard of MLTCS—or who actively reject it—are excluded from life-sustaining technologies created in the image of techno-optimism and thus left to die. This possibility may sound dystopian, but it follows logically from a system that predicates worthiness on techno-capitalist productivity and alignment with a narrowly constructed vision of human nature.

An Intra-Active Cyborg Politics

Throughout this research, I've attempted to offer an alternative view of human subjectivity that avoids harmful dualisms and determinisms of the MLS while offering space for technoscience practice in solving the climate crisis. The essential project here is to find a way to do technoscience that does not elevate the human category above the rest of nature and, in doing so, recenters the political and ethical responsibilities we have in proposing solutions that shape the world; in short, to find onto-epistemological tools that *bring politics (back) into 'nature.'*

As shorthand for this panoply of critical tools, I call this politics an Intra-Active Cyborg Politics. The New Materialist and feminist cyborg theorists I reference push back on the boundaries techno-optimists trace in defining human nature. Karen Barad's *Agential Realism*, supported by other New Materialist scholars, offers the 'intra-active' element—a term that challenges the idea of separate entities merely *interacting*. Instead, intra-actions suggest that things are always already entangled. We do not start as separate individuals or forces and then connect—our very beings are made and are constantly being re-made through these ongoing relationships. Boundaries, qualities and measurements exist, but they are not fixed. They are always shifting, always up for renegotiation. This approach leaves room for adaptability and creativity at the very fundamental level of what becoming human means.

The cyborg element is where I bring in Donna Haraway's philosophy, which offers a concrete way of doing technoscience in the modern age that promotes this creativity. Cyborg politics thrives on the boundaries created by techno-optimists' views of human nature: the division between nature and culture, human and animal, or human and technology. It is not about resolving the tension between these categories, but about living within them—existing in the space between the binaries rather than trying to collapse them. It is about embracing the "friction" of using and creating these technologies because in simply getting rid of the categories created by the techno-

optimists, we risk ignoring the real material effects such categories have in othering, dehumanizing and cutting off possibilities.

This isn't just an identity politics—it is a way of generating knowledge: a way of seeing and knowing that is grounded in complexity, contradiction, and, most importantly, accountability. It helps us engage critically with technoscience, without losing sight of the systems of knowledge and power that shape it. We become responsible for the boundaries we help create or sustain instead of taking them as a given. In a world defined by climate crisis and massive systemic shifts, I argue that we need frameworks that do not shut down possibilities and an intra-active cyborg politics offers one. It helps us live within the techno-capitalist system while remaining open to the other possibilities—possibilities that are more just, more livable, and more alive to imitate the complexities and agency of the world.

This body of scholarship exposes how techno-optimists' view of causality and scientific practice flattens reality. It renders the world inert, robbing it of agency, vitality, and, importantly, politics. Throughout this research, I have realized that the frameworks I was learning throughout my engineering degree and beyond (in general narratives about climate change in the West) were fueling my sense of frustration, my feeling of being stuck. Western technoscience frameworks feel lifeless and rigid because they refuse to acknowledge the crux of what is at issue: the power dynamics embedded in the material becoming of the world. What I was missing during my time in engineering was precisely this; *politics*.

There was a time when this ontology comforted me, though. It offered clarity, predictability, and the illusion of certainty in a world where politics seemed too complicated an avenue for change. But that comfort fades quickly when one begins to see the violence this worldview enables and what accepting it non-critically can entail—the way it reduces complex lives to data points, marginalizes alternate ways of knowing, omits accountability world-shaping practices and forecloses the possibility of imagining otherwise. Jedediah Purdy (2015) puts this idea plainly:

> "Politics suggests instability, arbitrary power [...]. Shouldn't we avoid rather than celebrate it, and find some other, more harmonious order— economy or ecology, say—to lean on instead? The attraction of getting away from politics is potent and perennial. The problem is that it is merely a fantasy. No order that grows spontaneously will stabilize and preserve the world. The alternative to spontaneous order is deliberate creation, and its source must be politics (Purdy 2015, 19-20)."

So, I now dream of a different world. Not one where the supposed apolitical nature of science presents to us rigid avenues for action, limiting our visions of the future, but one where multiplicity is embraced, where nuance thrives, and where creativity is a form of resistance; a world not bound by inevitability, but open to possibility. In such a world, the very act of imagining differently becomes not only possible, but necessary—a vibrant resistance to determinism. How wonderful is it to be welcomed into and feel this "new sense of aliveness" (Barad 2007, 177)?

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