The Politics and Ethics of Transhumanism: Exploring Implications for the Future in Advanced Capitalism

Alexander Thomas

A thesis submitted in partial fulfilment of the requirements of the University of East London for the degree of Doctor of Philosophy

September 2022

Abstract

This thesis critiques the philosophy of transhumanism by exploring how the dynamic co-development of humans and technology may proceed guided by the logics of advanced capitalism. Transhumanists underestimate the complexity of our relationship with technology, seeing it as a controllable, malleable tool that with the correct logic and scientific rigour can be turned to any end. Simultaneously, they fail to thoroughly situate technological advancement within the social, economic, cultural and political context in which it is emerging. Therefore, when More and Vita-More (2013, p.1) claim: 'One aspect of transhumanism…is the need for inclusivity, plurality, and continuous questioning of our knowledge', it is my contention that these three principles are incompatible with transhumanist development in the context of an advanced capitalist logic. As such the thesis constitutes an imminent critique of transhumanism arguing that it will fail to live up to its own purported values.

Indeed, transhumanism's instrumentalist underpinnings render it inapt to stand for any values beyond an obsessive and naïve dedication to instrumental 'progress'. Whilst the dynamic co-evolution of humans and technology is increasingly undermining stable and long-held notions of the human condition and the conceptual boundaries which have demarcated human beings as individuals, transhumanism hangs on to outmoded notions of liberal agency. This further shows its failure to contend with the very implications of the 'progress' it advocates.

The thesis argues that awareness of the growing influence of a technical rationality underpinning advanced capitalist relations and directing the co-evolution of humans and technology is needed. Every step of the development of radical technologies demands an equivalent ethical coevolution of our social world. Ongoing normative re-evaluations of the human must inform the process and radical social reform may be required to realise the stated transhumanist principles of inclusivity, plurality and the continuous questioning of knowledge.

Acknowledgements

I would like to thank all those that have read, promoted, listened to or published my work during the course of this research. I am especially grateful to my supervisors, Erika Cudworth, Steve Hobden and Debbie Shaw for all their guidance, diligence, wisdom and for pushing me until the end. Thanks to Andy Harris for his moral and bureaucratic support in the initial process, and indeed to all my colleagues and students at UEL, who have shown considerable interest and encouragement throughout. I am grateful to the many thinkers and storytellers who have variously informed, inspired, educated and infuriated me during my research. Thanks to the many friends and family members who have displayed interest and patience every time I've descended into transhumanism related digressions, especially Temi, Mike, Paul, Rhodri, Taylan, and Stu. Thanks too to all the other people who have contributed to this work in various ways. But mostly I would like to thank my Mum - Audrey, Dad – Viv, and brother – William, for their never-ending pride and encouragement.

Table of Contents

Chapter 1: Introduction

Throughout human history an awareness of the limitations of the human condition has been a prevalent feature of myriad cultures: from questioning the purpose and inevitability of death, to dreaming of additional capabilities. Human history has largely been an all too fragile and vulnerable experience marked by hardship, illness and grief. The search for meaning has often resulted in myths which extend the apparent expanse of human life beyond the empirical reality which faces us. Religions usually place these resplendent fantasies in an afterlife, another realm, though in many cases transcendent myths use Earth as the canvas for their imaginaries. Myths can be drawn upon for a range of notions that provide precedents for most objectives of human enhancement. The *Epic of Gilgamesh* (tr. Kovacs, 1989) charts a King's quest for immortality and dates back nearly four millennia (approx. 1700 B.C), although dreams of eternal life undoubtedly date well before this tale. In Greek mythology, ambivalence to such extra-human capacities is evident. Most notably, Daedalus, an innovator, craftsman and artist, uses his guile to escape from imprisonment in a tower in Crete by making wings from wax and feathers which provide the superhuman gift of flight to himself and his son, Icarus. Icarus, failing to heed his father's warnings, flies too close to the sun, burns the wax and drowns after crashing to Earth. Thus, Icarus is often the symbol of hubris, bringing into sharp relief the potential dangers of such extravagant desires.

A suite of converging scientific and technological advances is now making many of these myths and fantasies a very real possibility. Transhumanism is a philosophy which, at its core, advocates the technological upgrading of the human species. As a relatively new, yet rapidly expanding field of study, it engages with various forms of directed (human) evolution and the myriad questions this might raise. It eludes simple definition in part because of its various schisms and lineages. One of its leading proponents, Max More, calls it a 'life philosophy, an intellectual and cultural movement, and an area of study' (2013, p.4). However, when he adds, that it is the 'study of the ramifications, promises, and potential dangers of technologies that will enable us to overcome fundamental human limitations, and the related study of the ethical matters involved in developing and using such technologies' (More, 2013, p.4), he underplays the faith that transhumanists hold that technologically upgrading the species will bring about net positive consequences. Any investigation that deems the dangers greater than

the potential benefits would seem to contravene the transhumanist ideology.

Uplift: Towards the 'Super' Human

Some of the key differences between transhumanist imaginaries lies in the emphasis they place on each of the three core pillars of the creed, the so-called 'three supers': super-longevity, super-intelligence and super-wellbeing. The first of these takes us back to Gilgamesh and dreams of eternal life. The vast majority of transhumanists believe in radically expanding human lifespan with some even believing in the possibility of immortality. This introduces a further schism, between those who primarily advocate for this possibility through bio-technological developments such as genetic engineering (for instance Aubrey de Grey) and those who seek immortality in the digital realm, believing a human identity could be transferred to alternative substrates from our current fleshy incarnation. This organic/digital split has implications for superintelligence too. Within transhumanist discourse the 'singularitarians' emphasise the rapid pace of artificial intelligence (AI) development, often citing exponential growth of computing technologies. Many see an inevitability that this progress within AI will lead to a near-term explosion where digital intelligence vastly outstrips human intelligence leaving humanity in the evolutionary dust. For some, this calls for fusing the human mind with computers through brain-to-computer interfaces (BCIs) or other means as the only hope for humanity to survive beyond the singularity. Others see no such near-term prospects, viewing AI as a kind of tool or service that will provide us with increased capacities, but not exceeding the multifaceted intelligence of humans. Thus, for them, genetic engineering and psychopharmaceuticals are cited as more realistic propositions for radically boosting human intelligence.

Super-wellbeing is tellingly less prominent within transhumanist discourse. After all, wellbeing is a fuzzy concept when compared to age (highly quantifiable) and intelligence (which at least is nominally measured through the dubious methodology of IQ tests). Whilst putative attempts have been made to quantify wellbeing within transhumanism (David Pearce's 'gradients of hedonic bliss' (1995)), it remains much less defined in terms of its potentialities. This also points to a related schism: the political stances of transhumanism. The concept of wellbeing, like politics, requires an engagement with values. Transhumanism

has boasted its own political parties which implies it is a stance in itself. It has been argued that transhumanism is neither left nor right wing, but rather represents a new polarity – upwing. One of transhumanism's most notable proponents, FM2030, published a book entitled *Upwingers: A Futurist Manifesto* (1973) and Steve Fuller & Veronika Lipinska (2014) claim that Up/Down politics are the poles of the future with 'Up' being transhumanist, 'proactionary' and techno-Utopian and 'Down' being posthumanist (more on this concept later), 'precautionary' and environmentally minded. Whilst there is no doubt that the increasing potency of technologies will require a recalibration of political thought, it is spurious and simplistic to think this is the only question at stake in the future. Indeed, transhumanists are broadly split between two poles: the right-leaning techno-libertarian wing, often associated with Silicon Valley, and the left-leaning techno-progressive faction most notably represented by transhumanist James Hughes. The former generally emphasise the rights of individuals to upgrade themselves, whereas the latter offer more recognition of the societal implications, advocating a politics which fosters responsibility towards humanity at large to ensure transhumanist aims are broadly inclusive.

Technologies of Uplift

In terms of the real-world manifestations of transhumanist projects, it is the converging progress of a suite of technologies referred to as NBIC which constitute the basis for human enhancement potentialities. NBIC stands for nanotechnology, biotechnology, information technology and cognitive science. A distinction can be made between transhumanism as a broad-based philosophy or ideology and the process of technological and human coevolution known as 'technogenesis'. Technogenesis does not require technology to reach a certain level for the concept to become realised or instantiated, rather it refers to an ongoing process. Transhumanism also has no predetermined point at which we can deem human beings as 'transhuman'. In a sense we are already 'transhuman' – our interconnection with technologies means we already function in ways which can be considered significantly enhanced. Average life expectancy has doubled in the last few centuries for example, and the easy access we have to forms of knowledge render current human living different in some significant ways from pre-agricultural human living, or perhaps even pre-internet human living. The point is, that aiming for clear delineation is not realistic in such a complex unfolding. However,

transhumanism tends to imply some kind of future state (that is, it is not something that has already been realised) and Nick Bostrom (2008) suggests a human can only be considered transhuman when they have at least one capacity which significantly outstrips all the capabilities all humans currently have. Transhumanists often consider the human body itself as needing to have this enhancement embedded within it, thereby excluding the possibility of mobile phones, for example, making us transhuman. Despite this important distinction between transhumanism as an ideology and technogenesis as a process, it is also evident that the refining of transhumanist ideologies is interconnected with the unfolding of real technological development. It is worth analysing transhumanist ideas in part because they provide an insight into potential pathways of technogenesis, as well as offering proposals for desired outcomes. Transhumanism as an ideology may even play a role in the real world shaping of technologies – it is an increasingly potent cultural force, with its ideas increasingly connected to power (O'Connell, 2018).

Transhumanist Thought: Tendencies and Schisms

Transhumanism has multiple lineages as well as many schisms. Furthermore, many people whose thinking is fundamentally transhumanist, do not call themselves, or in some cases even consider themselves, transhumanists. An example is Ray Kurzweil who, despite being one of the foremost thinkers in terms of influence on transhumanism, particularly the singularitarian strand, rebuffs the label. Likewise de Gray, a prominent advocate for expanding human lifespans through biotechnological measures. There are a group of thinkers sometimes referred to as bioliberals, such as Nicholas Agar, who are not transhumanists in name, but whose writings are difficult to differentiate from transhumanist discourse. Even some of those most strongly associated with the ideology of transhumanism have recently expressed ambivalence to the term such as Bostrom and Hughes. In part this is perhaps because the term can be reductive, despite the rich variety in perspectives within transhumanist discourse. For the purposes of this thesis, my focus is not solely on those who directly identify with official transhumanist movements, but rather all those who advocate forms of 'technological human enhancement' are considered transhumanist.

Whilst the genealogy of transhumanism will be covered in greater detail in the next chapter, it

is worth noting that transhumanist ideas come from science fiction, academia, internet culture and from institutional transhumanist organisations such as *Humanity +* and the *Institute for the Ethics of Emerging Technologies (IEET).* As such, it would be remiss to limit the enquiry to signed up members of transhumanist organisations, or official transhumanist policies, manifestos and statements, as none of this captures the breadth and diversity of the thinking, nor the serious implications that transhumanist ideas augur.

For all its diversity of thought, transhumanism has some tendencies that seem inherent, following as they do from its core contention that human enhancement through the utilisation of technological and scientific advances should be aspired to and actively sought. At the heart of the belief system is the idea that only technology offers solutions to the inherent problems of humanity. As Pearce puts it: 'If we want to live in paradise, we will have to engineer it ourselves. If we want eternal life, then we'll need to rewrite our bug-ridden genetic code and become god-like. . .only hi-tech solutions can ever eradicate suffering from the world. Compassion alone is not enough' (IEET, 2007, n.p.). There are many tendencies within transhumanism captured here, from the conceptualisation of humans as code to aspirations of paradise and omnipotence, but perhaps the key terms are 'engineering' and 'solutions'. For transhumanists life is a tractable problem to be solved. They apply an engineering mindset that renders its thinking fundamentally instrumentalist at its core. Faith in the potency of human reason underpins this idea, especially of the kind employed by scientists which is heralded as the exceptional quality of humankind that brings about our potential for self-definition through practically evolving ourselves. Linked to this engineering mindset is 'epistemological certainty'. Transhumanists underestimate the complexity of our relationship with technology, seeing it as a controllable, malleable tool that with the correct logic and scientific rigour can be turned to any end. They claim that nature, including our own, is intelligible, reduceable, tractable and thus sufficiently limited in its complexity that human reason and its coextensive tools can conquer it.

A further tendency is a hierarchical outlook which is largely necessary to sustain the notion of 'enhancement'. Decontextualised comparisons or scenarios are often used to advocate enhancement and to avoid any contention in analysing the term. This is supplemented by an impulsion to quantify, measure and formalise, as these methodologies also give credence to

such value judgements. As stated, some transhumanist aims lend themselves naturally to quantification such as lifespan, others much less so. Hierarchical thinking can have deeply problematic exclusionary and discriminatory implications. One way transhumanist thought tends to avoid this challenge is by emphasising the role of individual choice in enhancement decisions. If individuals are empowered to judge for themselves what constitutes enhancement, they can be held responsible for any negative outcomes the decision to enhance or reject enhancement may cause. This is therefore another significant tendency within transhumanism, especially the libertarian strand: an emphasis on the liberal individual subject. The transhumanist conception of 'morphological freedom', which asserts the right of each individual to modify their body or reject modification, is the exemplar of this.

The tenor of much transhumanist thought dedicated to the potentially profound changes radical technological development may bring about is frequently characterised by abstraction. This is in part due to its inclination to de-contextualise to make the notion of enhancement more credible, but also because possible advancements NBIC technologies may bring are deemed so radical as to render the prevailing social conditions irrelevant. However, the nature and pace of the changes do not exist in a social vacuum. The prevailing societal structures will play a significant role in the process and its effects. It is important to consider how existent technologies have been disseminated, utilised, and manipulated within the current global political, cultural and economic landscape. In many ways it is important not to see transhumanism as some distant possibility of a fusion between human and machine with various ethical implications. Rather we can consider that this process is already underway and has been for some time (Hables Gray, 2001; Garreau, 2005; Shaw, 2008). Many aspects of our economy, not least the financial systems themselves, are already largely machine-based entities. If we are to interrogate the complex systems and power structures in which this human/machine hybrid exists there is much to be learnt from recent manifestations of this evolving relationship.

This thesis will critique the philosophy of transhumanism on the grounds that its adherents revere the instrumental potentialities of technology and fail to thoroughly situate technological advancement within the social, economic, cultural and political framework in which it is emerging, primarily that of advanced capitalism. Indeed, it will argue that the

instrumentalism inherent to the philosophy reflects the capitalist framework. Thus, when Max More and Natasha Vita-More claim: 'One aspect of transhumanism… is the need for inclusivity, plurality, and continuous questioning of our knowledge' (2013, p.1), this thesis questions whether such values are realisable if technogenesis continues under the current conditions of advanced capitalism. I claim both transhumanism and advanced capitalism contain within their logics instrumentalising tendencies that crowd out all such values. This is therefore an immanent critique of transhumanism – and I put forward three novel concepts designed to undermine the plausibility of the values transhumanism purports to support. Data Totalitarianism contradicts the credibility of a continuous questioning of knowledge, Transcendent Conformity challenges the question of plurality, and Systemic Dehumanisation undermines the likelihood of transhumanist development engendering inclusivity. I also sketch an outline for developing a future-minded ethical stance toward technogenetic developments called 'Virtual Relational Anthropaporia'. It combines a critical posthumanist ethical framework with the thought of Theodor Adorno.

Outline of the Thesis, Context and Novelty

The thesis draws upon a range of ideas and schools of thought related to Critical Theory and associated strands of Continental Philosophy, most notably critical posthumanism, but also Feenberg's critical constructivism (2017). In doing so, it develops a novel critique of transhumanist aspirations in the context of advanced capitalist logics. While there is an ever-broadening literature highlighting the intellectual contradictions and limitations of transhumanist discourse (Ross, 2020; Levin, 2021;), there is novelty here in assessing values claimed *within* transhumanist discourse for their plausibility, thereby representing an immanent critique. Furthermore, whilst some critiques have emphasised the potential for social problems to be exacerbated by enhancement possibilities (Sandel, 2009) and others have even expressly highlighted capitalism as a problematic basis for transhumanist developments (Doede, 2009), full volume critiques of technocapitalism have focussed more generally on technogenetic developments and potentialities (Allenby & Sarewitz, 2011) rather than addressing transhumanist aspirations and discourse. Whilst efforts have been made to bring transhumanism and critical posthumanism into conversation (Del Val & Sorgner, 2010; Ranisch & Sorgner, 2014; Jorion (ed.), 2022), and some critical

posthumanists have directly critiqued transhumanism (Hayles 1999, 2010; Braidotti 2013; Ferrando, 2019) this study goes further in this regard. The ethical framework developed in the penultimate chapter is a novel contribution, building on ideas within critical posthumanism and additionally drawing on Adorno's thought to create the beginnings of an ethical framework aimed at addressing the issues technogenetic developments in an advanced capitalist context raise.

The next chapter offers a more detailed genealogy and analysis of transhumanist thought, and its underlying assumptions concerning what the 'human' is. It seeks to establish the roots of transhumanism in the Enlightenment rational humanist tradition, as well as outlining some of the key organisations and trajectories of the modern incarnation of this philosophy. It also introduces the philosophy of critical posthumanism which will be drawn upon throughout the thesis to critique transhumanist positions.

Chapter 3 will offer an analysis of the pertinent logics of advanced capitalism. It will be argued that some of these logics are reflected in transhumanist imaginaries, and that transhumanism can be seen as an expression of capitalism's reliance on speculative future returns. The instrumentalist and reifying nature of capitalism will be identified, again tendencies that transhumanists also exhibit. The inequalities, expulsions and concentrations of capitalism will be emphasised as very relevant to the developing dynamics of techno-human relations. Furthermore, the interrelation of capitalism and technological development will be considered as well as the neoliberal ideology that underpins advanced capitalism. The chapter will also analyse the ecological, economic and political crises that capitalism is facing. Malm and Moore's notion of the 'Capitalocene' will be discussed here to establish the link between capitalism and the environmental devastation it has wrought. Finally, there will be a brief analysis of postcapitalist possibilities, including the implications of automation unemployment and Accelerationist aims which seek to draw upon technology to accelerate the contradictions of capitalism.

Chapters 4-7 will function as the immanent critique of transhumanism by questioning the plausibility of its purported values of pluralism, inclusivity and the continuous questioning of knowledge. Each chapter will introduce one of the three novel concepts which aim to

question the idealistic claims that these transhumanist values are realisable in the context of advanced capitalism. Chapter 4, *Data Totalitarianism*, argues that the 'continuous questioning of our knowledge' (More & Vita-More, 2013 p.1) will in fact constitute a disciplinary and instrumentalist production of knowledge that will serve powerful interests at the expense of other forms of understanding or ways of being. Transhumanists conceptualise knowledge as a guarantor of human progress. Their denial of complexity is exacerbated by hubristic and hyperbolic conceptions of human reason that constitutes a faith in epistemological certainty. Capitalists and transhumanists share a fetishisation of Big Data and its promise of new forms of knowledge. Both seek to render the world more pliable to the extraction of data extending towards totality for the sake of facilitating predictability and control. Surveillance practices within capitalist relations are driven by profit. Privileged access to Big Data and powerful algorithms are creating a division in society between those that own and benefit from knowledge products, and those objectified and manipulated by such products. Whilst transhumanists and surveillance capitalists fantasise about predictability and control, the new media infrastructures enabled by technological development create new forms of social complexity that radically undermine these fantasies.

Chapter 5, *Transcendent Conformity*, considers the notion of 'pluralism' (More & Vita-More, 2013 p.1). It argues that transhumanism is underpinned by a naïve, liberal understanding of the individual that denies the embeddedness of humans within complex systemic relations. By idealising rationally potent liberal individuals responsible for realising their own self-determined enhancements, transhumanists ignore power differentials, systemic constraints, evident contradictions and potential unintended consequences that radical technological developments may augur. The competitive demands of an unforgiving, high-stakes technocapitalist fitness landscape create a default instrumentalism. The implication of value pluralism is suggestive of tolerance of different views which allow for multiple forms of self-actualisation, whereas the ability to serve the capitalist system effectively will narrow agency and represent the actual driving force behind any multiplicity or variation of transhuman entities. There is an imperative to conform to the technosystem's logical needs and any plurality must yield to this imperative.

Chapter 6, *Systemic Dehumanisation*, considers the potentiality for transhumanist

developments to be inclusive in the context of advanced capitalism. Building on the logics of expulsions and concentrations highlighted in chapter 3, it is argued that radical technologies threaten to intensify these patterns of inequality and precarity. The potential for human enhancement technologies to bring about conceptual divergence within the human species opens the possibility for new forms of discrimination. The chapter considers the thought of transhumanist thinkers whose discourse threatens to aggravate the precarity that many humans may face in such a scenario. Savulescu calls for extensive surveillance and compulsory 'moral enhancement'. Fuller advocates an economics of death, whereby unaugmented humans (humanity 1.0) may be sacrificed for the project of creating a superior successor species. Bostrom offers a utilitarian framework that calculates modern catastrophes such as plagues, starvations and genocide as mere ripples in comparison with the potential to colonise space with enormous numbers of computer generated posthuman entities. The actual precarity that would likely be produced by a capitalism-inspired technogenesis is coupled with the conceptual dehumanising discourse of transhumanists which threatens genocidal implications to this unfolding.

Chapter 7, *Virtual Relational Anthropaporia*, sketches an outline of an ethical framework that advocates a less hubristic, totalitarian, individualistic attitude to technogenesis. It draws primarily on critical posthumanist thought to develop the notions of relationality as an ethical stance of compassion and the virtual as a forward-thinking recognition of interconnection with future states. It further draws on the thought of Adorno to develop a situated, negative ethics that problematises its own forms of reason by drawing attention to the aporia of Enlightenment thought. Thus, it is a stance which has humility (as opposed to transhumanist epistemological certainty) and compassion towards the other (as opposed to individualism and instrumentalist capabilities) at its core. It argues that our imbrication with technology will continue but it demands of us a deep and ongoing ethical investigation as our instrumentalist capacities expand. It acknowledges the mutability of the human condition and rejects universalised and essentialist conceptions of the human whilst taking a precautionary stance towards radical technological development due to the potential for inhuman implications. Chapter 8 will summarise the argument and draw conclusions.

Chapter 2: A Brief History of Transhumanism and its Critics

Introduction

This chapter situates the lineage of the philosophy of transhumanism by identifying its roots in the Enlightenment and with rational humanism. It will then trace the ideas of proto-transhumanists responding to Darwin's recasting of human genesis. An outline of the concrete development of converging NBIC technologies will follow, before a review of the modern history of the transhumanist movement. Attention will then be turned to the most prominent critics of transhumanism, starting with the bioconservatives, then postmodernist challenges to Enlightenment thought will be applied to transhumanist claims. Finally, the chapter will consider critical posthumanism as a potential countervailing understanding of the implications of technogenesis. It will track the lineages and outline the central concepts of critical posthumanism as well as considering the extent to which transhumanist and critical posthumanist thought have already come into conversation. Critical posthumanist theory will form the backbone of much of the criticism of transhumanism throughout the thesis.

The Enlightenment Origins of Transhumanism

Central to the transhumanist creed is a fetishisation of human reason. As such, the thread of intellectual endeavour can be traced through Western thought back to pre-Socratic philosophy. However, transhumanists usually cite their movement as the natural successor to Enlightenment humanism (Hughes, 2004, 2010, 2012; Bostrom, 2005; Stolyarov II, 2019). Indeed, Hughes characterises transhumanism as 'a modern form of Enlightenment techno-utopianism' (2012, p.757) and as 'the Enlightenment on steroids' (2013, p.133). The Age of Enlightenment brought about an era in Europe that sought to end the dominance of non-scientific explanations of reality in favour of rational attempts to utilise empiricism and criticality as the basis for uncovering the nature of things. The potential of science to reconfigure nature features heavily in Enlightenment thinking to the extent where notions of enhancing human capacities are sometimes explicitly stated, no longer as mythological fantasies, but as reasoned expressions of the potentiality of the scientific method. In *New*

Atlantis Francis Bacon envisioned a thriving Utopia dedicated to 'the knowledge of causes and secret motion of things, and the enlarging of the bounds of human empire, to the effecting of all things possible' (1996 [1626], p.480). Emphasising the import of Bacon's ideas to contemporary transhumanism, More suggests 'that transhumanists consider dropping the Western traditional but terribly outdated Christian calendar for a new one in which year zero would be the year in which Novum Organum was published' (2010, p.138). Later, Julien Offray de la Mettrie's book *Machine Man* (1748) had conceptualised the human as a biological machine, whose every facet would ultimately be explicable through comprehending the individual component parts. Condorcet asked,

> Would it be absurd now to suppose that the improvement of the human race should be regarded as capable of unlimited progress? That a time will come when death would result only from extraordinary accidents or the more and more gradual wearing out of vitality, and that, finally, the duration of the average interval between birth and wearing out has itself no specific limit whatsoever? (1997 [1795], p.109).

The Enlightenment thus emphasised faith placed not in God, but in science and the human capacity for utilising rationality towards the purposes of its own designs. Increasingly European humans conceptually separated themselves from the rest of nature as the sole bearers of reason. This provided them with the privileged right to turn nature towards their own ends. As such, a distinct 'instrumentalism' can be perceived in Enlightenment thought.

Furthermore, Enlightenment thought can be seen to idealise a specific version of humanity – one that was supposedly enlightened enough to fully believe in its own capacity for rationalism. In *What Is Enlightenment?* Kant summed this up as follows:

> Enlightenment is man's emergence from his self-imposed immaturity. Immaturity is the inability to use one's understanding without guidance from another. This immaturity is self-imposed when its cause lies not in lack of understanding, but in lack of resolve and courage to use it without guidance from another. Sapere Aude! Have courage to use your own understanding! (1997 [1784], p.11).

The idea of striving and perfectibility underpins this thinking and clearly informs transhumanism with its stated aims of self-directed evolution through technologically enlightened human enhancement. Integral to its creed is a hyper-humanism that anoints

humankind as a higher, or special kind of beast, imbued as it is with the power of reason, most potently and purely realised in scientific pursuits. It relies on an absolute faith in human rationality to bring about intended consequences (epistemological certainty) and its normative position is fundamentally instrumentalist – that is to say, scientific reason should be used to interpret and shape nature towards human ends.

Darwin's Blow to Human Narcissism and a Proto-Transhumanist Response

Darwin's *Origin of Species* (1859) challenged the perception of humans as uniquely distinct from the rest of the animal world - a potential blow to rational humanism, with its glorified envisioning of the status of humankind. However, it also aided a conception of humanity as a temporary state in a possibly endless evolutionary process. The Enlightenment concept of progress could be interpreted teleologically, as a definitive and necessary trajectory of history: the natural process of evolution. Furthermore, if humans are part of the natural world, that very canvas upon which Enlightenment rationality was instrumentalising so effectively, then the capacities of humans too could potentially be enhanced through the scientific method. The ideas in Offray de la Mettrie's *Machine Man* (1748) were thus deemed more plausible. Science was increasingly pitched against religion, as some of the gaps in human understanding began to be filled by scientific ideas that clearly contradicted the stories religion had told for centuries. But it was not only religion against which science was pitched. Increasingly science was heralded above all other cultural forms of knowledge and thinking.

Christopher Coenen traces a history of transhumanism aimed at showing that 'transhumanist visions could be an expression of displaced eschatological needs' (2014, p.38) with Darwin forming a major part of this displacement: 'human self-assertion…following the Darwinian blow to human narcissism' (2014, p.38). Coenen notes the influence of H.G. Wells in this formulation. For example, Wells states

> that growing majority of us who have been born since the 'Origin of Species' was written…perceive that man, and all the world of men, is no more than the present phase of development so great and splendid that beside this vision epics jingle like nursery rhymes, and all the exploits of humanity shrivel to the proportion of castles in the sand…This fact that man is not final is the great unmanageable, disturbing fact that arises upon us in the scientific discovery of the future, and to my mind, at

> any rate, the question what is to come after man is the most persistently fascinating and the most insoluble question in the whole world (1902, p.331).

Wells, a self-proclaimed socialist, speaks of looking 'back through countless millions of years and see[ing] the will to live struggling out of the intertidal slime' (Wells, 1902, p.331). This grandiose sentiment is part of a wider cultural shift which drew upon the awesome scope of nature as inspiration for a sense of the sublime. Coenen states:

> [d]uring the nineteenth century, gradualist geology, Darwinianism and cosmology expanded the time horizons of modernity in both directions. The distant past and the far future became subjects of inquiry and speculation. The awe-inspiring timescales and vastness of the universe created a new urgency of the mathematical sublime (2014, p.39).

Coenen goes on to link this to Kant's notion of the dynamic sublime: 'there is in our imagination a striving towards infinite progress, and in our reason a claim for absolute totality, regarded as a real idea…and this excites in us the feeling of a supersensible faculty' (Coenen, 2014, p.39). He recognises in Wells, and other formative voices of the late nineteenth and early twentieth centuries, an attempt to dignify humanity in a way that makes us part of and perhaps integral to the 'new insights into the immenseness of timescales and vastness of space' (Coenen, 2014, p.39). Transhumanist ideas are enabled by this shift as the sense of the sublime, invoked by the vast scale of space and time, can be something humanity is part of, rather than dwarfed by, if and only if humanity rises up to that scale itself.

Technoscience is thus sanctified as the means for the realisation of the new human self-assertion that is required after Darwin's strike against human narcissism. In his book *The Martyrdom of Man* (1872) Winwood Reade claimed 'it is Science alone which can ameliorate the condition of the human race' (2004 [1872], p.178). Reade's book explicitly introduced many of the ideas that transhumanists still promulgate to this day. Coenen argues that Reade 'developed the blueprint for the ideological nucleus of modern transhumanism by creating a specific set of visions of and a narrative about the future of humankind' (2014, p.41). Amongst these are space colonisation; the promise of a new human corporality; the idea of humanity functioning as a hive mind: 'its members think, feel act as one' (2004, p.179); the 'invention of immortality'; and the conviction that humanity will come to rule the universe as

a God-like post-human entity. Reade, writing before the 20th Century, could easily be confused with many of the modern transhumanist prophets when he says,

> These bodies which now we wear belong to the lower animals; our minds have already outgrown them; already we look upon them with contempt. A time will come when Science will transform them by means which we cannot conjecture…with one desire, they will labour together in a Sacred Cause: the extinction of disease and sin, the perfection of genius and love, the invention of immortality, the exploration of the infinite, and the conquest of creation (2004, p.188-9).

Reade's vision is also based on a teleological notion of progress, buoyed by the ever-expanding breadth of human understanding due to the accumulation of rationally construed knowledge. However, it is not just this Enlightenment inheritance that is evident in Reade's thinking. Coenen points out that his ideas 'reflected the imperialist context of his life and activities…providing a grand narrative in which all past human endeavours and British imperialism in particular were presented as steps towards a grandiose future' (2014, pp.42-3). He concludes, 'the genesis of transhumanism has been influenced by the notion of an "empire" and shaped by the imperialist reality of the late nineteenth and early twentieth centuries' (Coenen, 2014, p.41). Indeed, a 'dream of an empire to end all empires' (Coenen, 2014, p.38) forms a specific train of transhumanist thought that is fundamentally antithetical to notions of pluralism (which will be explored further in chapter 5). It is buoyed by the conception of a purity of reason leading to definitive truth and Utopian possibilities.

Contemporaneous to Reade is the Russian thinker Nikolai Federov, retroactively identified as the founder of Russian Cosmism, another proto-transhumanist philosophical movement dating from the turn of the 19th Century. Federov is considered by some contemporary Russian immortalists to be the first transhumanist (Bernstein, 2019). Russian immortalism can be seen as a subset of transhumanism, though its Federovian influence carries over some distinctive aims. They view 'evolutionary progress toward immortality [as] a prerequisite to moral progress' (Bernstein, 2019, pp.10-11) with some committing to Federov's further aim of employing technoscience to resurrect the dead. As Bernstein argues 'it is in the importance placed on redeeming the past while building a different future that Russian immortalism distinguishes itself from its Silicon Valley counterpart' (2019, p.229). Federov drew on the concept of the 'common cause' and understood that we have a duty not just towards

ourselves but all those who have lived to achieve immortality as well as 'populating other planets, and permanently establishing…a sort of Edenic "anti-entropic" condition' (Bernstein, 2019, p.17). Such kinship is an important aspect of Russian Cosmism that can be seen as contradictory to libertarian versions of transhumanism. The kinship remains anthropocentric as the 'regulation of nature' is called upon by Federov (1990) due to nature's blindness which 'left unregulated…drives the universe towards disintegration' (Young, 1979, p.113). Federov distinguishes this regulation from 'the pillage and plunder of nature ... through its exploitation and utilization' (Federov, 1990, p.79) as per capitalist relations, or the veneration of nature as per paganism. The centrality of human reason in perfecting nature's blind and destructive qualities renders nature our 'temporary enemy but eternal friend' (Federov, 1990). Federovians too, are firmly on the organicist side of the transhumanist schism regarding the question of the posthuman future being a purely silicon one or remaining carbon-based. Russian Cosmism clearly constitutes a proto-transhumanist vision as 'a holistic and anthropocentric view of the universe which presupposes a teleologically determined—and thus meaningful—evolution' (Hagemeister, 1997, p.185). Whilst the ethical dimension of kinship towards the dead is an unheralded concept in wider transhumanist discourse, the advocacy of Utopian possibilities, glorification of human reason and expansion of humanity beyond our bodily and planetary limitations are all familiar tropes.

A communal, kin-based, ethical underpinning is evident in proto-transhumanist thought beyond the Russian context. As noted, Wells was a socialist who saw technoscientific progress as fundamental to the moral progress which would arise from the perfectibility of humankind (Alexander, 2003). Meanwhile, Coenen sees in Wells' imaginaries 'a systematic othering of the non-scientific mind' (Coenen, 2014, p.45) and furthermore the 'targets of this "othering"…often were the British and Western elites' (Coenen, 2014, p.45). George Orwell sees in Wells a clear notion of good versus evil manifest in a conception of 'scientific man' versus 'romantic man': 'On the one side science, order, progress, internationalism, aeroplanes, steel, concrete, hygiene: on the other side war, nationalism, religion, monarchy, peasants, Greek professors, poets, horses' (1941, p.136). This battle in favour of technoscience against conservative forces was taken up by biologists J.B.S. Haldane and J.D. Bernal. Haldane's talk *Daedalus or Science and the Future* (1923), later published as a pamphlet, was an influential and inspirational call to arms for scientists and in particular biologists to take up their rightful role in shaping a radical future. In it he states:

> Let [the conservative] beware of him in whom reason has become the greatest and most terrible of his passions. These are the wreckers of outworn empires and civilizations, doubters, disintegraters, deciders. In the past they have been, in general, men like Voltaire, Bentham, Thales, Marx…Darwin furnishes an example of the same relentlessness of reason in the field of science. I suspect that as it becomes clear that at present reason not only has a freer play in science than elsewhere, but can produce as great effects on the world through science as through politics, philosophy, or literature, there will be more Darwins (Haldane, 1923, pp.78-9).

Here Haldane can be seen to challenge conservatives by celebrating the powers of reason writ large, but also of the pre-eminence of science as a force for shaping the world. Coenen (2014) argues that both Haldane and Bernal (who wrote *The World, the Flesh and the Devil* in 1929 which foreshadows the central concerns of contemporary transhumanism) built on Reade's earlier anti-religious sentiment: 'the transhumanism of Bernal and Haldane was arguably part and parcel of a broader fight against the old social order of their times…in which both men acted as famous "red scientists"' (2014, p.48). In the thought of Wells, Haldane and Bernal there is an evident assumption that scientific progress necessarily leads to ethical progress, indeed they are conflated to a singular notion of progress. Brian Alexander draws attention to this misguided conflation when he notes,

> World War I was a spectacular example of how the older morality was unable to cope with the forces unleashed by science. It was the first chemical, mechanised war…Men were ground up by machines. Haldane did not use the war as a rationale for halting science, but one for expanding it so that human beings could overcome the irrational passions that led to war (2003, p.16).

Ethical betterment is presumed inherent to instrumental progress even as the cataclysm of war screams of their contradictory potential. Even though proto-transhumanist visions sometimes offered more expressly inclusive ideals than their liberal and libertarian successor, they naively assumed that technoscientific progress would guarantee ethical outcomes.

Tight knit connections are notable between many of these proto-transhumanist thinkers. Wells had studied as a biologist under Thomas Huxley ('Darwin's bulldog') and was friends with Haldane and Bernal (Coenen, 2014). Thomas Huxley was the grandfather of Aldous Huxley (author of the dystopian sci-fi *Brave New World*) and Julian Huxley who is usually credited with the first usage of the term 'transhumanism'. The coinage is contested (Harrison

& Wolyniak, 2015) and even Huxley's first usage is not agreed upon. However, his 1951 article *Knowledge, Morality and Destiny* appears the likeliest candidate in which he states, 'Transhumanism…is the idea of humanity attempting to overcome its limitations and to arrive at fuller fruition' (Huxley, 1951, p.139). He later wrote, 'The human species can, if it wishes, transcend itself… in its entirety, as humanity. We need a name for this new belief. Perhaps transhumanism will serve' (Huxley, 1957, p.17). Julian Huxley is thus regularly cited as the first transhumanist. Max More, however, contends, 'Although Dante and Huxley used the term earlier, I first (and independently) coined the modern sense of the term…in my [1990] essay "Transhumanism: Toward a Futurist Philosophy" (2010, p.137). Sorgner claims that considering anyone prior to Huxley as transhumanist is anachronistic (2021). However, given the extent to which proto-transhumanists pre-empt modern transhumanist imaginaries and the diversity of positions in modern transhumanism, it is hard to justify the hard and fast delineation of Sorgner or More's claims. The central difference between proto-transhumanist and even Enlightenment and pre-Enlightenment human enhancement discourse and that of the twenty first century is the extent to which technological advances make some of these claims not theoretical but potentially imminent. Therefore, before turning to modern transhumanism, it is worth considering the history of the development of NBIC technologies.

The Rise of Converging NBIC Technologies

Biotechnology

Charles Darwin's cousin, Francis Galton, played an important role in the biological developments of the twentieth century though most of his work was undertaken in the nineteenth. Galton coined the term 'eugenics' (deriving from Greek, meaning 'well born') in 1883 to describe a potential method for enhancing the human species through selective breeding and sterilisation (Alexander, 2004; Rutherford, 2022). His emphasis on biological inheritance over environmental factors and the tractability of genetic dispositions proved highly influential. Winston Churchill, William Beveridge, John Maynard Keynes and Marie Stopes were all disciples of Galton's racist, classist and ableist theories in the UK (Rutherford, 2022). USA, Canada, Australia, Sweden, Denmark, Finland and Switzerland amongst other countries undertook State-sponsored eugenics programs (Bostrom, 2005). The

danger of such an ideology was brought into sharp focus by the Nazis, whose campaign of systemic mass murder constitutes another catastrophic rupture to the notion of straight forward teleological human progress that had developed out of the Enlightenment. A clear line can be drawn from Galton's ideas to the Nazi's genocidal atrocities (Rutherford, 2022). Despite the iniquitous history of eugenics, there is an evident legacy of eugenic thought in transhumanist discourse. Some emphasise the importance of liberalism to transhumanist thought (for example, morphological freedom) to distinguish their ideas from the state sponsored eugenics movements of the past (Sarewitz 2008; Levin 2021) whilst others consider 'human enhancement' to be a simple rebranding of eugenic aims (Fuller & Lipinksa, 2014).

Haldane, the proto-transhumanist biologist, played an important role in the development of biology and biotechnology in the twentieth century too. He was an effective science communicator as well as an important scientist. He rejected the simplistic and immoral claims of Galton's eugenics but saw the potential in biology to not just describe the nature of life, but to change it. Haldane was 'a product of th[e] long tradition of science-as-salvation and reason above all' (Alexander, 2003, p.15). For him, biology in particular offered the potential for humans to direct their own nature. Alexander's (2003) *Rapture: How Biotech Became the New Religion* identifies the importance of Haldane's lecture on the direction of twentieth and early twenty first century biotechnology. It also emphasises the eschatological underpinnings of much of biotechnology's development and how this was vital to the commercial growth of the industry. Despite the anti-religious, anti-establishment stance inherent to the thought of Haldane and Bernal, there is an evident quasi-religiosity to their invocations. Alexander emphasises this with his use of the term 'rapture' to tell the story of twentieth century biotechnology. Following Haldane's vision, the transcription of life into code has provided biology and biotechnology with the potential power to edit and direct life. In 1990 the Human Genome Project began the process of sequencing the human genome, a task that was completed in 2003. Gene editing is now a reality with possibilities ranging from egg selection, to three parent children, human-animal hybrids, and the prospect of artificial wombs for instance. Its potentialities are often held back as much by legality as technical feasibility. The development of CRISPR-Cas9 in 2012 is a significant advance. Jennifer Doudna, one of the co-creators of the technique, subtitled her book on the subject 'the unthinkable power to control evolution' (Doudna & Sternberg, 2017). Sheila Jasanoff points

out that she 'was not the first to link molecular biology with godlike power to make, or remake, humanity's destiny' (2019, p.6). Biotechnology has consistently been at the forefront of claims around our ability to tailor, select and enhance human capacities.

Information Technology

Information technology developed dramatically during the second half of the twentieth century. Computers, and later the internet, have radically transformed social, political and economic life. It is the pace of this development that has significant potential implications for transhumanists. The intelligent capacities which computers display have led to an array of speculations about and comparisons with human intelligence. Alan Turing's *Computing Machinery and Intelligence* (1950) gave rise to the concept of the Turing Test which imagines human and machine responses becoming indistinguishable to a human experimenter. Intelligence is a far more complex and contested notion than much speculation of this kind has credited. Evidently human consciousness cannot simply be reduced to a functional conception of intelligence. Nevertheless, comparisons between human and machine intelligence coupled with the heady pace of development of the latter have long since led to widespread conjecture about the possibility of machine intelligence eventually outstripping human intelligence. I.J. Good is often credited as the first to articulate the idea:

> Let an ultraintelligent machine be defined as a machine that can far surpass all the intellectual activities of any man however clever. Since the design of machines is one of these intellectual activities, an ultraintelligent machine could design even better machines; there would then unquestionably be an 'intelligence explosion,' and the intelligence of man would be left far behind. Thus the first ultraintelligent machine is the last invention that man need ever make (1965, p.33).

This notion is most commonly referred to in transhumanist parlance as 'The Singularity'. Vernor Vinge's *Technological Singularity* popularised the term. He says, 'Within thirty years, we will have the technological means to create superhuman intelligence. Shortly after, the human era will be ended' (1993, p.88). Bostrom has since argued that the term 'intelligence explosion' is more useful and exact (2014).

The assumption of continued and rapid growth of machine intelligence reinforces these predictions. Usually such an assumption references 'Moore's Law' which is often alluded to as a general notion of exponential growth of computer power and even broadly of technological capabilities. In actuality, Gordon E. Moore's original insight (1965) was a recognition that the number of transistors on an integrated circuit was doubling every year and a prediction that this would continue for the next 10 years. His prediction is not a law at all, and, as it is currently used, it is generalised beyond the scope of Moore's original thesis and usually refers to a doubling of computing power every 18 months. Ray Kurzweil (2000, 2006) has identified this exponential growth rate in a range of other technologies and often induces from this a law-like teleological certainty that such exponential growth is an inevitable, unstoppable process. Hans Moravec's *Mind Children* (1989) and *Robot* (1999) and Kurzweil's *Age of Spiritual Machines (*2000) consider the possibility of mind uploading, emphasising the potential duplicability of the human mind in digital form as well considering potential implications of artificial intelligence and robotics. Other important aspects of information technology development that hold high importance to the transhumanist creed are brain-to-computer interfaces (BCIs) and the internet of things. The former is important for those who envisage a fusion of the human and machine rather than the obsolescence of the human due to the superior machine intelligence implicit in Vinge's notion, or the pure digitisation of mind. The latter ultimately opens up all of nature to become part of a web of digitally interlinked information-mediated entities.

Cognitive Science

The history of cognitive science has been formatively influenced by information technologies and conceptual thinking about the functioning of information. Margaret Boden states,

> The field would be better defined as the study of 'mind as machine'. For the core assumption is that the same type of scientific theory applies to minds and mindlike artefacts. More precisely, cognitive science is the interdisciplinary study of mind, informed by theoretical concepts drawn from computer science and control theory (2006, p.12).

Control theory here is a reference to cybernetics. Jean-Pierre Dupuy (2009) also emphasises the criticality of cybernetics in the development of cognitive science highlighting its dual

aims of offering a physicalist account of nature and the mechanisation of the human. Whilst branches of cognitive science increasingly expand beyond this reductive frame (Damasio, 2000, 2005, 2012; LeDoux, 1998, 2002), it is the 'mind as machine' conception that underpins transhumanist thought on cognitive science. As Susan Levin states, transhumanists 'operate with an informational construction of the "cognitive"…This means that forms of rational engagement not reducible to informational manipulation—including the creativity required for fresh scientific discoveries and philosophical insights—are not included' (Levin, 2021, p.10). If the activity of the mind is conceptualised as a disembodied process, abstracted from its material instantiation, more outlandish possibilities are afforded to transhumanists. The notion of uploading the mind, offering digital immortality, is dependent on such a view.

Nanotechnology

Nanotechnology is another area which enables many of the most fanciful visions of transhumanists. Richard Feynman's speech, *There is Plenty of Room at the Bottom* (1959) was a formative address in shaping many of the ideas for future possibilities of nanotech. He was inspired by the 'biological phenomena in which chemical forces are used in a repetitious fashion to produce all kinds of weird effects' (Feynman, 1959) and proposed machine-based rather than biological assembly of molecular structures with atomic precision. K. Eric Drexler later popularised the nanotechnological potentialities in *Engines of Creation* (1986). He argues the prospective nanotech revolution has two key features derived from Feynman's conception: 'manufacturing using machinery based on nanoscale devices, and products built with atomic precision' (2013, p.x). This atomically precise manufacturing (APM) is very different from the existent multi-billion dollar nanotech industry of today. Drexler acknowledges that 'most research advertised as "nanotechnology" has…been irrelevant' (2013, p.279) to his APM based expectations. Furthermore, the chemist Richard Smalley has debated with Drexler about the feasibility of such non-biological assemblers (Drexler & Smalley, 1993) arguing they are not possible. If Drexler's ideas are feasible, then the possibility of what he terms 'radical abundance' (2013) emerges. Drexler explains,

> Coal and diamonds, sand and computer chips, cancer and healthy tissue: throughout history, variations in the arrangement of atoms have distinguished the cheap from the cherished, the diseased from the healthy. Arranged one way, atoms make up soil, air, and water; arranged another, they make up ripe strawberries

(1986, p.3).

APM enables the reconstitution of atoms into the arrangements we desire. The human body itself, comprised as it is of atoms, is thus rendered pliable to re-arrangement. As Bostrom explains 'The difference between the best times in life and the worst times is ultimately a difference in the way our atoms are arranged. In principle that's amenable to technological innovation…This is the basic goal of transhumanism' (in Garreau, 2005, p.242). He further notes APM 'could help us abolish most disease and aging, make possible the reanimiation of cryonics patients, enable affordable space colonization, and…lead to the rapid creation of vast arsenals of lethal or non-lethal weapons' (in Garreau, 2005, p.11). Indeed, the idea of nanobots, floating around our blood stream, identifying disease and quickly nullifying it must simultaneously open up the possibility of radically effective means of surveillance and coercion. Robert Freitas's Nanomedicine Vols. I&II (1999, 2003) investigates in detail possible medical applications of nanotechnology and his later collaboration with Ralph Merkle (2004) analyses the prospects of kinematic self-replicating machines building on the earlier ideas of Drexler.

Modern Transhumanism

These brief histories, broadly summarising the trajectories of the converging technologies of nanotechnology, biotechnology, information technology and cognitive science (NBIC), all contain ideas and thinkers that have a formative influence on transhumanism as an ethos as well as the technologies themselves. As has been established, transhumanist ideas have an ancient history, but the technological developments of the twentieth and early twenty first centuries have given rise to the movement as a serious, if still somewhat fringe, collection of thinkers. The pace of technological change was a counterweight to the ethical failings of the twentieth Century including the two World Wars. As Bostrom states,

> In the postwar era, many optimistic futurists who had become suspicious of collectively orchestrated social change found a new home for their hopes in scientific and technological progress. Space travel, medicine, and computers seemed to offer a path to a better world. The shift of attention also reflected the breathtaking pace of development in these fields. Science had caught up with speculation (2005, p.7).

Science Fiction once more bolstered the appetite for the spectacular belief in progress. Arthur C. Clarke, Isaac Asimov and Stanislaw Lem amongst others provided beguiling visions of techno-futurist worlds (Griffiths, 1980; Vint, 2014). The 'space race' and the six US manned moon landings from 1969 also propelled this techno-enthusiasm (Sorgner, 2021).

It is in this context that modern transhumanism can be seen to take root. F.M. Esfandiary is an important cultural influence on the modern incarnation of transhumanism. He changed his name to FM-2030 in the hope of celebrating his 100th birthday that year (alas, he died in 2000 and was cryonically frozen), in a time when life would be spectacularly improved: 'The name 2030 reflects my conviction that the years around 2030 will be a magical time. In 2030 we will be ageless and everyone will have an excellent chance to live forever. 2030 is a dream and a goal' (Esfandiary, 2000). Another reason for the name change introduces a notable cultural aspect of transhumanist development. Esfandiary saw names as part of a modern collectivist mentality, while he himself was a radical libertarian. His thinking fetishises science and rugged individualism influenced by the philosophy of Ayn Rand: 'Who are the revolutionaries of our time? They are the global travellers, global planners…cyberneticists. Space scientists, astronauts…Geneticists, biologists, physicists…immortalists, post humanists…revolutionizing the human condition in a fundamental way' (Esfandiary, 1970, p.82). He dismissed the 'old order' and identified 'upwingers' (1973) in contradistinction to those who held traditional family values and religious beliefs. In that regard he follows in the footsteps of Wells, Haldane and Bernal, but his libertarian radicalism was in the opposite direction from their socialist or communist convictions, signalling a shift between early proto-transhumanist and later transhumanist ideals.

Esfandiary befriended and influenced Natasha Vita-More (real name Nancie Clark) and Max More (real name Max O'Connor) who have since become a prominent transhumanist couple who co-edited *The Transhumanist Reader* (2013). More, along with T.O. Morrow (real name Tom Bell), founded the Extropy journal in 1989 (Vita More, 2019) and later the Extropy Institute (1992) which existed until 2007. Extropy is the conceptual inverse of entropy (which relates to the second law of thermodynamics and indicates a general decline into disorder). Thus, Extropians seek to fundamentally undermine the laws of physics through the

application of human reason. More describes the idea as 'the extent of a system's intelligence, information, order, vitality, and capacity for improvement' (1998). The principles of Extropianism were identified as: 'perpetual progress, self-transformation, practical optimism, intelligent technology, open society, self-direction, and rational thinking' (1998). Extropianism played a key role in bringing together numerous disparate groups that were gaining interest in technologies, futurist themes and transhumanist ideas such as cryonics. The Extropy mailing list starting in 1991, was a place where connections were made and ideas shared and prominent figures such as Anders Sandberg, Hal Finney, Robin Hanson and Eliezer Yudkowsky were notable contributors (Bostrom, 2005; Vita-More, 2019).

The World Transhumanist Association (WTA) (later becoming Humanity+, the largest transhumanist non-profit organisation) was founded in 1998 by Bostrom and Pearce. Bostrom claims the aim 'was to develop a more mature academically respectable form of transhumanism, freed from the "cultishness" [of Extropians]' (2005, p.15). The WTA established a Transhumanist Declaration, FAQ, and later, a constitution (Bostrom, 2005). In 2004 Bostrom founded the Institute for Ethics and Emerging Technologies along with James Hughes which aimed to 'promote the ethical use of technology to expand human capacities' (cited in Bostrom, 2005, p.16). Hughes (2004) has advocated a democratic version of transhumanism while More and many other Extropians have also toned down their libertarian impulses. Resultantly, inclusivity is increasingly recognised as one of the principles guiding these mainstream institutions' stated aims. A range of other institutions have also sprung up, not necessarily addressing transhumanist aims directly but engaging with existential risk and the specifics of some of the technologies with transhumanist potential. These include Machine Intelligence Research Institute founded in 2000 by Eliezer Yudkowsky; Kurzweil's Singularity University; The Future of Life Institute, founded by Max Tegmark and tech billionaire Jann Tallinn in 2014 (its board of advisors includes Elon Musk and included Stephen Hawking prior to his death); and The Future of Humanity Institute, an interdisciplinary research institute at Oxford University which is run by Bostrom and includes Drexler and Sandberg.

These institutions yield considerably more cultural weight, connections and esteem than the Extropy Institute. At the same time the transhumanist ideas have spread and diversified, taking on various new forms as investigated in Mark O'Connell's *To Be a Machine* (2017). For example, biohacking has become increasingly popular, with the makeshift, do-it-yourself spirit inherent to the risky body morphologies. Political parties have emerged in many countries, most famously with Zoltan Istvan's 2016 US Presidential campaign which involved travelling the country in a bus shaped like a coffin called the "Immortality Bus" (O'Connell, 2017). None have so far gained any serious electoral success. Another important strain of transhumanist development is amongst the billionaires of Silicon Valley. Often linked to a variety of libertarian ideas, Peter Thiel is the pantomime villain exemplar of these thinkers. Coenen (2014) points out this is in contradistinction to the 'outsider' position taken by Haldane and Bernal, and arguably even by later Extropian thinkers such as Esfandiary and More: 'transhumanism is increasingly the ideology of choice among important members of societal elites such as several leading figures of the U.S. computer and Internet Industry' (Coenen, 2014, p.49). O'Connell (2018b) suggests 'the Silicon Valley cult of eternal youth and transformative technology that it feeds off' combines with 'our current cultural anxieties – climate catastrophe, decline of transatlantic political orders, resurgent nuclear terror' (2018a) in a strange brew of paranoid survivalism and utopian fantasy. These are the fault lines upon which capitalism and transhumanism most clearly meet.

Indeed, Hughes (2014) notes that by 2009, the original Extropians, with the support of Thiel-backed organisations, replaced progressive thinkers within Humanity+ with a more libertarian minded leadership such as More, Patri Friedman and Sonia Arrison. Friedman, the son of anarcho-capitalist thinker David Friedman and the grandson of Milton Friedman, is the chairman of the Seasteading Institute. Hughes describes the ethos of the organisation as 'colonies of high-tech anarcho-capitalists freed from the constraints of democratic statism, like the CEOs who form the utopian colony at the conclusion of Ayn Rand's 1957 novel *Atlas Shrugged*' (Hughes, 2014, p.140). Whilst Hughes (2004) argues for an inclusive left-transhumanist agenda, a position he claims is largely supported by polls of WTA members, the coalition of anarcho-capitalist ideology, Silicon Valley billionaires and transhumanist Utopian imaginaries are a potent cultural and financial force culminating in 'the hegemonic control of transhumanist discourse by wealthy Californian libertarians' (Hughes, 2014, p.143). The antipathy to democratic oversight, lineage of libertarian philosophy and the

calculating logic of rational utilitarianism can be seen in what Vita-More (2019) identifies as three key concepts of 'Transhumanism Now': the proactionary principle, morphological freedom and existential risk. These concepts will be explored and critiqued throughout this thesis.

Critiques of Transhumanism

Given the radical and at times outlandish claims of transhumanists about what the future of humanity promises, it is unsurprising that the philosophy has drawn a range of criticism.

Bioconservative and New Critiques

Perhaps the most direct and prominent critics have been labelled bioconservatives. Francis Fukuyama (2004) famously called transhumanism the world's most dangerous idea and posits the notion of Factor X to defend a unique human essentialism (2002). Meanwhile, Leon Kass, influential advisor to George Bush Jr., complains 'Homogenisation, mediocrity, pacification, drug induced contentment, debasement of taste, souls without love and longings – these are the inevitable results of making the essence of human nature the last project of technical mastery' (Kass, 2002 in Ross, 2019, p.23). Dale Carrico characterises these bioconservative positions as 'oppos[ing] medical and other techno-transcendental outcomes in the name of a defence of the natural deployed as a moral category' (Carrico, 2013, pp.54-5) and they especially involve an essentialising defence of human nature. Carrico, who coined the term 'technoprogressive', is also worth mentioning for his ultimate rejection of that most progressive wing of transhumanist thought. He states,

> technoprogressivisms will never properly crystallize into a tribal designation, an identity movement, a political party machine, a subcultural movement, an army marching in lockstep toward 'the future,' or any such thing. The future is not a place or a 'goal': futurity is the political condition of plurality, democracy, freedom and it is open, unpredictable, collective, promising, unforgivable or it is nothing at all, whatever it calls itself. Democratic and progressive movements are inherently anti-monolithicizing, inherently pluralizing (Carrico, 2007, n.p.).

Thus, for Carrico, the nature of transhumanism, as a tribal ideology that proclaims the benefits of enhancing the human condition through the use of applied technoscience, is inherently wrongheaded: true technoprogressives should resist alliance with transhumanists.

Recently, a number of volumes have been published that offer a variety of philosophical critiques of transhumanism. Particularly notable are Allenby & Sarewitz's *The Techno-Human Condition* (2011), Benjamin Ross' *The Philosophy of Transhumanism* (2020) and Susan B. Levin's *Posthuman Bliss* (2021), all of which will be drawn upon extensively in Chapters 4 & 5. Allenby & Sarewitz critique the transhumanist dependency on the outdated figure of the liberal human subject, and the failure of transhumanists to acknowledge and contend with the 'wicked complexity' in which we are enmeshed. Ross emphasises transhumanists' framing of life as a technical problem through its reductive computational and materialist view and considers transhumanism as a totalizing ideology, in accordance with Anglo-American eugenics. Levin identifies the tension between the utilitarian underpinning of transhumanist thought and its proclaimed libertarian individualism, its essentialising of rationality as uniquely human and draws on Aristotelean virtue ethics as a critique of the values implicit in transhumanism.

Contradictions of Enlightenment Thought and Postmodern Reflections

Another notable source of criticism of transhumanism came in the *Global Spiral's Special Issue on Transhumanism* (2009). Don Idhe, Katherine Hayles and Jean-Pierre Dupuy were amongst those whose essays precipitated a response from transhumanist thinkers in a follow-up edition. The exchange was collated in a book entitled *Transhumanism and Its Critics (2010).* In her *History of Transhumanism* Vita-More characterises this insightful and valuable collection of critiques as 'misinformation' (2019, p.53) claiming they represented a 'postmodernist stance with forked tongues' (2019, p.54). This typifies transhumanist responses to external criticism, whilst the magmatic quality of transhumanist thought evinces a surprising amount of tolerance, acceptance and pragmatism within the philosophy itself. Whilst Vita-More invokes postmodernism here pejoratively and inexactly, transhumanism, with its rational essentialism and hubristic epistemologial certainty, typifies the failure of modernist thought that postmodernism seeks to move beyond. Postmodernists critique

Modernism for 'its search for a foundation of knowledge, for its universalising and totalising claims, for its hubris to supply apodictic truth, and for its allegedly fallacious rationalism' (Best & Kellner, 1991, p.4). Hughes suggests most transhumanists are unaware of the potency of this critique and that they 'argue the Enlightenment case for Reason without awareness of its self-undermining nature' (2010, p.3). His essay *Contradictions from the Enlightenment Roots of Transhumanism* (2010) is uncharacteristic in exemplifying an acknowledgement of central inconsistencies of transhumanism from one of its main proponents. The problems it concedes are worth consideration especially in relation to postmodernist critique.

For Jean-François Lyotard (1984), the postmodern condition constitutes a state of 'incredulity to metanarratives'. Transhumanism can be conceived as a simplistic metanarrative of teleological human progress: 'faith in inevitable progress toward Singularities and cosmological engineering' (Hughes, 2010, p.10). Hughes recognises this as a legacy of the Enlightenment which 'secularized religious eschatology into a narrative of inevitable human social, scientific, and moral progress' (Hughes, 2010, p.10). Whilst transhumanism seems an outdated discourse from a postmodern perspective, another aspect of Lyotard's reading of postmodernism chimes well with transhumanism. Lyotard (1984) predicts the computerisation of knowledge will lead to a pragmatic attitude to knowledge. Without strict grand narratives into which forms of knowledge must cohere, a more instrumentalist attitude can prevail. As Best & Kellner describe it, postmodernism 'rejects modern assumptions of social coherence and notions of causality in favour of multiplicity, plurality, fragmentation, and indeterminacy' (Best & Kellner, 1991, p.4). As mentioned, transhumanism is extremely tolerant of very different versions of human enhancement. For example, there are positions in transhumanism which contradict the metanarrative of the teleological account of progress due to 'their rational awareness of the possibility of human stagnation or extinction' (Hughes, 2010, p.10). Bostrom's focus on existential risk exemplifies this strand within transhumanism and its related offshoot of 'Longtermist' thinking (Torres, 2021) which will be explored further in Chapter 6. The silicon and carbon-based versions of superlongevity provide another example of this plurality within transhumanist discourse. Transhumanism thus typifies defenders of modernist theory in 'attack[ing] post-modern relativism, irrationalism and nihilism' (Best & Kellner, 1991, p.4) whilst simultaneously being well-described by postmodernist predictions.

The question of subjecthood is also challenged by postmodernism in a way that unsettles transhumanist discourse. Postmodernism 'abandons the rational and unified subject…in favour of a socially and linguistically decentred and fragmented subject' (Best & Kellner, 1991, p.5). The very technologies that transhumanists advocate further erode the sustainability of the myth of the liberal human individual. Hughes is a notable exception within transhumanist discourse in recognising this when he states, 'transhumanist technologies of radical personal modification have made newly relevant this unresolved contradiction between the Enlightenment's liberal individualism and its erosion of the rational agent' (2010, p.14). He further acknowledges 'Contemporary transhumanism has yet to grapple with the radical consequences of the erosion of liberal individualism on their projects of individually chosen enhancement and longevity' (2010, p.14). This points to a central contradiction in transhumanist thinking that is never resolved. On the one hand, there is a presumed superior rationality towards which we are progressing. On the other hand, choices for what constitutes enhancement are the domain of each individual. Where individuals act or desire irrationally, which version prevails? More implies a presumed superior rationality bringing about post-democratic politics underpinning the contingency of a commitment to individual human rights:

> Democratic arrangements have no intrinsic value; they have value only to the extent that they enable us to achieve shared goals while protecting our freedom. Surely, as we strive to transcend the biological limitations of human nature, we can also improve upon monkey politics? (More, 2004, n.p.).

Persson & Savulescu's (2012) 'God Machine' further exemplifies a presumed superior reason with apodictic knowledge overriding the purported liberalism.

Furthermore, whilst transhumanists tend to eschew ethical debates about what constitutes enhancement by outsourcing such considerations to individual choice or presuming instrumental progress itself resolves all ethical questions, insofar as ethics is a consideration another contradiction arises. Hughes refers to the purported 'moral universalism, that ethics and law should apply equally to all persons' advocated by the Enlightenment, but also maintains the same focus on criticality and reason 'generated its postmodern critique, that the rights of man are not self-evident and absolute, and that the "moral universals" are in fact

deeply historically situated' (Hughes, 2010, p.12). The underlying assumption that enhanced reason will necessitate superior ethics usually enables transhumanists to defer commitment to particular values, but the incongruity between recognising perspectival and contextual values and supposing a universalist truth through enhanced reason remains. Whilst Hughes acknowledges transhumanism's failures to contend with the disintegration of the liberal human subject and the situated and perspectival nature of ethics, one area of philosophy busily investigates these very questions in the context of technogenesis: critical posthumanism.

Critical Posthumanism

Although the term 'posthuman' is used in transhumanist literature, it usually refers to a technologically enhanced entity derived from the human, but no longer intuitively recognisable as such. The posthuman in transhumanism is often seen as the aim or telos of its endeavours. 'Critical Posthumanism', however, has an entirely different set of concerns. Posthumanism, in this sense, refers not to the end of humankind and its replacement with a successor species, but rather to the end of the conception of humankind as it is understood in post-Enlightenment humanist discourse from which transhumanism emerges. The 'liberal human subject' is its primary target, an entity that entirely underplays the relational ontology of 'the human'. That said, 'posthumanism' is not a singular and clearly delineated discourse, and it is worth outlining some of its genealogies.

Cary Wolfe (2010) identifies the emergence of the term in contemporary critical discourse in the mid-1990s, though he places the roots of its primary genealogy in the 1960s with Foucault's claim that 'man is an invention of recent date. And one perhaps nearing its end' (2002, p.387). This conceptualises 'man' as 'a social construct linked to formations of power' (Cudworth & Hobden, 2011, p.143). As Rosi Braidotti explains:

> At the start of it there is He: the classical ideal of 'Man', formulated first by Protagoras as 'the measure of all things', later renewed in the Italian Renaissance as a universal model and represented in Leonardo Da Vinci's Vitruvian man. An ideal of bodily perfection which…doubles up as a set of mental, discursive and spiritual values. Together they uphold a specific view of what is human about humanity. Moreover, they assert with unshakable certainty the almost boundless

> capacity of humans to pursue their individual and collective perfectibility. That iconic image is the emblem of humanism as a doctrine that combines the biological, discursive and moral expansion of human capabilities into an idea of teleologically ordained, rational progress (2013, p.12).

Foucault's 'end of man' thus draws attention to the unspoken assumptions that at once duplicates and exacerbates European, patriarchal modes of domination. The very definition of the human is 'Man', a Eurocentric physical ideal of man at that: white, able-bodied, heterosexual, 'rational'.

From its beginnings, humanism can be seen to measure and exclude, failing to pay heed to a differentiated humanity, neglecting its promise of affirming the dignity and worth of all people. As Wolfe explains, 'the philosophical and theoretical frameworks used by humanism to try to make good on those commitments reproduce the very kind of normative subjectivity – a specific concept of the human – that grounds discrimination…in the first place' (2010, p.xvii). Critical posthumanism rejects the moral universality presumed by the 'rational ideal' and following Nietzsche draws on perspectivism for its ethical and epistemological underpinnings (Ferrando, 2019) and the pluralism made possible by feminist epistemologies such as Donna Haraway's 'situated knowledges' (1998, p.188). While highly critical of the discriminatory aspects of humanism, critical posthumanists often confess to misgivings about the denouncement of humanism in its entirety: 'Complicitous with genocides and crimes on the one hand, supportive of enormous hopes and aspirations to freedom on the other, Humanism somehow defeats linear criticism. This Protean quality is partly responsible for its longevity' (Braidotti, 2013, p.16). Wolfe (2010) too, suggests there is much to be admired in humanism and its rejection 'tout court' would be erroneous. Enlightenment ideals and some aspects of humanism may potentially thrive in critical posthumanist thinking which Stefan Herbrechter frames as

> a defence and possibly a re-invention of some humanist values and methodologies which, in the face of a fundamental transformation provoked by digitalization and the advent of ubiquitous computing and social media, appear to have become obsolete, or to be in urgent need of revision (2018, p.95).

However, the critical posthumanist re-inventions counteract the transhumanist celebration of the discriminatory, differentiating capacity of reason as method and justification for its ends.

Herbrechter's description also points to a further posthumanist genealogy which can be traced from Haraway's *Cyborg Manifesto* (1985) in which she claims 'We are all chimeras, theorised and fabricated hybrids of machine and organism; in short, we are cyborgs' (1985, p.66). Haraway celebrates the potential in the erosion of boundaries that science and technological progress augur, calling for '*pleasure* in the confusion of boundaries and for *responsibility* in their construction' (1985, p.66). In particular, Haraway signals three vital boundary breakdowns: that of human and animal, organism and machine, and the boundary between physical and non-physical. She states,

> Late twentieth-century machines have made thoroughly ambiguous the difference between natural and artificial, mind and body, self-developing and externally-designed, and many other distinctions that used to apply to organisms and machines. Our machines are disturbingly lively, and we ourselves frighteningly inert (1985, p.69).

The responsibility Haraway preaches is what clearly distinguishes her project from the 'techno-masculinism' and 'blissed-out techno-idiocy' (Gane & Haraway, 2006, p.146) of transhumanism. N. Katherine Hayles also emphasises that the humanist paradigm is uprooted by these collapsing boundaries:

> the posthuman privileges information pattern over material instantiation, so that embodiment in a biological substrate is seen as an accident of history rather than an inevitability of life… the posthuman view configures human being so that it can be seamlessly articulated with intelligent machines (1999, pp.3-4).

The human is no longer the measure and grounding of all other matter, rather computation is. For Pramod Nayar, 'Posthumanities asks: what is human in the age of biotech, the connected/hybrid organism, the distributed self, but *also in* the age of genocide and human rights violations?' (2009, p.11). It is not radical technological change alone that undermines the liberal human conception. As Halberstam & Livingstone state 'posthuman bodies are the causes and effects of postmodern relations of power and pleasure, virtuality and reality, sex and its consequences' (1995, p.3), thus they seek to challenge 'the coherence of the human body…[as it] collapses into sub-, inter-, trans, pre-, anti-' (1995, p.viii). Nevertheless, the 'idea of the self-enclosed biological organism that is the human is eroded in biotechnology and computerisation… [and] is one whose self extends beyond the immediate body, whose

identity is linked to others' (Nayar, 2009, P.3). Thus, technological development plays a key role in eroding the cogency of the myth of the liberal human subject. Elaine Graham (2002) too emphasises the 'challenge to the fixity of human nature': Graham uses the term 'ontological hygiene' as the idea of the clearly delineated and demarcated human and consistently undermines its cogency. Furthermore, her use of 'post/human' as her preferred label functions as 'a questioning both of the inevitability of a successor species and of there being any consensus surrounding the effects of technologies on the future of humanity' (2002, p.11). Thus, in this genealogy, although the liberal human subject is still a primary target, concerns around digital, postmodern culture and material technological challenges supplement the theoretical onslaught upon the fixity of human nature.

Another facet of critical posthumanism more clearly places the area of thought beyond the scope of human-centric thinking. In this regard, posthumanism is less concerned with the enabling of the creation and replication of power differentials between people than with the domination by humans over non-human nature. As Braidotti explains,

> Posthuman critical theory unfolds at the intersection between post-humanism on the one hand and post-anthropocentricism on the other. The former proposes the philosophical critique of the Western Humanist ideal of 'Man' as the allegedly universal measure of all things, whereas the latter rests on the rejection of species hierarchy and human exceptionalism (2018, p.339).

Posthumanists claim there is an ontological as well as an ethical deficiency in anthropocentric thinking, namely the human failure to recognise themselves as embedded and embodied within nature: 'the premise that humanity alone is not a spatial and temporal web of interspecies dependencies' (Haraway, 2007, p.11). This ontological failing leads to the dangerous and destructive use and abuse of nature as merely a resource. As natural beings, humans' domination over nature constitutes a self-defeating, inherently contradictory conquest.

It further leads to the unethical abuse of non-human animals due to the human exceptionalism explicit in the 'the human-centric understanding of the human as the unique animal striving in the world' (Cudworth & Hobden, 2011, p.146). Whilst it is easy to find evidence of an anthropocentric worldview in cultures that pre-date the Enlightenment, Enlightenment

humanist values have tended to reinforce these attitudes and provide a conceptual framework of ourselves separate from nature – an illusion that leads Bruno Latour (1993) to claim 'we have never been modern'. The long-standing human quest for emancipation from nature is enabled by the cognitive dissonance required to separate ourselves, placing the human in a singular and exclusive realm. The illusion also bolsters the instrumental rationality that underlies the humanist and derivative transhumanist mentality. Science has thus far proven just another enabler of this pattern as Cudworth & Hobden explain: 'The emergence of science as an arbiter of the natural simply replaced a view of the human having dominion over the rest of nature. Both perspectives point to a sharp distinction between the human and the rest of nature' (2018, p.69). Indeed, according to Latour (1993), science plays a role in a 'purification' – the false separation of nature from culture, whereas in reality 'hybridization' constantly takes place where nature/culture combinations exist in abundance.

How life is categorised and governed through discursive, anthropocentric, hierarchical conceptualisations is a central question to critical posthumanists. Building on Foucault's investigation of biopolitics which seeks 'to ensure, sustain, and multiply life, to put this life in order' (2002, p.138) and Agamben's recognition that the 'fundamental categorical pair of Western politics is…that of bare life/political life, *zoe/bios*, exclusion/inclusion' (1998, p.8), critical posthumanists deconstruct the paradigmatic humanist framing of the notion of life. Anthropocentric thinking has led to the privileging of the presumed 'rational', political sphere of life (bios) and the expulsion of the rest of life (zoe). Recalling the discriminatory legacy of humanism, it is unsurprising that even humans often find themselves reduced to bare life (zoe) and on the vulnerable side of this exclusive dualism. For Agamben, this is represented by the figure of homo sacer (1998), those who can legitimately be killed, whilst Achille Mbembe introduces the notion of necropolitics in which the 'exercise [of] sovereignty is to exercise control over mortality and to define life as the deployment and manifestation of power' (2003, p.11). The postanthropocentric concerns of posthumanists sees them celebrate zoe (Braidotti, 2006, 2013, 2019) and reject the false binary dichotomy and the hierarchy it entails. However, transhumanists too co-opt the strategy of postanthropocentricism, but not in order to expand the circle of care and compassion, but rather to radicalise the discriminatory power of 'rationality'. Fuller (2019) suggests the notion of the 'Republic of Humanity' within which subjects are conferred rights, but such subjects do not need to be human. They merely need to meet others within the republic as an equal

and be capable of self-assertion. Fuller's unspoken aim is to confer rights upon machinic capital, such as artificial intelligences and exclude those humans that are unable to utilise such machines (perhaps through lack of understanding, training or ownership) rendering them homo sacer, bare life, without rights. This argument will be explored more thoroughly in chapter 6.

The transhumanist tendency to downplay or ignore the parlous state of life on planet Earth resulting from anthropocentric practices is in contradistinction to critical posthumanists for whom 'recognition of shared vulnerability and imperilled condition…is nothing short of a revolutionary process' (Cudworth & Hobden, 2018, p.154). Indeed, whereas transhumanists tend to focus on life extension possibilities for individual humans, critical posthumanists mourn an age in which the 'death horizon' of extinction signalled by the nuclear era is extended to most species in 'the posthuman era of the anthropocene' (Braidotti, 2013, p.111). Climate change signals all too clearly the limitations of human reason to overcome the deep complexity in which we are enmeshed: a blow to the fragile ego of transhumanist aspirations. The threat of extinction is spuriously quantified in transhumanist discourse under the moniker of 'existential risk', which determinedly doubles down on anthropocentricism by only considering human life in its calculations. Posthumanists, meanwhile, take a different approach, recomposing 'humanity around a commonly shared bond of vulnerability [that] connects the human to the fate of other species…Death and destruction are the common denominators for this transversal alliance' (Braidotti, 2013, p.111). Indeed, for posthumanists our civilisation is dying, such is the pathological killing that it has produced, but it offers the process of learning to live better through this event: 'there are many manners of dying, some being more ugly [sic] than others' (Stengers, 2015, p.10). There is an array of postanthropocentric visions of 'dying well' from the voluntarism for extinction called for by Patricia MacCormack's (2020) *Ahumanist Manifesto*, to Haraway's call to 'make kin, not babies' (2016) though not all envisage a world in which humans no longer figure.

The critical posthumanist insistence on facing the reality of our times signals a deeper engagement with science than transhumanists can claim. For a philosophy that heralds scientific reason as its foundation, transhumanism focusses firmly on imaginary futures, divorced from current crises and indifferent to their causes. Haraway, whilst rejecting the

label of ‘posthumanist’, sums up the postanthropocentic aspects of the philosophy in stating, ‘when I say I am a creature of the mud not the sky, I mean I am an entity given to the powers of the Earth. I am Terran. I am not astralized, not in awe of the chief gods or the single gods, I am Terran’ (Haraway, 2016a, p.272-3). Inspired, by the claim, Cudworth & Hobden call for a *Terraist Manifesto* which advocates causing less harm and ‘promoting flourishing of life in [our] communities’ (2018, p.156). Death and dying may figure heavily in posthumanist discourse, but it is no less committed to life and living than transhumanism. The difference lies in the recognition that the discriminatory, anthropocentric life ways that have brought about our parlous state demand of us a radical rethinking. Transhumanism narrows its focus to humancentric progress supercharged by technogenesis. This restricted vision is inherently anti-scientific given our embeddedness in multiple fragile relations, and ethically problematic as it exacerbates the carnage of our times.

Posthumanism and Transhumanism in Dialogue

Whilst posthumanists rarely direct their critiques at transhumanism specifically, their discourse in many ways contradicts the foundational assumptions of the transhumanist frame. Attempts have been made to bring these philosophies into conversation. *The Beyond Humanism* conference series (starting in 2009), its book series (from 2011) and the related *Journal of Posthuman Studies* which began in 2017 are notable in this regard (Sorgner, 2021). Paul Jorion’s edited volume *Humanism and Its Discontents* (2022) offers a further contemplation on the relationship between these philosophies. Jaime Del Val and Stefan Sorgner have also developed the philosophy of metahumanism which situates itself as ‘a critique of some of humanism's foundational premises such as the free will, autonomy and superiority of anthropoi due to their rationality’ (Del Val & Sorgner, 2010). Its focus on relationality, becoming and embodiment (or perhaps meta-embodiment) along with its rejection of humanism would suggest a strong identification with posthumanism and a rejection of transhumanism. However, its initiators are two very different thinkers with Sorgner situating metahumanism as attempting a dialogue between post- and transhumanism and Del Val emphatically rejecting transhumanism as an ideology. In a sense, such contestation is fitting for the radical pluralism espoused by the movement: ‘the holding together of multiple and contradictory tendencies is an underlying claim embedded in the

very proposal of the Manifesto' (Del Val, 2020). Fuller (2019) meanwhile, argues that posthumanism and transhumanism can be broadly identified as contrasting political poles that will come to replace the traditional polarity of right and left. For him, transhumanism represents an up pole and posthumanism the down, with the former looking skyward for its aspirational trajectory and the latter determinedly remaining Earth-bound in its purview. Fuller's short-sighted claim neglects to recognise that questions of social justice, equality and plurality are far from settled by pinning colours to the mast of human enhancement. Nevertheless, critical posthumanism does offer a potent source of resistance to transhumanist claims and aspirations.

Critical posthumanism will underpin much of the critique of the transhumanist philosophy in this thesis. In particular, Barad and Hayles will be drawn upon in Chapter 5 to offer alternative conceptualisations to the simplistic notion of human agency upon which the transhumanist concept of morphological freedom depends. Hayles' framework also emphasises the role of non-conscious cognition which counters the rational essentialism of transhumanist thought. Chapter 7 will utilise critical posthumanist discourse in developing an ethical framework for countering the pathologies of technogenetic progress under capitalist relations. In particular, it will emphasise the compassionate relationality inherent to critical posthumanist thought as a 'a politics *for* all that lives, and *for* the purpose of eliminating multiple forms of oppression' (Cudworth & Hobden, 2018, p.136); and the notion of the virtual which extends this compassionate relationality into the future.

Conclusion

Transhumanism can most simply be understood as an ideological stance in favour of utilising technology to enhance or upgrade the human condition. There are various versions of what such enhancement should entail and thus there are numerous schisms within transhumanist discourse. Some of the most important transhumanist thinkers (such as Kurzweil, Savulescu and Fuller) do not necessarily identify as transhumanists. Nevertheless, they are considered transhumanists in this thesis as their ideas exert such an influence on transhumanist thought and they all expressly advocate human enhancement technologies. The breadth of visions means it is less useful to consider it as an identitarian political movement, but rather as a

proactionary (More, 2013b) stance to radical technological developments. Underpinning transhumanist thought is a hyper-humanism, that embraces the humanist legacy of essentialising and exceptionalising human reason and seeing it as a source of transcendent potentiality.

The most forceful public challenge to transhumanists has been from bioconservatives who generally attack transhumanism for its threat to the dignity and sanctity of humans. They appeal to some essential humanness as a defence against the threat transhumanism represents. This thesis will pay little or no attention to this line of argument. Instead, it will develop its critique in part from a critical posthumanist standpoint. Such a critique attacks the humanist assumptions on which transhumanism's philosophical lineage depends. Another part of the critique levelled at transhumanism herein is that it reflects and threatens to exacerbate many of the excesses of capitalism. It is the logics of capitalism that will next be considered.

Chapter 3: The Logics and Trajectories of Advanced Capitalism

Introduction

This chapter primarily emphasises that the dynamic unfolding of technogenesis is bound up within capitalist relations. To abstractly argue for human enhancement technologies without thinking through the logics of capitalism is egregiously myopic. The chapter will open with reference to Marx's theory of capital, in part due to the integral role his ideas play in much of the critiques of capitalism that followed, but also because certain Marxist insights are pertinent to my critique of transhumanism. The notions of reification and instrumental rationality developed by critical theorists will then be introduced, again concepts that recur throughout the thesis. 'Advanced capitalism' and 'technocapitalism' are defined and analysed in order to demonstrate contemporary capitalism's neoliberal ideology and its imbrication with technological development. Further pertinent logics of contemporary capitalism will then be identified, particularly drawing on the work of Mark Fisher and Saskia Sassen's focus on expulsions and concentrations.

Whilst transhumanist aims are currently developing in an advanced capitalist context, it is acknowledged that this may not continue to be the case. The environmental crisis caused by and threatening to the logics of capitalism will be considered, followed by the economic crises of capitalism which have deepened in the context of the global pandemic. The implications of the emergence of information as the most valuable asset in society will then be considered. On the one hand, the inherently sharable and non-rivalry nature of information gives rise to possibilities of postcapitalism, as the value this information bequeaths has the potential to exist for free, outside of markets. On the other hand, information coupled with powerful algorithms could lead to new formations of radical power subverting postcapitalist aspirations and exacerbating inequities within the capitalist paradigm. This dynamic is more fully explored in chapter 4. The potential for significant automation unemployment to intensify the structural inequities and exacerbate the dynamics of expulsions and concentrations is then explored. Finally, the philosophy of Accelerationism is considered. It is particularly pertinent as Accelerationists seek a similar proactionary stance to technological

development as transhumanists. However, in their case the aim is either to bring the contradictions inherent to capitalism more quickly to the fore, or to make the very logics of capitalism the defining force of the trans- or posthuman becoming.

The chapters following on from this are the main theoretical conceptualisations of the thesis. Data Totalitarianism, Transcendent Conformity, and Systemic Dehumanisation will each seek to develop their own arguments for some of the possible and concerning trajectories of currently emerging processes and structures arising from the co-development of advanced capitalism and radical technological powers with transhumanist potentialities. In order to do so, each will draw upon many of the logics, trajectories, problems and concerns that this chapter seeks to outline. Whilst this chapter argues for a conception of capitalism in the context of critical theory, and also offers some speculative scenarios deemed worthy of consideration, its main purpose is to provide a platform on which the rest of the thesis can build.

Marx's Theory of Capital

At the heart of a Marxist analysis is the idea that capital creates a dynamic process of endless accumulation and that the role of labour necessitates a perpetual class struggle by pitting workers' interests against those of capitalists. Capitalism for Marx is growth oriented, depends on the exploitation of labour for the production of goods and is technologically and organisationally dynamic (Harvey, 1990).

Marx defines capital in different ways across his vast body of work. Perhaps the most useful conception of it is 'value in motion' (Harvey, 2017): it is a process, a flow, rather than a material entity. However, at various stages of the process the value of capital will be manifest in a variety of different material forms including, money, commodities, the means of production and labour, all of which need some explanation in Marxist terms. 'Value' is one of the key concepts of Marx's analysis of capital. Using his dialectical method, he breaks value into two categories – 'use value' which is the inherent worth of a commodity, and 'exchange value' which is its value on the market (its price) which is determined in relation

to all other commodities. Thus ‘use value’ exists independently of a market or other system of exchange, whereas ‘exchange values’ exist only in this context.

This distinction opens up another vital notion, that of ‘surplus value’. Importantly, profit derives from the ‘surplus value’ of labour which is gained through the exploitation of the worker during the production process. This occurs because the worker is forced to sell their labour as a commodity. Labour to Marx is ‘the worker’s own life-activity, the manifestation of his [sic] own life’ (1977, p.250), but in the context of capitalism, labour is objectified. The capitalist purchases the worker for a given number of hours. The ‘exchange value’ of the commodity the worker produces in that period may exceed the cost of the means of production and the labour value purchased by the capitalist thereby providing the capitalist with ‘surplus value’. Herein lies one of the important features of the class struggle between worker and capitalist. Their interests will always be in conflict. The higher the wage the worker demands, the lower the ‘surplus value’ the capitalist can accrue. Marx argues that the price of labour will tend to drop to the ‘cost of production of labour’ which is the amount needed to keep the worker alive, fit to work and able to reproduce the working class. If labour can organise, it can drive up the conditions increasing the cost of labour. Thus, the capitalist will always seek to undermine organised labour and maintain a standing reserve army of labour to ensure the worker has little bargaining power. Marx theorises the cost of the means of production to be fixed and at a level with competitors so surplus value cannot, in the long term, be drawn from the means of production. Value is therefore ‘crystalized social labour’ (1977, p.379) and surplus value can only come from labour.

The above description of the process of capital as ‘value in motion’ appears cyclical. However, it is better thought of as a spiral. For capitalism to function effectively there is a presumption of perpetual growth as surplus value is extracted from the worker, realised and distributed throughout the system endlessly. As Harvey states, ‘capitalism has to prepare the ground for, and actually achieve an expansion of, output and a growth in real values, no matter what the social, political, geopolitical, or ecological consequences’ (1990, p.180). This growth represents a permanently increasing disparity between capitalist and worker. The worker is not only alienated because their labour is objectified, and its benefits are realised by the capitalist, but also because this process puts workers in a perpetual cycle of

disempowerment. As the capitalist extracts the surplus value and the total amount of capital at any given moment grows, the worker will have a smaller and smaller share of it, thus labouring towards their own domination. As our desires are of a social nature and relatively determined by comparison to the social world in which we live, even if wages are increasing in real terms, they will be doing so to a lesser degree than capital at large for the presumption of profit necessary to keep the capitalist wheels churning. Furthermore, the accumulation of capital is limitless. The capitalist cannot reach a point of satiation because they too are embedded in a systemic process in which they also play the pre-determined role of having to compete with other capitalists. Indeed, Marx theorises that the nature of competition and the advantages that can be accrued through economies of scale mean that even if the capitalist system begins with highly, dispersed, decentralised markets, they will increasingly tend towards monopoly and oligopoly control. Thus, the capitalist is hostage to the systemic process and a victim of the coercive laws of competition. At every turn the system pits capitalist against worker, capitalist against capitalist and worker against worker, thus social relations are dominated by competition instead of co-operation and are mediated through objectification and commodification.

These coercive competitive social relations have another important outcome which relates to capital's relationship with technology. For Marx capitalism is singular in its dynamic propensity to inspire technological and organisational change. As the exchange value of commodities is based on social average prices set by the market, they seek additional surplus value by temporary advantages within the means of production which requires constant improvement in technology and organisation. Marx's interpretation is that in the long term any technological or organisational advantages will be copied (for Marx machines can thus only ever be constant capital, not the source of surplus value) and so living labour is the only real permanent source of surplus value. This, however, does not stop capitalists seeking these short-term benefits. This dynamism, which leads to greater productivity, can also result in higher standards of living. If the productivity gains occur in goods needed to reproduce waged labour this can actually lower the price of labour, as the same standard of living can be attained for less money. How these gains manifest themselves depend upon the general strength and organisation of the labour force, but of course, the capitalist will seek to use such productivity gains to eke out extra surplus value. Also, added productivity can lower the need for skilled labour, which again weakens the worker's position, and can lead to unemployment

thus expanding the reserve standing army of potential workers and driving down wages. The perpetual class struggle is manifest with every gain, every adaptation to this highly dynamic and all-encompassing systemic process.

The logics that Marx identifies here will be drawn upon and developed throughout this chapter, and their implications will become increasingly evident throughout the thesis. The most pertinent of these are the quantification of all utility through exchange values; commodification, objectification and exploitation of humans through labour and the class conflict this necessitates; a requirement for perpetual growth; and finally, a competitive imperative directing all agency towards instrumental processes and technological dynamism.

Critical Theory, Capitalist Rationality and Instrumentality

In his analysis of capitalism Marx showed how market rationality determines that reason is dependent on the social context. Even if individuals behave rationally according to their own interests (a classical economic assumption that by now has been thoroughly debunked by a variety of fields including behavioural economics (Kahneman & Tversky, 2000)), the market produces irrational outcomes, or at least outcomes that reveal a 'formal' bias. Such an example of irrational formal bias is Marx's recognition that 'The worker becomes poorer the more wealth he produces' (1982 [1844], p.13). This occurs because surplus value is produced by the worker but accrued by the capitalist. This does not require 'substantive bias', that is to say bias based on prejudice which rationality should serve to inhibit. Rather, the reason inherent in the system provides the rationality for the outcome. As Andrew Feenberg describes it 'Formal bias hides in aspects of rational systems that only become visible in the light of historical and contextual analysis. It is not a matter of prejudice based on pseudo-facts or narrative myths; rather, the design of the system objectifies the discriminatory principle' (2017, p.24). It is through this systemic discriminatory principle that market logic enables an impersonal domination of some subjects over others. The market can be viewed as establishing a social rationality, independent of human reason, that creates certain 'rational' outcomes that replicate and exacerbate power differentials and domination. As shall become evident in chapter 4, algorithms potentially learn from and replicate these hidden forms of discrimination.

The first generation of the Frankfurt School critical theorists built on Marx's observations to construct a fuller critique of social rationality. György Lukács (1885-1971) and Max Weber (1864-1920) also played a part in the development of these ideas. Lukács' notion of reification builds on Marx's concept of the commodity form. Commodities for Marx abstract all the dynamic, messy processes of their creation into an objectified, 'fetishized' commodity – a thing of a specific value, exchangeable in the marketplace. For Lukács the "organic, irrational and qualitatively determined unity of the product" (1923, p.127) is destroyed and replaced by the abstract commodity which

> stamps its imprint upon the whole consciousness of man; his qualities and abilities are no longer an organic part of his personality, they are things which he can 'own' or 'dispose of' like the various objects of the external world. And there is no natural form in which human relations can be cast, no way in which man can bring his physical and psychic 'qualities' into play without their being subjected increasingly to this reifying process (1923, p.146)

Furthermore, reification affects the relationships between people (which may be primarily determined by economic function); the relationship to oneself (the fragmenting of human experience in the acceptance of a law-governed system of social relations and a conceptualisation of oneself as an atomised individual with capacities abstracted to objective commodities); and the relationship between individuals and the social system in its entirety (Lukács, 1923). In this regard, from individuals to artifacts, institutions to laws, all become 'thing-like'. Both objects and subjects alike thus become reified, that is defined by their functional role within the system. For the successful working of a rational system, quantitative elements are privileged at the expense of the qualitative dimension of social relations. Lukács argues this extends beyond the commodity form and the economic sphere, extending outwards to all aspects of society resulting in formal reason and rational quantification playing an increasingly dominant role. Alternative values derived from human experience are undermined by the focus on efficiency of technical manipulation central to the rationality the system imposes. When considering technogenetic development in a capitalist context, it becomes vital to understand these reifying processes exist and are likely to direct the process in ways which may exclude or weaken certain legitimate values. The biases inherent to the instrumentalist privileging of reason become manifest in the development of techno-human relations.

Taking up this idea, the critical theorists of the Frankfurt school determined that this system of 'rational domination' is not an inevitable consequence of the application of reason per se, but rather a contingent historical outcome, caused by the social context of capitalism. Herbert Marcuse's critique of 'technical rationality' elaborates on Marx's critique of market rationality. He states 'when technics become the universal form of production, it circumscribes an entire culture; it projects a historical totality – a world' (1964, p.154). This 'world' belies critical interrogation by privileging the efficiency of technical manipulation, rendering 'irrational' anything which may hinder its workings. Appeals to science and efficiency are effective because they appear value neutral, but the rationality they inscribe is that of domination, bound as they are to the logics of capitalism. As Marcuse explains 'Modern man takes the entirety of Being as raw material for production and subjects the entirety of the object-world to the sweep and order of production' (1964, pp.153-154). Science for Marcuse is not inherently wrong-headed, but in a capitalist context it takes on a dominant mode of interpreting the world through formalisation, quantification and instrumentalisation at the expense of other potential values. Technology would not necessarily lead to greater domination, but, bound up as it is in the capitalist rationality of domination, 'Technology has become the great vehicle of reification" (1964, p.154). Technology in capitalist relations becomes fundamentally *instrumentalist*. However, Marcuse sees potentiality in science and technology for providing a different outcome by directing technology towards values alternative to those created by the instrumental rationality of capitalism. The question of what these values should be and how capitalist logics may prevent them from being realised is central to the concern of this thesis.

Defining Advanced Capitalism

Capitalism is an evolving, adaptive system, albeit one that has various incarnations with nation states practicing different forms around the world (Hall & Soskice, eds. 2001; Crouch & Streeck, eds.,1997). Nationally, various forms of capitalism compete, interact, adapt and constantly co-evolve. As such capitalism today appears very different from that which was theorised by Marx and twentieth century critical theorists. An area of broad agreement amongst theorists is there have been two dominant ideologies of capitalism since the end of

World War 2. The first was characterised by stable economic growth and rising living standards for a period of over twenty years from the end of the Second World War. Following the Bretton Woods agreement, Keynesian demand management policies were utilised to balance inflation and unemployment levels acting as a counterweight to the vagaries of the business cycle. The state was thus seen as responsible for unemployment (rather than individuals being held to account). The period saw large welfare state expansionism in the leading Western capitalist countries, for example with the creation of a National Health Service in the UK. The welfare state offered a partial 'de-commodification of labour' (Bowles, 2007) as the state would provide a safety-net for those who were unable to find work. The inherent and permanent class struggle that Marx envisioned was to some extent temporarily mitigated. As Streeck explains,

> capitalism presupposes a social contract in which the legitimate mutual expectations of capital and labour, of profit-dependents and wage-dependents, are more or less explicitly enshrined as a formal or informal economic constitution. Contrary to what economic theories and ideology would have us believe, capitalism is not a state of nature but a historical social order in need of institutionalisation and legitimation (2014, p.24).

The usually characteristic clash of interests of the capitalist and working classes was kept in check by state policy in 'the otherwise widely different countries' (Streeck, 2014, p.11) constituting Western capitalist democracies during this period. The workers broadly accepted markets and private property ownership in the context of rising living standards, social security assurances and democratic rights (Streeck, 2014). By the late 1960s, pressure was beginning to tell on this age of Keynesian consensus and Keynesian policy was ultimately deemed ineffectual in dealing with the stagflation (persistent high inflation coupled with high unemployment) that set in.

During the 1980s and 1990s, global capitalism was systematically reformulated. Many of the concessions granted to workers during the post war period were withdrawn in this latest turn. The hegemonic neoliberal ideology underpinned these changes. 'Neoliberalism' has clear roots in the ideas of Friedrich Hayek, Milton Friedman, and the Chicago School. Also influential was the formation of the Mont Pelerin Society (Mirowski & Plehwe, 2009): 'a closed intellectual network that provided the basic ideological infrastructure for neoliberalism to ferment' (Srnicek & Williams, 2015, p.54). Harvey defines neoliberalism as a 'political

project to re-establish the conditions for capital accumulation and to restore the power of economic elites' (2007, p.19). Its rise to mainstream political and economic dominance was not a necessary result of the economic crises of the 1970s. Rather, the careful fermentation of these ideas across multiple institutions took advantage of the crisis (Klein, 2007) to introduce a reconstituted set of capitalist relations. 'Advanced capitalism' is a useful term for capturing the complex ongoing dynamics of the current incarnation of the varieties of capitalism globally, albeit recognising that a 'neoliberal' ideology has played a significant role in the shaping and intellectual underpinning of the current system.

Central to the new system was clearing away the cornerstones of consensus that had been built to make way for an unleashing of 'market liberalisation'. In its place, a 'flexible' labour force was motivated by harsher conditions. The retraction of social security provisions, alongside globalising processes whereby increasingly labour markets could be drawn upon internationally, and 'the division of labour markets into core and periphery areas with different degrees of protection' (Streeck, 2014, p.28-9) resulted in less job security, lower pay, and an increased governmental tolerance for high structural unemployment. The effects were further intensified by 'privatisation of public services and a cutback of public employment, and if possible, the elimination of trade unions from the wage formation process' (Streeck, 2014, p.29). In terms of the dialectic relationship between capitalists and workers, it was very clear who were the winners and losers in this reconstituted 'consensus'. As Streeck explains:

> At the end, over and above national differences and specificities, stood a 'lean' and 'modernised' welfare state increasingly geared to 'recommodification', whose 'employment-friendliness' and lower costs had been bought by lowering the minimum subsistence level guaranteed as a social right (2014, p.29).

The firm became the central agent (Hall & Soskice, 2001) of global capital because 'capital markets were transformed into markets for corporate control, which made of "shareholder value" the supreme maxim of good management' (Streeck, 2014, p.29). The 'liberalisation' not only applied to the labour market, but also to goods, services and perhaps most importantly, finance which is pivotal in the increasingly pervasive, complex, decentralised and global character of capitalism. Bound up with the development of advanced capitalism, as well as the ideological underpinning of neoliberalism, is the social changes and economic

tendencies brought about by rapidly developing technologies, especially information technologies.

Technocapitalism and the Technosystem

Technocapitalism as a concept is suggestive of how capitalism and technological development co-evolve with each manifesting material changes upon the other. The technological dynamism of capitalism has led to the development of technologies that themselves come to influence the nature of capitalist relations. Best & Kellner articulate technocapitalism as,

> a constellation in which technology and scientific knowledge, computerization and automation of labor, and interactive technology play a role in the process of production analogous to the function of human labour power and machines in an earlier era of capitalism. Technocapitalism also encompasses novel modes of societal organization, unique forms of culture and everyday life and innovative types of contestation (2001, p.213).

Thus, they recognise a fundamental change to the valorisation process. Consequently, commodities themselves are changing. Luis Suarez Villa says, 'The rise of technocapitalism involves the commodification of knowledge in faster and more diverse ways than at any previous time in human history… the pervasive corporatisation of invention and innovation' (2001, p.4). Best & Kellner also recognise the corporate element citing 'a decline of the state and enlarged power for the market, accompanied by growing strength of transnational corporations and governmental bodies and the decreased nature of the nation-state and its institutions' (2001, p.212). It has already been acknowledged that a neoliberal ideology is partly responsible for greater market power and the waning of state institutions. That these processes are exacerbated by this technocapital synthesis is also notable.

Technocapitalism also plays a role in enabling processes of globalisation. Susan Strange (1997) identifies the accelerating rate of technological development as the primary common factor across capitalist societies, arguing 'technological changes and the new mobility of capital and of knowledge have been substituting global markets for local markets at…a rapid pace' (1997, p.187). Information technologies also enable an overcoming of space and time

restrictions. Given Marx's recognition of the singular dynamism of capitalism, it is also pertinent that a salient aspect of technocapitalism is an increase in speed. Dynamism has accelerated to a frenzy: 'Knowledge and its transformation into exchange value in ever faster and more valuable ways is what distinguishes this emerging new epoch from industrial capitalism' (Suarez-Villa, 2001, p18-9). Information is often cited as the central commodity within technocapitalism, with Castells regarding it as the central feature of the 'information society' (1999). Related to this is the rise of platform capitalism (Srnicek, 2017) where companies play the role of intermediary by providing the information aspect of a commodity rather than the commodity itself. This enables the world's largest hotel company to own no hotels (Air b'n'b) and the world's largest taxi firm to own no taxis (Uber) (Chace, 2015). The rise of 'surveillance capitalism' (Zuboff, 2017) draws upon the consumption of big data and machine learning to further revolutionise forms of capital accumulation (further explored in chapter 4).

Andrew Feenberg's notion of the 'technosystem' offers a conceptualisation of technocapitalism which emphasises the complex processual embeddedness of capitalism and technological development while highlighting the instrumental rationality of markets to which the Frankfurt School thinkers drew attention. It refers 'to the field of technically rational disciplines and operations associated with markets, administrations, and technologies' (2017, p.x). He cites three principles of social rationality that relate to each of these functions, namely the exchange of equivalents that enables functioning markets, classification and application of universal rules that facilitate administrative functions and the efficient adjustment of means to ends (which is primarily the role of technology). Feenberg (2017) sees this as an unprecedented historical development whereby the hegemony of capitalist instrumental rationality characterises the contemporary world, invading all social institutions.

This instrumentalism is conceptually central to this thesis. Both transhumanists and capitalists implicitly regard instrumental progress as largely sufficient to guarantee progress in social outcomes. They focus on improving means, driven by notions of growth and progress, but for ill-defined ends that are without an ethical core, as further explored in chapters 4, 5 and 7. Furthermore, this section has sought to make explicit the interconnectedness of capitalism

and technological development. As noted by Marx, capitalism is technologically dynamic and technocapitalism speaks to how technology in turn shapes capitalist relations. This reiterates the point that to advocate human enhancement technologies without explicit consideration of advanced capitalist logics is specious.

Capitalist Realism and Advanced Capitalist Logics

Capitalism is often considered to be such an efficiently self-regulating system that there was a period around the end of the 20th Century when some commentators believed that we had reached the 'end of history' (Fukuyama, 1992). John Gray points out that for those proponents of the system,

> the past hardly existed… The long boom, the weightless economy, the great moderation, the new paradigm and the flat world - these and other wild fantasies were recycled as established truths by politicians and journalists, economists and bankers, academics and supposedly hard-headed business people (2002, p.xi).

While the 2007-8 financial crisis undermined such delusions, what followed was a wave of policies that reiterated the ideology of neoliberal capitalism in the modern guise of austerity. That the enacted solutions were contradictory to the theoretical underpinnings of free-market capitalism (the socialisation of market failure) is testament to the adaptability inherent to capitalist logics and the strength of powerful actors within the system. Streeck says of the outcome, 'Today it is virtually impossible to tell where the state ends or the market begins, and whether governments have been nationalising banks, or banks have been privatising the state' (2014, p.40). On the flexibility that has allowed this ideology to persist, Fisher states:

> The limits of capitalism are not fixed by fiat, but defined (and re-defined) pragmatically and improvisationally. This makes capitalism…a monstrous, infinitely plastic entity, capable of metabolising and absorbing anything with which it comes into contact (Fisher, 2009, p.6).

Fisher offers the term 'Capitalist Realism' as a descriptor for the 'pervasive atmosphere' summarised by Thatcher's doctrine that 'there is no alternative' (TINA): capitalism as timeless, and beyond re-imagination. Laws, regulations, technical systems and cultural norms

have enabled the expansion of markets to appear ‘natural’ and inevitable rather than contingent and ideological. Capitalism, and especially neoliberalism, remain loaded terms – even their use implies critique (Bowles, 2007; Streeck, 2014; Monbiot 2016). They go unnamed, pre-supposed, and thus beyond question. Thus, the system’s anonymity further facilitates its durability.

The liberal human individual central to humanist and transhumanist discourse is also interpellated for capitalist ends. Capitalism claims to empower individuals by making each person an agent of free expression through the choice to purchase whatever goods they desire. But individuals are thus responsible for the outcome. Whilst markets contain formal biases, their hidden nature enables a surface promise of moral neutrality: ‘Part of the appeal of markets is that they don't pass judgement on the preferences they satisfy…If someone is willing to pay for sex or a kidney, and a consenting adult is willing to sell, the only question the economist asks is, “How much?” Markets don't wag fingers’ (Sandel, 2012, p.14). Through this sustained presumption of indiscriminate arbitration, capitalism abnegates the responsibilities for its ethical failings, and outsources it to individual actions and choices. The climate crisis is a prime example:

> The cause of eco catastrophe is an impersonal structure which even though it is capable of producing all manner of effects, is precisely not a subject capable of exercising responsibility. The required subject - a collective subject - does not exist, yet the crisis, like all other global crises we’re now facing, demands that it be constructed (Fisher, 2008 p.66).

If everyone is responsible, no one is. Capitalism ‘contracts out its responsibilities to consumers, by itself receding into invisibility’ (Fisher, 2008 p.66). The professed neutrality also bolsters capitalism’s dynamic instrumentalism: the focus is on what will sate our libidinous desires and how to further animate them.

Whilst the individual is pragmatically interpellated as a coherent and rational figure to appeal to a supposed freedom, and repudiate ethical failings, at a deeper level the individual is undermined by the commodification of knowledge deep into the atomised, reified subject (such as behavioural data and biocapital). Lyotard (1984) predicts this process with the ‘computerization of society’ whereby knowledge, freed from the constraints of belonging to a wider meta narrative, takes on the pragmatic form of being ‘dedicated to optimizing the

performance of a project' (1984, p.6). Deleuze, meanwhile argues that 'Individuals have become "dividuals," and masses, samples, data, markets, or "banks"' (1992). Big data and artificial intelligence work to composite the activity of 'dividuals' en masse, and transform this data into knowledge products, producing practical effects for commercial interests. Biotechnology too aims to commodify life itself, reconstituted once more into commercial forms of information. Melinda Cooper, argues neoliberalism differs from its predecessor because of its 'intent to efface the boundaries between the spheres of production and reproduction, labor and life, the market and living tissues—the very boundaries that were constitutive of welfare state biopolitics and human rights discourse' (2008, p.9). The effacing of boundaries constitutive of neoliberalism undermines the notion of the liberal human subject, a process largely ignored by transhumanists as the liberal individual animates the capitalist and transhumanist imagination. Critical posthumanism, meanwhile 'negotiates the pressing contemporary question of what it means to be human under the conditions of globalisation, technoscience, late capitalism and climate change' (Herbrechter, 2018, p.94). The dizzyingly complex ethical implications of commodified techno-human assemblages are largely ignored in transhumanist and pro-capitalist discourse as such questions would threaten the banal ideological zeal of each.

The rational individual is further compromised by techno-capitalist relations reconstituting our being into its own frameworks of control:

> Time ceases to be linear, becomes chaotic, broken down into punctiform divisions. As production and distribution are restricted so are nervous systems. To function effectively as a component of just-in-time production you must develop the capacity to respond to unforeseen events, you must learn to live in conditions of total instability, or 'precarity' (Fisher, 2008, p.34).

Embedding its logics in the nervous systems of its constituents further underpins capitalist resilience. Market fundamentalism creates a certain type of economy and a certain type of citizen. For Fisher, the entertainment matrix simultaneously consolidates capitalism's tendency to create atomised individuals with its 'walling up against the social' (2008, p.24), (or as Sherry Turkle (2011) would have it, we are 'alone, together'), whilst simultaneously fortifying its hedonic principle of creating a constant urge for sugary gratification. Fisher states, 'the consequence of being hooked into the entertainment matrix is twitchy, agitated interpassivity, an inability to concentrate or focus…[resulting in] an experience of pure

material signifiers…a series of pure and unrelated presents in time' (2008, pp.24-5). The presents in time create a false sense of atomised, unconnected moments to be maximally enjoyed. This fracturing is reminiscent of Lyotard's (1984) postmodern subject: the collapse of the 'grand narratives' of modernity reflected in the collapse of coherent narratives of the self, which, like postmodern knowledge, is reduced to whatever pragmatically works for the given moment.

Given that a subset of transhumanist thinkers identify as 'Longtermists', it is ironic that this short-term hedonic outlook of the capitalist subject seems singularly vulnerable to transhumanist fantasies, especially libertarian ones. Thinking in a 'series of nows' precipitates a nearsighted and decontextualised viewpoint: atomistic, hedonic, fanciful. A further dynamic which sets capitalism against long-term thinking is its profoundly powerful and systemically embedded drive for growth: 'The relationship between capitalism and eco-disaster is neither coincidental nor accidental: capital's…"growth fetish", mean that capital is by its very nature opposed to any notion of sustainability' (Fisher, 2008, p.19). The possibility of ceaseless growth is dependent on a notion of perpetual progress. To invoke Lyotard again, if the postmodern condition expresses an 'incredulity to meta-narratives' (Lyotard, 1984, p.xxiv), transhumanism represents a return to modernity. Transhumanism promises a linear trajectory of progress culminating in a resplendent future of radical abundance, and morphological freedom: a grand narrative that redeems capitalism from its stuttering contradictions and ecological devastation. Cooper argues neoliberalism and the biotech industry finds common cause in 'a speculative reinvention of the future' (Cooper, 2008, p.11). This is equally true of capitalism and transhumanism as both require a fundamentalist faith in eternal growth and progress.

The growth fetish motivates a drive to bring as much of life as possible into the auspices of capital and this requires the valuing of the invaluable, measuring of the immeasurable, quantifying of the unquantifiable. For anything to be capitalisable, it needs a calculable value: an exchange value. Effectively everything exists in a new empirical reality with an imagined price tag. Incomparable things are incorporated into this system of equivalence. Furthermore, undervaluing certain things (such as nature) is part of capital's exploitative method of accumulation. Mazzucatto (2018) recognises this process at work in the global economy where value extraction reaps greater reward than value creation. It is not just the

miscalculation of real value necessitated by the brute process of universal pricing that is problematic (knowing the price of everything and the value of nothing). As Sandel argues,

> Economists often assume that markets are inert, that they do not affect the goods exchanged. But this is untrue. Markets leave their mark…Not all goods are properly valued [as instruments of profit and use]. The most obvious example is human beings. Slavery was appalling because it treated human beings as commodities …as instruments of gain and objects of use (2012, pp.9-10).

The obsession with quantification extends beyond the price mechanism making advanced capitalist societies increasingly bureaucratic, with an almost obsessive tendency to measure producing 'new kinds of bureaucracy – "aims and objectives", "outcomes", "mission statements" – have proliferated, even as neoliberal rhetoric about the end of top-down, centralised control has gained pre-eminence' (Fisher, 2008, p.40). This creates vested interests outside its locus of intent, where 'targets quickly cease to be a way of measuring performance and become ends in themselves' (Fisher, 2008, pp.42-43). The cybernetics-informed information reductivism already identified in transhumanist discourse again finds a synergising accomplice in the quantifying impulses of advanced capitalism. In doing so it aids in creating an ontology more befitting of computers than humans. It offers an implicit moral justification for its own instrumental rationality by concealing its formal biases and interpreting the fuzzy, blurred, complexity of life as something inert and seemingly neutral. The process completes an act of magic: the creation of an empirical reality that appears as natural as the trees it cuts down and the species it renders extinct.

Critical posthumanism attempts to engage with the breakdown of the liberal subject into its reified, commodified parts, as well as attempting to conceptualise a relational, posthuman subject (further explored in Chapter 5). Advanced capitalism's technocentric rationalism determines that opaque, centreless and complex systemic logics structure our interactions and behaviours increasingly anonymously and unnoticed. Technology functions to make these logics ever more inscrutable and deeply entrenched. Saskia Sassen (2008) characterises modern 'global assemblages' as reconstituting spatio-temporal frameworks as neither national nor global but rather undermining both concepts. Complexity is a key facet of these new arrangements as they are comprised of institutions such as multinational corporations, and state agencies, as well as legal structures such as free-trade blocs, technologically dependent

phenomena, such as global digital markets, and they are reliant upon networks of services within a geographic space (Sassen, 2008). Essentially, they can be seen as enabling efficient flows of processes which facilitate the accumulation of capital composed of a combination of territory, authority, rights and technical capacities. Most governments are only minimally empowered to stand in the way of these capital flows and merely service them. Although the Covid-19 pandemic revealed considerable powers of government in exceptional circumstances, it is less clear that public health always trumped capital interests. Indeed, billionaires' wealth vastly increased during the pandemic whilst living conditions of the working classes have fallen considerably, indicating the pandemic does not spell the end of neoliberalism (Sumonja, 2020). Fisher's claim that 'the closest thing we have to ruling powers now are nebulous, unaccountable interests exercising corporate irresponsibility' (2008, p.63) remains pertinent. As Deleuze (1992) argues, this is something different to the Foucauldian loci of discipline (the factory, the school, the prison). Capitalism is now 'essentially dispersive, and the factory has given way to the corporation' (1992, p.6). It is all-pervasive and at once, evasive, seemingly impervious to constraint.

As people can rely less on the state to supply basic needs, money has a greater importance:

> As money comes to buy more and more – political influence, good medical care, a home in a safe neighborhood rather than a crime-ridden one, access to elite schools rather than failing ones – the distribution of income and wealth looms larger and larger…the commodification of everything sharpens the sting of inequality by making money matter more (Sandel, 2012, pp.8-9).

Alan Finlayson sees in neoliberalism an urge to 'literalis[e] the market metaphor; thinking all interactions as governed by a logic "like" that of markets' (in Gilbert, 2015, n.p.). A 'business ontology' whereby everything should be run as a business, promotes the instrumentalist principles of growth, efficiency and competition and expands it to all areas of life including technogenetic developments. Strange (1997) cites three aspects of the fading relevance of national states and institutions. The first is 'the general decline in the ability of governments to manage their national economies as they may like' (in Crouch & Streeck eds., 1997, p.188). The increased role of finance has left governments often needing to serve the interests of finance capital, over and above competing ideological aims it may otherwise wish to address. The second is the 'growth in transnational regulation…by means of which national regulation is steadily supplanted and national differences eroded' (in Crouch &

Streeck eds., 1997, p.188). And finally, 'the de-nationalisation of firms, the loss of identity between the location of the firm's headquarters and its behaviour in the world economy' (in Crouch & Streeck eds., 1997, p.188). This last point is made all the more relevant by the growing importance of large corporations to the economy and the increasing structural power these organisations wield. This trajectory of advanced capitalism would be celebrated by Extropians whose original five principles included 'Spontaneous Order', which for Hughes, 'distilled their belief, derived from the work of Friedrich Hayek and Ayn Rand, that an anarchistic market creates free and dynamic order, while the state and its life-stealing authoritarianism is entropic' (Hughes, 2004, p.166). Such ideas underpin the concept of seasteading, the creation of permanent structures at sea outside the jurisdiction of any Government (The Seasteading Institute), which is sometimes cited within transhumanist discourse as constituting potential havens for proactionary technological experimentation.

T**rajectories of Advanced Capitalism: Inequality, Concentrations and Expulsions**

Perhaps the single most significant trend that has arisen during the most recent incarnation of global capitalism is a growth in inequality within developed Western countries, and between the wealthiest 1% and the rest globally. These dynamics undermine the idea that a process such as the development of transhumanist technologies will be an inclusive one, as more fully explored in Chapter 6. Between 1980 and 2014 the average real income of the richest 1% of Americans increased by 169% from $469,403 to $1,260,508 (inflation adjusted) (Stiglitz, 2016, p.135). This equates to a rise in share of national income from 10% to 21%. The inequity intensifies further up the wealth scale. As Dorling reveals, whilst 'the 1% have pulled away, inequalities within the 1% have grown enormously' (2014, p.11). It is no surprise then that over the same period, the top 0.1% saw their average real income increase by 281% from $1,597,080, to $6,087,113 (inflation adjusted) meaning 'their share of national income almost tripled, from 3.4 to 10.3%' (Stiglitz, 2016, p.135). Despite the economic growth in the USA between 1983 and 2009, the bottom 80% of the income distribution saw a net fall in their wealth over this period (Wolff & Allegretto, in Brynjolfsson & McAfee, 2014) completely undermining the validity of trickledown economics.

Increases in inequality measured by wealth are even more pronounced than those measured by income: 'by one estimate more than 10 times so' (Stiglitz, 2016, p136). Wealth estimates can be harder to accurately assess due to the $21-$32 trillion the Tax Justice Network (2021) estimates is hidden in secret offshore tax havens. The Pandora papers, the latest leak revealing the impunity of the super-rich to avoid and evade taxes, led Jeffrey Sachs (2021) to characterise the current economic system as a 'plutocracy'. This is the context which enables the wealthiest 26 individuals to have the same wealth as half of the world put together (Oxfam, 2019). The $550 billion added to the wealth of billionaires in 2017 alone would be enough to wipe out global poverty seven times over (Oxfam, 2018). More recently, billionaire wealth has surged during the COVID-19 pandemic with a $3.9 trillion increase between 18 March and 31 December 2020 (Oxfam, 2021).

While it is clear that the impacts of technology on the economy have exacerbated this inequality, technology alone is not responsible. These outcomes are not the cold, indifferent results of a naturally occurring technological economy. Rather, the wealthiest and most powerful are able to leverage their power to ensure new technology services their own ends. Elite groups have vested interests in utilising existing power structures and capitalist systemic dynamics to intensify these inequalities as it means increasing their wealth. Technology, of course, is an additional enabler that is more accessible to those with the power, money and know-how to best leverage it. However, as Sassen notes, such acute concentrations could not have occurred without the aid of complex 'predatory formations, a mix of elites and systemic capacities':

> Rich individuals and global firms by themselves could not have achieved such extreme concentration of the world's wealth. They need what we might think of as systemic help: a complex interaction of these actors with systems regeared toward enabling extreme concentration. Such systemic capacities are a variable mix of technical, market, and financial innovations plus government enablement…that function as a kind of haze…Today, the structures through which concentration happens are complex assemblages of multiple elements rather than the fiefdoms of the few robber Barons (2014, p.13).

Sassen cites two key enablers in this 'profound shift' in systemic logics post 1980. The first is 'the material development of growing areas of the world into extreme zones for economic operations' (2014, p.9). Linked to this idea is Sassen's concept of 'global assemblages' (2008) outlined above. The other key enabler Sassen identifies is the rise of finance and its

capacity ‘to develop enormously complex instruments that allow it to securitise the broadest-ever, historically speaking, range of entities and processes’ (2014, p.9). Whilst financial deregulation has enabled significant rises in inequality, it has also led to a huge growth in national deficits, which were used as justification for the wave of austerity measures in the developed world: an undermining of social wealth in the guise of a slew of privatisation and a slashing of public services.

In addition to the ever-increasing concentration of wealth enabled by predatory formations (elites and systemic logics including technical apparatus), at the other end of the social pyramid an ‘emergence of new logics of expulsion’ (Sassen, 2014, p.4) can be recognised. It is the combination of concentration and expulsion that is effective in ‘capturing the pathologies of today’s global capitalism’ (Sassen, 2014, p.4). Once more the systemic logics play a key role, both in enabling the process and determining that it is opaque: ‘This tipping point into radical expulsion was enabled by elementary decisions in some cases, but in others by some of our most advanced economic and technical achievements’ (Sassen, 2014, p.4) and ‘enormous technical and legal complexities are needed to execute what are ultimately elementary extractions’ (2014, p.15). The nebulous nature of the forces involved create a centrelessness which is key to the resilience of the system:

> Historically, the oppressed have often risen against their masters. But today the oppressed have mostly been expelled and survive a great distance from their oppressors. Further, the ‘oppressor’ is increasingly a complex system that combines persons, networks, and machines with no obvious centre (Sassen, 2014, p.10).

Surplus populations of expelled people serve as a useful tool for capitalist interests. They suppress wages by offering a large reserve pool to call upon during periods of growth and can also be used as a disciplinary measure or threat during stagnations. As well as suppressing wages they weaken workers’ bargaining power which can lead to worsening employment conditions.

In modern advanced capitalist economies there is an increase in precarity (Standing, 2011) characterised by ‘more casual working hours, low and stagnant wages, decreasing job protections and widespread insecurity’ (Srnicek & Williams, 2015, p.93). Sassen (2014)

observes that this precarity accentuates rises in depression, anxiety and suicide, factors that are not accounted for in traditional economic measures, denying an elevated awareness and introspective attitude to such phenomena. The treatment of surplus populations has implications in a world with transhuman technological potentialities. Over 45,400 deaths during the process of migration were recorded between 2014 and 2021 (IOM, 2021), and 120,000 deaths in UK between 2010 and 2017 were linked to health and social care cuts (BMJ, 2017). These losses can be said to result from systematic marginalisation. As will be explored more thoroughly in chapter 6, such systemic marginalisation could increase dramatically in the context of transhumanist aims. Again, the coherence with logics of advanced capitalism could portend a concerning intensification of the most problematic tendencies of each system.

There are a number of systemic logics then inherent to advanced capitalism that have an important significance when considering the emergence of radical technological developments. Firstly, capitalism is extremely resilient and is supported by a vast infrastructure of technical, legal and systemic processes. This can be conceived as a 'technosystem'. Secondly, its systemic logics are increasingly opaque as a result of deepening complexity, and it subsumes its constituents into its logics, rendering it an increasingly centreless, amorphous system. Thirdly, it interpellates the liberal individual whilst simultaneously reconstituting people into its own ontology: atomised, precarious, devoid of a consistent identity. Fourthly, its logics of competition and its drive for growth and efficiency render concepts such as sustainability and long-termism anathema to it. This growth fetish undermines the cogency of the liberal individual as capital burrows into the constituent elements of the individual in its thirst for profit. From bio-capital to data-mining, capitalism deconstructs and commodifies the very entity it interpellates. Fifthly, it has developed a business ontology that undermines the public sector and creates deepening levels of inequality (concentrations and expulsions) and conditions of precarity, that is to say, an unforgiving fitness landscape. Finally, it reduces everything to a determined value. From individuals to artifacts, institutions to laws, all become 'thing-like'. Both objects and subjects thus become reified, that is, defined by their functional role within the system. For the successful working of a rational system, quantitative elements are privileged at the expense of the qualitative dimension of social relations. This reification expands towards totality as its growth fetish creates an inherent need to include as much of the natural world as possible into

its workings. This has spawned a highly bureaucratic, data-driven society. These factors will be drawn upon throughout this thesis as they leave their mark on technogenetic developments.

The Environmental Crisis of Advanced Capitalism

While for Sassen it is *people* that are 'expelled' from 'the core social and economic orders of our time' (2014, p.1), the concept can be extended to include the biosphere and elements within it such as the mass species extinctions which are currently taking place at between 1000 and 10,000 times the rate which would normally be expected (Chivian & Bernstein, 2008). As many as 50% of the species on planet Earth are expected to be at threat of extinction by 2050 (Chivian & Bernstein, 2008). Climate change endangers not just advanced capitalism but human life as we know it (Lawrence & Laybourn-Langton, 2021). The Paris climate negotiations put a target of 1.5C increase in global temperatures in relation to pre-industrial levels as failure to stop emissions beyond that threshold will lead to increased likelihood of 'severe, pervasive and irreversible impacts for people and ecosystems' (IPCC, 2014). These threats include substantial numbers of species extinctions; severe risk to global and regional food security (including utilisation, access and price stability); threats to ecosystems (especially marine ecosystems – polar and coral reefs) and cultures; expansion of 'dead zones' in the oceans; extreme weather conditions including heatwaves and coastal flooding and extreme weather events; coastal erosion and submergence; limiting human activities especially of vulnerable groups; increased risk of human conflicts including civil war; resource shortages; increased displacement of peoples; risks to critical infrastructure, national security and territorial integrity (IPCC, 2018). Alas, recent research (Climate Analytics, 2015) shows we have already breached a 1C rise above pre-industrial levels. Climate change is not the only ecological crisis that the Earth faces. Rockström et al. (2009) propose the concept of 'planetary boundaries' that must not be transgressed if the planet is to avoid unacceptable environmental impacts. Of the nine boundaries they identify, climate change is only one of three (along with the rate of biodiversity loss and interference with the nitrogen cycle) that have already been breached.

Such is the extensive impact of human behaviour upon nature that Crutzen & Stoermer (2000) proposed the term 'Anthropocene' to indicate a new geological era running from the start of the industrial revolution. Although the term has become increasingly influential, it has also inspired a number of critiques. The first is its anthropocentric worldview, guilty of human exceptionalism where the human is not embedded in the nature it despoils, but is rather a free-floating agent (Chiew, 2015). Instead, it is argued we 'require a deeper sense of entanglement and relationality with systemic processes of social nature' (Cudworth & Hobden, 2018, p.17). A further flaw with the term 'Anthropocene' is its inherent supposition that all of humanity is responsible for the processes that have led to environmental degradation. This conflation of humankind to a singular force is problematic as it misrepresents or at least obfuscates the systemic processes and differentiated responsibilities that have been complicit in the combined deleterious effects of anthropogenic activities.

There has been an explosion of suggested alternatives to the term 'Anthropocene', but one of the most apt is the 'Capitalocene' (Malm, 2016; Moore, 2015). Jason W. Moore (2015) problematises an undifferentiated humanity but his formulation also specifically addresses the 'Anthropocene's' human exceptionalism. He explains '*Capitalism in the Web of Life* is about how the mosaic of relations that we call capitalism work *through* nature; and how nature works through that more limited zone, capitalism. This double movement…is what I call the "Double Internality"' (2015, p.1). The false Cartesian dichotomy of nature and society is, for Moore, a discourse which underpins and enables capitalism's nefarious, extractive activities: 'Nature could not be rendered "cheap" until it was rendered external' (2015, p.297). This 'externalising' and 'cheapening' of nature enables capitalism to avoid paying its bills. The environmental externalities are socialised while the profits of the exploitation are privatised. Rejecting this Cartesian dualism, Moore instead posits 'humanity-in-nature/nature-in-humanity' (2015, p.5): capitalism, humanity and everything else are part of a 'world-ecology' within 'the oikeios':

> No domain of human experience is independent of it. World-ecology as a framework for unifying the production of nature, the pursuit of power, and the accumulation of capital, offers a way of re-reading the diversity of modern human experience as unavoidably, irreducibly, socio-ecological (2015, p.291).

Thus, Moore establishes the embeddedness and entanglement with nature envisaged by new materialist and posthumanist thinkers (Barad, 2007; Bradiotti 2013). Nature thus co-evolves alongside capitalism as Moore states: 'an elusive logic of financial calculability rules the roost of global capitalism, shaping, as never before, the structures of everyday life – including the "everyday lives" of birds and bees and bugs, alongside human beings' (2015, p.292). The flipside of this co-evolution, namely how capitalism is shaped by its extractions from nature, is perhaps the most instructive part of Moore's contention. This encompasses a re-thinking of Marx's law of value. In a key passage Moore succinctly articulates this new conception of value which builds on the thinking of feminist and green ideas of allowing for value beyond that of abstract social labour:

> Capital must not only ceaselessly accumulate and revolutionise commodity production; it must ceaselessly search for, and find ways to produce, Cheap Natures: a rising stream of low-cost food, labor-power, energy, and raw materials to the factory gates (or office doors)…These are Four Cheaps. The law of value in capitalism is a law of Cheap Nature (2015, p.53).

The historical process of capitalism as a world ecology in nature has always relied upon new methods of extracting at least one of these 'Four Cheaps' to create new opportunities for capital accumulation. As Moore explains, 'Why do new imperialisms, new industrialisations, new agricultural revolutions, new scientific revolutions go hand in hand? Because the (capitalised) forces of production rely on the (appropriated) conditions of reproduction: the Four Cheaps' (2015, p.101). It is this appropriation of nature (the maximisation of unpaid human and nonhuman work in service to capitalisation) that is the prime loci of capitalist expansion.

Seen through the web-of-life, Moore argues it 'is possible that capitalism has entered an era of epochal crisis' (2015, p.298). Each period of capitalism, or every expansion of accumulation, depends upon the movement of a 'great frontier' or a 'world-ecological revolution': a new method of producing Cheap Nature on a wider scale. Thus, the 'history of capitalism is the history of revolutionising nature' (Moore, 2015, p.112) and part of this history is the exhaustion of historical natures which leads to the demand for further expansion of sites of accumulation. This causes conflict between 'the finite character of the biosphere and the infinite character of capital's demands' (Moore, 2015, p.112). The finite character

causes the creation of negative value, the most notable example of which is climate change whereby: 'the accumulation of waste and toxification now threatens the unpaid work that is being done' (2015, p.305). Transhumanism in this context can be seen as a 'grand narrative' (Lyotard, 1984) that speaks to the continued revolutionising of nature and the overcoming of negative value in the shape of environmental catastrophes. As Charles Thorpe insightfully notes,

> Techno-futurist dreams have an important ideological function today when there is increasing societal consciousness of the destructive ecological consequences of capitalist growth…techno futurists assert the possibility of endless growth through the mastering of the nanoscale…the uploading of consciousness…the colonisation of space. Implicit, and sometimes explicit, in this discourse is the continued progressiveness of capitalism (2016, p.97).

Thorpe goes on to cite the way that a chart in Kurzweil's *The Age of Spiritual* implies that 'technology emerges out of the cosmos itself' (2016, p.98). Indeed, this is a common trope in transhumanist thought: situating technology as embedded in nature – like Moore's capitalism, technology too is part of the web-of-life. But whereas, for Moore, the situating is part of a 'double internality' that allows for a more complex and nuanced critique of capitalism-in-nature and nature-in-capitalism, for Kurzweil the trope acts as a morally neutering excuse for a simplifying determinism. This can be seen in Kurzweil's *The Singularity is Near* (2006) where he lists a series of events leading to "The Singularity" from the Cambrian explosion through the industrial revolution to the computer.

As Capitalism and Nature are one for Moore, so Technology and Nature are one for Kurzweil. But whereas Moore battles with a complex dynamic ecology, Kurzweil breezes through a simple, mechanistic history that accelerates on a pre-determined and visible path into a fantastical future. In a warped reflection of so much of Moore's thinking, perhaps the next 'Cheap Nature' for extraction is human nature. Not the Marxist exploitation of labour but the posthuman body reified and commodified by biotechnological and information capitalism as grist for the mill of endless techno-capitalist expansion.

These 'inevitable futures' (Kurzweil, 2006) depend upon ignoring complexity. The systemic unity of nature, capitalism, technological progress, the human and non-human world and all

the manifold interactions and complex entanglement this implies are largely ignored by Kurzweil. A singular 'grand-narrative' of over-riding techno-progressivism requires little consideration of complications such as planetary environmental degradation. Climate Change does not loom large, it is simply transcended: as if a higher order of intelligence automatically solves all technical problems (and for many transhumanists, everything is just a technical problem). Meanwhile, there is much to be said for the arguments presented by Moore that any new categorisation of our geological epoch framed at capturing the effects of human activity on nature (or perhaps in nature) should focus on the structural logics of capitalism rather than a generalised humanity. Justin McBrien sees capitalism as 'accumulating extinction', a kind of inherent death instinct, he labels the 'Necrocene': 'Capitalism found in the atom bomb the dark watery reflection of its own image. It realised its logic could only lead to one thing: total extinction. It realised that it had become the Necrocene' (2016, p.124). This conceit is echoed in Thorpe's (2017) 'Necroculture'. For all its 'monster pliancy' capitalism is not an invincible system then. Embedded as it is in nature, its complicity in nature's destruction may yet signal its own. But this is not the only fragility it faces. Moore states: 'The shift towards financialisation, and the deepening capitalisation in the sphere of reproduction, has been a powerful way of postponing the inevitable blowback. It has allowed capitalism to survive' (2015, p.305). However, even without the looming environmental 'blowback', this financialisation taken on its own terms is also at a point of looming crisis.

The Economic Crisis of Advanced Capitalism

The role of finance in the economic crisis of 2007-08 has been well documented (Tett, 2010; Lanchester, 2010; Stiglitz, 2010). The fact that the economic consensus limped on for over a decade of stagnation has equally been pored over (Crouch, 2011; Streeck, 2014, 2016; Varoufakis, 2017). The Covid-19 pandemic has deepened the economic crisis and made inequities more pronounced and evident. There have been notable diagnoses and prescriptions for redressing some of advanced capitalism's more nefarious economic impacts (Piketty, 2014; Jacobs & Mazzucato (eds.), 2016; Raworth, 2017), but in practical terms, there has been very little headway in seeing these alternative versions of capitalism come to fruition in developed Western economies. However, the logics of advanced capitalism appear

to be under extreme strain. Political turbulence of recent years including the rise of numerous authoritarian and nationalist governments and political shocks is evidence of democratic discord.

Streeck (2014, 2016) suggests that capitalism is on borrowed time citing three simultaneous crises from which he sees no obvious escape. The first is a banking crisis: banks are less willing to lend to each other following the increase in bad credit. The second crisis is in public finances which has been brought about by 'budget deficits and rising levels of government debt, which go back to the 1970s, as well as the borrowing required since 2008 to save both the financial industry… and the real economy through fiscal stimuli' (Streek, 2014, p.7). The Covid-19 pandemic has significantly exacerbated this issue. Finally, there is also a crisis in the 'real economy' characterised by high unemployment and stagnation (Streek, 2014). Streeck (2014) goes on to explain how these three crises are fundamentally interlinked through money (one and two), credit (one and three) and government spending (two and three), noting that 'They continually reinforce one another, although their scale, urgency and interdependence vary from country to country' (2014, p.9). Furthermore, the genesis of these three crises lies in the three methods which have been used to create an illusion of growth and prosperity. The first method was inflation, followed by public debt increases (which were then sharply cut back in the 1990s originally by Clinton in the US with other countries soon following suit) and finally through private debt. Streeck argues governments have run out of tricks to perpetuate this game of illusion: 'the money magic of the past two decades, produced with the help of unfettered finance industry, may have finally become too dangerous for governments to dare to buy more time with it' (2014, p.46). For Streeck, the liberating of finance has been the key to capitalism's 'bought time'. Indeed, it is the reconstituting of finance as an active force which is the catalyst for crisis and the reason for the failure of crisis theories predating the 'neoliberal' advanced capitalist era:

> The problem of the Frankfurt crisis theories of the 1970s was that they did not think capital capable of any strategic purpose, because they treated it as an apparatus rather than an agency, as means of production rather than a class…So there was no way of dealing with what eventually happened in the decades after the end of the long 1960s: that is, when capital proved to be a player instead of a plaything, a predator instead of a working animal, with an urgent need to break free from the cage-like institutional framework of the post 1945 social market economy (2014, p.18).

The role finance plays undermines advanced capitalist societies' ability to sustain democracy for Streeck (2014, 2016), Crouch (2011) and Varoufakis (2017). This 'predator' demands that governments act in its service, even where that contradicts the democratic desires of its citizens. Varoufakis (2017) argues the European Union's treatment of Greece following the democratic election of Syriza is an exemplar of this conflict. Ultimately the demands of capital must trump the demands of citizens for advanced capitalist societies to stay afloat.

Crouch focuses on the increased power and size of corporations in *The Strange Non-death of Neoliberalism.* This is also an important aspect of the current systemic fragility. The structural power of corporations in a world where 'economic and political power translate into each other' (2011) gives rise to undemocratic relationships between states and business. It remains to be seen whether this 'non-death' can continue given the undemocratic political contradictions that characterise the current power structures, and the economic fragility which has no obvious solution and has seemingly run out of short-term fixes. Varoufakis (2021) argues that profit no longer powers the global economy, but rather central bank money is keeping it afloat. He argues finance has 'become fully decoupled from the real economy' (2021, n.p.) citing a key indicator as 12th August, the day when the announcement of the UK economy's greatest slump (over 20% in seven months) was met with a 2% jump in the Stock Exchange (2021). This disconnect between finance and reality, he claims, can be traced to April 2009 when the 'G7's central banks coalesced…to use their money printing capacity to re-float global finance' (Varoufakis, 2021, n.p.). Varoufakis argues a new economic mode is already replacing capitalism: techno-feudalism. He states, 'value extraction has increasingly shifted away from markets and onto digital platforms…which no longer operate like oligopolistic firms, but rather like private fiefdoms or estates…[and] have replaced markets as the locus of private wealth extraction' (Varoufakis, 2021, n.p.). It is instructive that the giant technology firms in which so much transhumanist faith and fervour is placed are the very source of a potentially feudalist form of post-capitalism, emphasising the dubious claims of an inclusive orientation.

Thus, whilst some thinkers have started to ponder beyond capitalism, defying Thatcher's TINA maxim, others believe that moment is already upon us, and our techno-human relations are fundamental to the shift. It appears to be leading to a deepening of the democratic deficit,

and an intensification of concentrations and expulsions. This is the context in which transhumanist aspirations are currently becoming manifest. The process maybe characterised by an intensification of competition as the stakes rise (explored further in chapter 5), a radicalising of the division between techno-capitalist power holders and the masses who provide their algorithmic source wealth (chapter 4) and a technogenetic trajectory characterised by exclusionary power structures (chapter 6).

The Information Economy

Emergent processes within the advanced capitalist paradigm give rise to other, less gloomy potentialities for a postcapitalist world. The implications of information becoming the central source of value in society could see much of what we produce becoming significantly cheaper or free. For Paul Mason (2015), therein lie the seeds of 'postcapitalism'. This is because information goods do not behave like other economic products such as manufactured goods and services. As Mason explains, 'Once you can copy and paste something, it can be reproduced for free. It has, in economics speak, a "zero marginal cost"' (2015, p.117). Furthermore, 'If you were trying to "own" a piece of information…it does not degrade with use, and that one person consuming it does not prevent another person consuming it. Economists call this "non-rivalry"' (2015, pp.117-8). The significant implication of a reproducible, non-rivalry entity taking centre stage of an economy is that the traditional logics of the economy should break down. This is because the rules of supply and demand are based on a presumption of scarcity. Information is inherently abundant - once something is understood or made manifest in a form that is infinitely sharable, it can be passed on at no additional cost undermining the most fundamental tenets of economics.

Downwards pressure on price mechanisms pushes the exchange value of information goods towards zero. As fundamentally social beings, voluntary sharing through networks spreads information goods liberally and naturally without restraint. Such logics can be seen through illegal file sharing networks, such as Napster, that became popular at the end of the twentieth and start of the twenty first century. Kevin Kelly thus identified three aspects of a new economic order: 'it is global…favours intangible things - ideas, information, and relationships. And it is intensely interlinked. These three attributes produce a new type of

marketplace and society' (1999, p.1). This intense interlinking, or dense networking, tends to bring about non-market dynamics and mechanisms. Socially productive cooperation becomes the main driver of value creation (Negri, 2014) and does not need to be mediated by capitalist relations. Of course, in a capitalist context, companies will endeavour to find ways to capture and commodify such relations. As much as network technologies and information goods lead to non-market forms of collaboration that may bring about more egalitarian societies, they can equally be used to concentrate wealth and power rather than disseminate it as in Varoufakis' (2021) techno-feudalist system. The incentive for companies that deal in information goods is to conceal the value of information they benefit from and to protect the value of information they own.

The first of these logics taps into the 'non-rival', zero-marginal cost aspects inherent to information which leads to its tendency to be shareable: 'We want free online experiences so badly that we are happy to not be paid for information that comes from us now or ever. That sensibility also implies that the more dominant information becomes in our economy, the less most of us will be worth' (Lanier, 2014, p.12). When we consider the inherent value of our information, companies need to ensure that this valuable commodity flows towards them unfettered and preferably free, something a number of companies are achieving very successfully (Zuboff, 2017; Srnicek, 2017). As Lanier further explains:

> the dominant principle of…the information economy, has lately been to conceal the value of information…We've decided not to pay most people for performing the new roles that are valuable in relation to the latest technologies. Ordinary people 'share', while elite network presences generate unprecedented fortunes. Whether these elite new presences are consumer facing services like Google, or more hidden operations like high frequency trading firms, is mostly a matter of semantics. In either case the biggest and best-connected computers provide the settings in which information turns into money (2014, p.11).

As well as ensuring rich flows of valuable data, companies work hard to protect the value of information goods they own. There are two primary methods involved. The first is through copyright law. Legal protections can limit the inherent tendency of information from spreading to a degree, but a further method is required to support the legal framework and that is the design of the technology itself.

The giants of the information economy are often seen to be in competition, not for one aspect of a market, but for the whole suite of technologies as this provides the best protection of their information goods, whilst simultaneously offering users the most seamless interconnectivity of their devices. As Srnicek (2017) notes, these companies are 'naturally monopolising' by creating 'a closed-in ecosystem', thereby exacerbating the already naturally monopolising forces of capitalism. Mason emphasises the point: 'With info-capitalism, a monopoly is not just some clever tactic to maximise profit. It is the only way an industry can run. The small number of companies that dominate each sector is striking' (2015, p.119). Artificial intelligence promises to be the tool that best utilises data to turn a profit, hence Srnicek's belief that AI is seen by these companies as the future of the economy (2017). Srnicek goes on to explain that the hardware required to become a successful information business is prohibitively expensive to normal companies, making it challenging for smaller companies to access these markets. The network effects of data accumulation mean there is 'a tendency towards monopolisation is built into the DNA of platforms' (Srnicek, 2017, p.56). Lanier has a name for these centralised, well-funded computers: 'A siren server…is an elite computer or coordinated collection of computers on a network. It is characterised by narcissism, hyper amplified risk aversion, and extreme information asymmetry' (2014, p.49). This is the pervasiveness and power of the new information economy. Shoshana Zuboff (2017) has argued it constitutes a new phase of capitalism which she refers to as *Surveillance Capitalism*. The asymmetry of power relations for Zuboff (2017) constitutes a fundamental division of learning and understanding in society with the potential to hugely exacerbate social inequity, as further investigated in chapter 4.

The potential social inequity is exacerbated by further economic inequity because the kind of markets that modern digital technologies often create are ones where the most successful take all and the rest take nothing. Digital products are often reproducible at close to zero cost and are accessible to massive global markets. This combination of digitisation and networked globalisation is potent and radical. Lanier confirms: 'distributions of outcomes in fashionable, digitally networked, hyper-efficient markets tend to be winner-take-all' (2014, p.33) and adds 'Unfortunately, the new digital economy, like older feudal or robber baron economies, is thus far generating outcomes that resemble a "star system" more often than a bell curve' (2014, p.34). The huge growth in inequality inherent to the logics of advanced capitalism, is compounded by the dynamics of the emerging economic paradigm: 'The primary business of

digital networking has come to be the creation of ultrasecret mega-dossiers about what others are doing, and using this information to concentrate money and power' (Lanier, 2014, p.54). Lanier himself, recognises the transcendent potency of information: 'An opaque, elite server that remembers everything money used to forget, placed at the centre of human affairs, begins to resemble certain ideas about God' (2014, p.27). The systemic logics at play take on a life force of their own with acute concentration of power a potentially emergent property of the combination of advanced AI and endless data: 'In the network age there can be collusion without colluders, conspiracies without conspirators' (Lanier, 2014, p.64). Mason's 'Postcapitalism' thus looks a naively optimistic outcome of the new logics of information capitalism, not least in the context of technocapitalism's tendency towards ever more powerful corporate companies successfully commodifying the knowledge and information economies. But even if the information economy finds a way to avoid both Mason's suggested route out of capitalism and the star system outcomes that seem inherent to its logics, another force of technology undermines the capitalist economy: potentially massive levels of unemployment.

Automation Unemployment: The Economic Singularity?

As Mason and Lanier have suggested above, labour tends to play a subordinate role in an info-tech economy – problematic if we assume Marx's idea that profit must always derive from labour. But Marx also recognised how competition meant capitalists drive technological dynamism in the search for short term surplus value by producing commodities below the average cost of production. The pace of technological change and the nature of information commodities (bought and sold in compressed space-time), may render this process an intensifying state, requiring businesses to 'skate the edge of chaos' (Kelly, 2011). As numerous commentators point out (Ford, 2015; Lanier, 2014; Srnicek, 2016), platform-capitalist companies such as Uber, Airbnb, and Netflix require very few staff to run their multi-billion dollar businesses. Indeed, the pattern is ubiquitous: 'companies…which today are nascent and fast growing, and tomorrow will be economic giants, are extremely parsimonious employers of humans' (Chace, 2016, p.28). Furthermore, the rise of artificial intelligence and robotics is highly likely to enable the automation of the workplace in a wide variety of fields intensifying the issue created by these new info-tech industries:

> In every single function of the economy - from production to distribution to management to retail - we see large-scale tendencies towards automation. This latest wave of automation is predicated upon algorithmic enhancements (particularly in machine learning and deep learning), rapid developments in robotics and exponential growth in computing power (the source of big data) that are coalescing into a 'second machine age' that is transforming the range of tasks that machines can fulfil (Srnicek & Williams, 2015, pp.110-1).

The hollowing out of mid-level jobs has been in part due to automation – the job markets of developed countries are increasingly characterised by a multiplicity of low-paid, routine work particularly in the service sector. These former jobs have thus far remained reasonably resilient because the labour is cheap and easily available. However, as the processes mentioned above take hold, this labour may be replaced by machines. As Carr explains:

> The logic of capitalism, when combined with the history of scientific and technological progress, would seem to be a recipe for the eventual removal of labour from the processes of production. Machines, unlike workers, don't demand a share of the returns on capitalists' investments. They don't get sick or expect paid vacations or demand yearly raises. For the capitalist, labour is a problem that progress solves (2015, p.31).

Indeed, some capitalists herald automation as the business world's 'emancipation from human workers' (Little, cited in Carr, 2015, p.37), thus it is not humans that will be set free from the drudgery of work but business that will be set free from human fallibility and co-dependency.

A report by the National Bureau of Economic Research (Acemoglu & Restrepo, 2017) confirmed that the process is already well underway, building on the alarms raised in the Oxford University (Frey & Osbourne, 2013) report which determined that 47% of jobs are highly automatable and will likely not exist within the next decade or two. The newer report claims that in the US between 1990 and 2007, 'that one more robot in a commuting zone reduce[d] employment by 6.2 workers' (Acemoglu & Restrepo, 2017, p.4). Blaming processes of globalisation for the loss of manufacturing jobs in the developed world is thus a misconceptualisation: these jobs have not migrated abroad, they have disappeared. De-industrialisation is taking place in the developed world *and* the developing world as a result of automation. This can also partly explain the increasing decoupling of wages and productivity growth.

Despite these patterns, statistics (such as Frey & Osbourne's figure of 47%) give a misleading sense of determinism to these ongoing developing dynamics. It is, however, possible that automation unemployment may become significant: 'The economic imperative of "a highly competitive world" made that inevitable. If a robot could work faster, cheaper, or better than its human counterparts, the robot would get the job' (Carr, 2015, p.20). It could even constitute what Chace (2016) terms an 'economic singularity' whereby the retreat of labour from the value composition of capitalist economics functions as a fatal systemic shock. If changes occur at a pace befitting of a technological ontology rather than a human one, then the collateral damage could be significant. The systemic logics currently in place are entirely inapt for these forthcoming circumstances. Of particular concern is the current treatment of expelled groups and the intensification of concentrations of wealth in the hands of an ever-smaller minority.

There remain commentators who are sceptical of technology's potential to render most humans unemployable, or even for automation unemployment to cause significant economic disruption. The least refined of these positions reasons inductively from history that, despite previous fears, we now have greater productivity and better jobs than at the start of the industrial revolution. This 'Luddite fallacy' position deems that technological development has always created more jobs than it has destroyed and so this pattern must continue. However, this very simplistic argument fails to engage with the trajectory of technological advances, or to consider the implications of continued exponential growth in computing capabilities thereby 'underestimating the very different nature of the technological advances currently in progress, in terms of their much broader industrial and occupational applications and their speed of diffusion' (Armellini & Pike, 2017, n.p.). Automation is likely to continue to act as a suppressant on wages and to aid the increase of the capital-to-labour ratio, deepening the neoliberal pattern of widening inequalities:

> the capital share is a basic determinant of income distribution. Capital is already much more unevenly distributed than income in all countries. The introduction of robots would drive up the capital share indefinitely, so the income distribution would tend to grow ever more uneven (Berg, Buffie & Zana, 2016, p.11).

If significant automation unemployment does occur, this growing inequity could be taken to extremes: ‘we could be looking at a society that grows ever richer, but in which all the gains in wealth accrue to whoever owns the robots’ (Krugman, cited in Carr, 2015, p.33). The mechanisms of social mobility would be largely destroyed.

If robots and AI do render masses of human beings redundant ‘the most important question in 21st-century economics may well be: What should we do with all the superfluous people?’ (Harari, 2017). We may face the stark scenario of a small elite with an almost total concentration of wealth and access to the most powerfully transformative technologies in world history and a redundant mass of people no longer suited to the environment (or fitness landscape) in which they find themselves and entirely dependent on the benevolence of that elite. As we have seen with the example of migrants, prevailing liberal values in developed countries do not always extend to those who do not share the same privilege, race, culture or religion. But even as far as they do extend, there has been a pragmatic reason for these liberal values to have developed:

> Liberalism succeeded because there was much political, economic and military sense in ascribing value to every human being. On the mass battlefields of modern industrial wars, and in the mass production lines of modern industrial economies every human counted. There was value to every pair of hands that could hold a rifle or pull a lever (Harari, 2016, p.308).

History would suggest it extremely naïve to think, given the likely difference in cultural worlds and even potential species-defining variations transhumanist technologies augur, that much benevolence towards disenfranchised populations would be forthcoming. Harari conceptualises the notion of ‘The Gods and the useless’ to capture the gulf between a super elite and unemployed masses, a radicalisation of the pattern of concentrations and expulsions noted by Sassen. Certainly, if this era of advanced capitalism is the period which ushers in such radical technological change, then the logics of expulsions (and the normalising force of this pattern) have deeply disturbing cultural implications, as further explored in Chapter 6. In an era of radical technological power, the ‘useless’ may even represent a security threat to the elite which could be used to justify aggressive and authoritarian actions.

Accelerationism

The pliancy of capitalism signals a durability and adaptability which may allow the system to subsume these processes potentially at a significant human cost. The philosophy of Accelerationism is particularly pertinent in exploring this unfolding, as it seeks to actively speed up these technological dynamics with a libidinal desire to bring about new socio-technological relations.

The dual pull of the autonomous value derived from information representing a potential postcapitalist escape route whilst also threatening the very basis of labour underpins much of the thought of Accelerationism. Noys considers that 'accelerationism points to the problem of labor as the "moving contradiction" of capital – both source of value, and squeezed out by the machine – then it tries to solve this contradiction by alchemising labor with the machine' (2014, p.66). This alchemy constitutes a fusion, or perhaps a sublimation of the human into the machine, which both threatens to subvert capitalism whilst simultaneously acquiescing to its dynamic, growth-centric logics. Thus, 'Accelerationism is a political heresy: the insistence that the only radical political response to capitalism is not to protest, disrupt, or critique, nor to await its demise at the hands of its own contradictions, but to accelerate its uprooting, alienating, decoding, abstractive tendencies' (Mackay & Avanessian, 2014, p.4). Accelerationism takes root from an acceptance of capitalist realism, the pervasive sense that 'there is no alternative', thus constituting 'a certain nihilistic alignment of philosophical thought with the excesses of capitalist culture' (Mackay & Avanessian, 2014, p.4). It has a variety of manifestations, and proponents on the right and the left. Srnicek & Williams (2014) declare Marx and Nick Land as the two paradigmatic accelerationists which pointedly emphasises these dichotomous visions.

A libidinal, anti-humanist form of accelerationism finds expression on the right of the political spectrum in the form of Nick Land. The melding of humanity into the machine is the sublimation of humankind for Land and it is to be welcomed. The schizophrenic flows of capital, unhinged and set free from the humanist interferences of state, or indeed all human planning and intention are what Land sees as inevitable and desirable progress. Land celebrates the coming irrelevance of the human,

> it is utterly superstitious to imagine that the human dominion of terrestrial culture is still marked out in centuries, let alone in some metaphysical perpetuity… thinking no longer passes through a deepening of human cognition, but rather through a becoming inhuman of cognition, a migration of cognition out into the emerging planetary technosentience reservoir, into 'dehumanized landscapes...emptied spaces' where human culture will be dissolved (2014, p.255).

The automated, cybernetic becoming is overdetermined from his perspective. Indeed, this is Nature for Land: 'Nature is not the primitive or the simple, and certainly not the rustic, the organic, or the innocent. It is the space of concurrence, or unplanned synthesis, which is thus contrasted to the industrial sphere of telic predestination: that of divine creation or human work' (Land, 2014, p.270). Land's embrace of the 'accelerative liquid monstrosity' (Noys, 2014, p.69) of capital is based on a strong antipathy to human cognition, and whilst his frenetic prose is expressive of the libidinal pull towards the opaque logics of machinic capital, it is perhaps not surprising that such an ethically vacuous stance has since morphed into something much more sinister. Land's *Dark Enlightenment* (2012) continues his fantasy of the dominance of capital and the dizzying powers it yields, but fuses it with racism making it popular with the neo-reactionaries of the far right. Benjamin Noys has traced accelerationist themes back to the Italian Futurists who also espoused a fascist philosophy, celebrating the sublime power and speed of the machine. Noys cites Marinetti's claim that,

> "Those who are weak and sick [will be], crushed, crumbled, pulverized by the relentless wheels of intense civilization"…The only survival is elective surgery by "the cruel razors of velocity" that will provide the "clean" speed to transform the human body into a new individual war-machine (Noys, 2014, p.18).

The proximity of fascist, authoritarian fantasy, machinic potency, the cult of war, and the sense of uplift required to toughen the fragile human body and mind, are notable, especially in the work of Land where capitalism is heralded as the source of dynamism to bring about a 'meat-grinder' (Land, 2011, p.396) future. Despite his pseudo-transhumanist desire for sublimation of the human into technology, Land's work is a total rejection of the liberal Enlightenment humanism that transhumanists claim as their philosophical underpinning. Human rationality, the lodestar of transhumanist aspirations, is the very thing Land would like to see destroyed and replaced by a different form of reason: autopoietic technocapitalist logics. Prior to the banality of his descent into racism and fascism, Land offered a pertinent guide as to what transhumanist aims might look like when developed through the logics of

capitalism. For him, it is the eradication of human values, and their replacement with an abstract, schizophrenic hyper-instrumentalism. Whilst Land's indifference (or antipathy) to individual human beings constitutes a divergence with traditional transhumanist thought, it is an instructive characterisation of the fusion of the human and the machine in the context of capitalism. Furthermore, it draws attention to the importance of inserting external values into this unfolding if such a cold and indifferent destruction of the human is to be resisted.

Accelerationism's proponents on the left emphasise very different potentialities of technological dynamism. In their *Manifesto for an Accelerationist Politics* Srnicek & Williams argue that, 'not only is capitalism an unjust and perverted system, but it is also a system that holds back progress. Our technological development is being suppressed by capitalism, as much as it has been unleashed' (2014, p.361). They cite patent wars and monopolies as examples of neoliberal constraints on progress and call for utilising existing infrastructure as a 'springboard…towards postcapitalism' (2014, p.355). Theirs is a more grounded and pragmatic conception of accelerationism, a rejection of Land's libidinal, opaque protestations where 'the human can eventually be discarded as mere drag to an abstract planetary intelligence' (Srnicek & Williams, 2014, p.352). Indeed, in *Inventing the Future* (2015), they drop reference to accelerationism altogether, perhaps in recognition of the increasingly dubious associations it may carry. Still, they call for a fully automated, post-work society bringing about a Utopian future: 'such an economy would aim to liberate humanity from the drudgery of work while *simultaneously* producing increasing amounts of wealth' (2015, p.109). These ideas have a long lineage in post-scarcity literature. *Fully Automated Luxury Communism* (FALC) (Bastani, 2019) offers an analogous provocation advocating for a techno-prosperous, work-free world of plenitude and equality. These visions make a similar mistake to transhumanism. Whereas transhumanism views technological progress through the prism of individual enhancement, detached from social context, FALC considers social context detached from the transhumanist potentialities implied by the technologies they envisage. Both are Utopian abstractions, failing to think more fully through our embeddedness in a complex unfolding.

Conclusion

This chapter has identified some of the key logics of capitalism that are especially pertinent to transhumanist aims and technogenetic developments. Perhaps the most important feature is the instrumentalist nature of capitalism. Instrumentalism also underpins transhumanism: both tend towards a dynamic enlargement of technical means but without a clear conceptualisation of ethical ends. Responsibility for determining ends is contracted out to individuals or machines. Capitalism, like transhumanist discourse, interpellates the individual, and both assume individual rational actors. The notion of the liberal human subject which underpins these ideologies will be challenged in chapter 5. The logics of competition and efficiency will also be explored in chapter 5 as they undermine the freedom individual actors are assumed to exhibit by emphasising the contextual relations within which actors are bound. The quantifying, formalising and reifying elements of capitalism and transhumanism are explored in chapter 4 as humans become knowledge products of surveillance capitalists. The human can be perceived as a new frontier in the quest for cheap nature, driven by the need for perpetual growth inherent to capitalism and the desire for control integral to transhumanism. The process further undermines the cogency of liberal human individuals, as people are disindividuated as data and reindexed into new categorical markers. This also gives rise to the increasingly opaque execution of power that can exacerbate the inequities perpetuated by capitalism. Chapter 6 will more thoroughly investigate the implications of these inequities which in the advanced capitalist context manifests in expulsions and concentrations and potentiates an extreme division in society with the introduction of transhumanist technologies.

This chapter has also introduced the notion of the technosystem which indicates a complex, evolving arrangement that includes within it recursive feedback loops between technogenetic development and capitalist relations. This interrelation reveals the potential for emergent destabilising aspects of technological development which could threaten the cogency of capitalism as a system. Thus, there is a recognition that advanced capitalism may not be the system in which technogenetic trajectories continue. Nevertheless, the logics of this system play a central role in the current unfolding and as such are worthy of thorough analysis in conjunction with transhumanist aims. Furthermore, should capitalism be destabilised by the

emergence of radically potent technologies, certain logics may remain or intensify in whichever new systems develop. Complexity, relationality and the processual unfolding of systems are more thoroughly explored in chapters 4 and 7.

Chapter 4: Data Totalitarianism

Introduction

The central concern of this chapter is the rise of a disciplinary and instrumentalist production of knowledge that privileges measurable, commercially valuable data at the expense of other forms of understanding. This facet of contemporary technogenetic relations undermines the transhumanist value of the 'continuous questioning of our knowledge' (More & Vita-More, 2013 p.1). In particular, it will be claimed that access to new forms of knowledge may enable types of instrumentalism that could constitute a process of enclosure of human possibilities: the replacing of social and ecological complexity with a heuristic sociotechnological world designed to enable better prediction, manipulation and control. Humans, reconstituted as data, can be indexed, categorised or otherwise processed *en masse*, not as individuals but rather as 'dividuals' (after Deleuze). Humans are thus rendered objects, in a process that melds reification with the computerisation of knowledge (Lyotard, 1984). At the heart of this chapter is the tension between an increasingly potent instrumentalist machine-ecology aimed at control and totality, and the inevitable social and technological complexity in which such aims are embedded, undermining their efficacy as an apparatus of certainty and control. The technologies that enable these hubristic aims paradoxically catalyse complexity leading to greater uncertainty.

The chapter begins by outlining the transhumanist conceptualisation of knowledge as a linear path of progress making the world ever more tractable to human reason. Complexity theory will then be drawn upon to contest this simplistic worldview. Furthermore, it will be argued that epistemology cannot be separated from ontology and ethics due to the processual, relational co-constitution of knowledge and being (Barad, 2007). The influence of cybernetic thought upon transhumanism will be outlined to demonstrate how a dubious 'informational frame' underpins transhumanist fantasies of radical abundance and immortality. The instrumentalist tendencies of technological progress will be considered as enframing or constraining other possible trajectories of techno-human co-evolution. Foucault's analysis of the relationship between knowledge and power will be drawn upon to reflect on how

technologies can be used to direct, regulate and manipulate human conduct. The underlying urge to control natural and social forces that is evident in transhumanist discourse will be considered in relation to an equivalent urge in techno-capitalist relations.

Zuboff's notion of 'Surveillance Capitalism' will be identified as a shift in capitalist relations in which Big Data and algorithms construct knowledge products that formalise automating human behaviour as the most valuable assets in the economy. This process propels the urge to control towards commercial imperatives. The heuristic nature of Big Data will be outlined and the way in which its shrouded methodologies and effects obfuscate problematic power relations. An investigation of the emergence of a new media ecology follows in which the technical developments inspired by the urge to control, actually catalyse complexity in the form of increasingly chaotic social relations. Finally, buoyed by the growth fetish of capitalism, and the pseudo-colonialist nature of data expropriation, it will be argued that the technogenetic trajectory of algorithmic control aims towards totality. Transhumanism, in undermining the nature of complexity, projects a tractable, machine-like world and Big Data functions not only to interpret this world but also to produce it.

The Transhumanist Conception of Knowledge

In transhumanist discourse knowledge is usually conceived of as a linear, positivist development of scientific and technological understanding, a one-way instrumentalist path leading to an ever-closer proximity to omniscience and omnipotence. Such knowledge is characterised as belonging to a universalised 'humanity', thus deterring questions about unequal access to technologies and the myriad social implications of the potential inequity. The relationship between knowledge and power is not an issue that transhumanists tend to concern themselves with. Essentially, knowledge can be drawn upon by 'morphologically free', liberally conceived individuals enabling them to 'enhance' themselves. The notion of enhancement is broadly uncontested and left to the individual to determine, or contradictorily and somewhat circularly, presumed to be rationally deducible through enhanced reasoning. Another blind spot of this epistemological stance is that it ignores the ecological complexity in which humans are embedded which potentiates human knowledge as a source of disequilibrium or environmental threat. Our development of nuclear weapons, for example,

could yet cause the devastation of life on the planet. For transhumanists such concerns are considered secondary to anthropocentric aspirations, and presumed to be controllable through rational management such as existential risk analysis which would be enhanced through transhumanist developments. Thus, the ever-greater potency of knowledge gained through and utilisable by human reason tames the world towards human-centred aims. Knowledge is the means by which transhumanist capabilities are unleashed and its potentialities are realised.

Transhumanists' totalising faith in the power of human reason to bring about desired effects underwrites their optimistic attitude towards the acquisition of knowledge. For Ross 'epistemological certainty…the belief that there are no problems that cannot be solved through applied reason' (2020, p.14) is one of the primary philosophical commitments of transhumanism. Immediately problematic is the contradictory stance of simultaneously claiming that human reason is so potent that it is apt to successfully design and create superior iterations of itself culminating in a successor species and yet so thoroughly limited that the 'three-pound, cheese-like thinking machine that we lug around in our skulls…may cap our ability to discover philosophical and scientific truths' (Bostrom, 2005, pp.3-4) and thus requires upgrading. This seeming contradiction often leads transhumanists to invoke an abstract conception of pure reason functioning as an external arbiter on existence, a perfected version of human reason attained through technological augmentation. Such a construction derives from the false Cartesian dualism that transhumanists inherit of mind separate from matter and relatedly, the human separate from nature on account of our advanced reasoning capacities. A further contradiction lies in the transhumanist tendency to criticise essentialising conceptualisations of the human while also being guilty of essentialising rationalism itself as the defining feature of humanity. As Levin explains, 'transhumanists are rational essentialists, with their aspiration to unbounded self-creation, whose origin is reason, folded into that essentialism' (2021, p.17). The godlike super-arbiter of essentialised and transcendent reason is presumed to resolve questions of incommensurable values evincing the transhumanist failure to recognise the situated, perspectival, embodied, contextual nature of ethical questions that are not reducible to truth claims.

Transhumanists' commitment to epistemological certainty leads them to endeavour to make a world in the image they project: tractable, predictable, knowable, controllable. 'Dataism', a new 'Data Religion' that reveres the authority of Big Data through its conceptualisation that

‘exactly the same mathematical laws apply to both biochemical and electronic algorithms’ (Harari, 2016, p.367), is appealing to transhumanists because it facilitates epistemological certainty by promising to constrain and control complexity. By making things quantifiable only that which can be measured can be considered, and therefore aspects of reality which defy reductionism and quantification are removed from consideration. The very notion of ‘enhancement’ becomes slippery when placed in relation to all other things, but through decontextualization, individuation and measurement (all heuristic processes), ‘enhancement’ can begin to appear incontrovertible. Decontextualised measurement encourages aims of totality because more of something ‘good’ is always considered positive, as is abolition of something ‘bad’ when good and bad are separated from deeper interrogations of value or more rigorous contextualisation. An example is Kurzweil and De Gray’s notions of superlongevity which constitute ‘a near-seamless ontological shift: the meaning of aging and death is reoriented away from any essential existential import, and re-cast as a slowing or interruption of data-processing’ (Ross, 2020, p.82). Meaning and values are cast out, along with systemic questions of sustainability and related concerns, if ageing is reduced to a data-driven concept where death and depletion are ‘bad’ and health and longevity are ‘good’.

It is worth considering the derivation of ‘the continuous questioning of knowledge’ as a transhumanist value. Three notable influences on More illuminate how he came to advocate the seemingly modest position of the ‘questioning of’ rather than the continuous ‘acquisition of’ knowledge, which would seem more befitting of his view. The first influence is Ayn Rand. ‘Spontaneous Order’ was one of the original Extropian principles. Salome Bour notes ‘this principle was connected to the philosophy of Ayn Rand, who influenced Max More in his early days’ (2021, p.139). Rand’s objectivism envisaged ‘the concept of man as a heroic being, with his own happiness as the moral purpose of his life, with productive achievement as his noblest activity, and reason as his only absolute’ (Rand, 1992 [1957], p.1170). However, More went on to become critical of Rand as her Objectivism was a ‘closed system’ with foundationalist axioms. He states, ‘Rand herself and too many of her disciples became true believers, dogmatists suffering from a hardening of the orthodoxies. This result can be traced to the combination of her personality with her Objectivist epistemology’ and ‘Rand's style, both in person and in writing, favored declaration over explanation, and easy condemnation over deeper understanding’ (More, 1994, n.p.). In 1998 More dropped Spontaneous Order from the Extropian Principles and added Open Society, a nod to Karl

Popper's *Open Society and Its Enemies*. But Popper's 'minimum concession to irrationalism', that is the recognition that 'the fundamental rationalist attitude is based upon an irrational decision, or upon faith in reason' (in More, 1994, n.p.) left More seeking a firmer commitment to rationalism.

From there More (1994) turned to William Bartley's *The Retreat to Commitment*, from which he derived his 'pancritical rationalist' stance that he suggests should underpin a transhumanist epistemology. This position views 'the scope of reason as unlimited and… rejects the demand for rational proofs of our rational standards…holding all positions to be criticizable' (More, 1994, n.p.). More's embrace of pancritical rationalism is motivated by his desire for rationalism to be all-conquering, the idea that pure reason can discover the truth of all things and arrange reality toward an ever-closer degree of perfection. It is not about acknowledging the indeterminacy of human understanding as the human cannot stand outside of the unfolding reality to judge things rationally as a neutral arbiter. Nor is it about recognising that knowledge and rationality cannot solve all problems as questions of ethics are beyond reduction to truth claims. There is no humility at all in More's position, but rather the facile belief that rationalism itself can penetrate truth endlessly moving ever closer to totality but never reaching it. Furthermore, More's belief in the primacy of rationalism seems to jar with his libertarian instincts. He espouses the sovereign importance of the individual as 'cognitively independent' (More, 1993) and as a heroic figure determining their own path and applying their own rational faculties in their own interests. He ignores the fact that the interests of individuals necessarily collide and cannot be contrived to align through pure rationality. This emphasis within transhumanist discourse of the individual separate from relations, a free-willed, independent rational agent, will be further analysed in Chapter 5. But it is useful now to question More's notion of all-conquering rationalism by situating human 'reason' both ontologically and epistemically to reveal its limitations, and its hyperbolic construction within transhumanist thinking.

The Ontological Limitations of Human Reason

Our ability to access context-independent confirmation of our interpretations and assumptions about the world is intrinsically restricted. What we think we know is fundamentally

unverifiable. Transhumanists usually characterise this limitation as a tractable epistemological problem, but it is, in fact an ontological one. Evelyn Fox Keller asks,

> By what mandate is the world obliged to make sense to us? Is such an assumption even plausible? I would say no, and on a priori grounds…The human mind does not encompass the world; rather, it is itself a part of that world, and no amount of self-reflection provides an escape from that limitation…The mind—along with its capacity to make rational sense—is itself a biological phenomenon (2002, p.295).

The transhumanist tendency to conceptually separate human reason from its situated entanglements and hold it up as a free-floating purveyor of the world is symptomatic of their ontological shortcomings. Even Kant, one of the Enlightenment heroes of transhumanist thought, is clear in his rejection of the ontological stance of 'scientific realism' that transhumanists are largely committed to. Humans' ability to reason is contingent upon how our minds work. For Levin, transhumanists' failure to recognise this constitutes evidence of an irrational faith that undercuts the rationality that transhumanists purport to draw on and exemplify: 'when transhumanists press us to leverage a purportedly crystal-clear lens on reality proper…they evince their colossal blindness to the parameters of human existence' (2021, p.231). For Dupuy (2007), this ontological error means transhumanist thinking is not a question of epistemological 'uncertainty' which implies tractability, but rather of 'radical indeterminacy'. Thus, tinkering with evolution puts humanity 'in the position of being the divine maker of the world, the demiurge, while at the same time condemning him to see himself as out of date' (Dupuy, 2007, p.250). The human is at once a mere object to be improved, and simultaneously God-like: all powerful, and yet curiously maladroit.

Ray Brassier rejects the import of the ontological divide between what really is and what humans can know in advocating for the philosophy of Prometheanism which 'is the attempt to participate in the creation of the world without having to defer to a divine blueprint' (2014, p.485). Brasssier claims 'the disequilibrium we introduce into the world through our desire to know is no more or less objectionable than the disequilibrium that is already there in the world' (2014, p.485). The embeddedness of the human mind within manifold relations to the world means that the human mind cannot claim a perspective above or separate from these relations and so it cannot consider itself a separate, rational arbiter on existence. But for Brassier this limitation is not pertinent as an inhibitor of 'progress' as 'the claim that there is a "way of the world", a ready-made world whose order is simply to be accepted as an

ultimately unintelligible, brute given…is objectionably theological' (2014, p.485). Recognising that certain human truth claims are ultimately unverifiable does not stop humans reconstituting the world based on what we believe we know. As Brassier argues 'The true and the made become convertible at the point when only what has been (humanly) made can be truly known' (2014, p.484). Brassier's point reminds us that epistemology and ontology are fundamentally interconnected. What is known, or at least believed, impacts, as well as derives from, what is.

However, there is an important point missing from Brassier's account. The interconnection between epistemology and ontology brings a further factor into the frame: ethics. Karen Barad's *Meeting the Universe Halfway* (2007) offers a compelling alternative to the transhumanist framing of knowledge. One of the reasons it is so effective as a counterpoint to transhumanism is that Barad, a scholar of theoretical particle physics, draws on quantum theory to develop a scientifically rigorous account of being that situates meaning and matter as co-constitutive.

Barad argues that 'contemporary physics makes the inescapable entanglement of matters of being, knowing, and doing, of ontology, epistemology, and ethics, of fact and value, so tangible, so poignant' (2007, p.3). What we know, or what we think we know (epistemology) is dependent on and derived from what is (ontology) as well as feeding back into and co-constituting what is, and thus has unavoidably ethical implications. As she states, 'an empirically accurate understanding of scientific practice, one that is consonant with the latest scientific research, strongly suggests a fundamental inseparability of epistemological, ontological, and ethical considerations' (2007, p.25). This gives rise to her ethico-onto-epistemological framework in which our relationship to and understanding of knowledge has ethical as well as ontological implications (a point that will be explored further in Chapters 5 and 7). Whilst the Promethean shrug of indifference to what cannot be known may be onto-epistemologically valid, it is ethically contestable. Furthermore, knowing is not something exclusive to human reason, but 'a distributed practice that includes the larger material arrangement. To the extent that humans participate in scientific or other practices of knowing, they do so as part of the larger material configuration of the world and its ongoing open-ended articulation' (Barad, 2007, p.379). Thus, the transhumanist characterisation of human

reason as 'salvific' (Waters, 2011, p.168), and a surety that it '*will* produce the divine, namely, posthumanity' (Levin, 2021, p.228) is hyperbolic, ungrounded and contravenes a scientifically credible understanding of agency. Ultimately, the ethics of transhumanist aspirations will be revealed to be compromised by their failure to recognise profound epistemological limitations to which the focus will now turn.

The Epistemological Limitations of Human Reason – Complexity

Transhumanists tend to underestimate the depth of complexity in which we are enmeshed, a side effect of their emphasis on subjects and objects (relata) over relations. According to Capra & Luisi the ultimate relational interconnection of reality renders it impossible to understand anything completely let alone everything:

> Twentieth-century science has shown repeatedly that all natural phenomena are ultimately interconnected, and that their essential properties, in fact, derive from their relationships to other things. Hence in order to explain any one of them completely, we would have to understand all the others, and that is obviously impossible (2014, p.2).

Conceiving of reality in terms of multiple interlinked systems, or a 'world of systems' (Bunge, 1979) is at the heart of complexity theory which seeks to engage with the implications of the epistemological challenges facing human reason. Cudworth & Hobden explain,

> Everything above the level of the most elementary particles is a system of one form or another. This extends from atoms, through molecules, cells, bodies and upwards into social systems, solar systems, galaxies to finally, perhaps, the universe. From a complexity perspective these systems share certain common features, and all systems provide the environment for all other systems – in that sense we exist in a totally (to whatever minimal extent) interconnected universe (2011, p.4).

It should be noted that complexity theory is not one unified theory, but has numerous incarnations, some of which are, to an extent, ontologically and epistemologically contradictory to each other. Broadly, two versions of this theory can be characterised as 'restricted' or 'general' (Morin, 2007). The former conception views complexity as a property of the world, but it seeks to tame it through methods such as quantitative modelling.

Complexity here, rests within the epistemology of science, as it is a question of having enough processing power to analyse and interpret the complexity. It also rejects the ontological limitation of human endeavours to probe reality outlined above. 'General complexity' meanwhile requires a more cautious and qualitative approach to epistemological questions. Complexity becomes an inescapable facet of reality, complete with its own properties, rather than something that will ultimately yield to the brute force of information processing and analysis. Cudworth & Hobden characterise Morin's notion of general complexity as 'one which cannot be tamed mathematically and perceives a broad unpredictability to existence and a hard to determine relationship between causes and effects' (2011, p.3). It is this conception of complexity that constitutes a threat to transhumanist epistemological certainty.

Systems thinking is at the heart of complexity theory. Capra & Luisi argue 'the zeitgeist…of the early twenty-first century is being shaped by a profound change of paradigms, characterised by a shift of metaphors from the world as a machine to the world as a network' (2014, p.12). This paradigm shift is instructive as it points to a transformation in our conception of systems from a Newtonian conceptualisation, to complex or ecological ones (see Ulanowicz, 2007; Capra & Luisi, 2014). Newtonian systems may be simple or complicated, but they are not complex. Each part of a Newtonian system plays a role in the functioning of that system: it is the sum of its parts. Transhumanism tends to characterise even the human mind in this modular, Newtonian, manner, indeed this characterises its attitude to reality at large (Levin, 2021). The system has a centralised telos or goal and the components' behaviours are usually limited to servicing that broader aim. Most technological products can be viewed in this way from mobile phones to aeroplanes. But such thinking limits our consideration of these products to how they function and what they are primarily meant for, rather than the multifarious impacts on their environments that determine what they do. It is the interconnectedness of systems that enables complexity thinking to recognise a range of diverse and decentralised phenomena that describes and reflects reality in a way that closed, atomistic, Newtonian systems-thinking fails to conceive of.

Complex systems are causally open and therefore constantly interact with their environment. The environment in this sense is made up of all the other systems that exist within and around

it: ‘A system…indicates the possibility of drawing a notional boundary around a certain group of elements that indicates a certain degree of autonomy. Systems overlap and intersect with other systems’ (Cudworth & Hobden, 2011, p.4). Systems then, can be anything from material entities like bodies, to complex social structures such as nation states and corporations: they are ‘multileveled’ and ‘nested’. That is to say, systems can be hierarchical and can exist within other systems; they can be material or conceptual, human and non-human. A system will act upon its environment just as its environment will act upon it. Hence both are in a constant state of flux: they are inherently adaptable and dynamic. This has led to the concept of ‘Complex Adaptive Systems’. It should be noted that the dynamism need not lead to instability over a given period. As Walby states, ‘since every system is understood to take all other systems as its environment, systems co-evolve as they complexly adapt to their environment’ (2003, p.8). Thus, complexity theory brings together the notions of system and process. This co-evolution enables the reframing of standard conceptions of social change and agency away from ‘a simple notion of a social force impacting on another social entity’ (Walby, 2003, p.8) to a more nuanced and ontologically sophisticated conception of reality. This can be characterised as a ‘movement away from essentialist notions of social objects towards relational and processual ontologies’ (Bousquet & Curtis, 2011, p.48) in which the idea of identifying straightforward linear causal relationships disintegrates.

Indeed, non-linearity is an inherent and defining property of complex adaptive systems that is central in determining their unpredictability. Unlike linear, closed, Newtonian systems where ‘[t]he conventional scientific paradigm leads us to expect that a small input will lead to a small output and, correspondingly, a large input will produce a large output. This proportionality is broken in complex, non-linear systems’ (Hendrick, 2009, p.6). It is largely this non-linearity that lies at the heart of the conflicting versions of complexity thinking. General complexity theorists view the unpredictability of non-linearity as characterising a fundamental aspect of complex systems that will make them permanently intractable and unknowable at the most granular level. Hence qualitative investigations are the most appropriate. Whereas restricted complexity theorists deem that even the most uncertain and inexplicable outcomes could be accurately modelled and determined with sufficient information and processing power. The former view holds that no ‘direct mathematically calculable relationship would be expected between two elements; even repeating exactly the same action may not result in the same outcome and may theoretically have a completely

different effect' (Cudworth & Hobden, 2011 p.65). Importantly this means that there is a significant contingence on historical context which may be effectively untraceable: 'very small changes in the early conditions of a system can result in the development path of a system changing enormously…the contrary is also true – large events can have minimal impacts' (Cudworth & Hobden, 2011, p.66). The unpredictable non-linearity does not constitute chaos as a further tendency within complex systems is 'self-organisation'.

A propensity to self-organise is a property of complex systems. This occurs when negative feedback loops play a regulating function that aids in the creation and maintenance of a system. Whilst it can be noted that human agency may mean human systems have a more powerful propensity to self-organise, as humans can think abstractly (Westley et al, 2002) and actively co-ordinate and collaborate in ways that provide stability and order, non-human systems also display this trait. Conscious agency is not a requirement of self-organisation then, rather it is 'a spontaneous and non-directed process' (Cudworth & Hobden, 2013, p.5). As positive feedback loops can destabilise systems, equilibrium is often a temporary and contingent state, despite a system's inherent propensity to self-organise. Nevertheless, 'Underlying the notion of self-organisation is the idea that there are patterns of behaviour in the interactions of matter…there are regularities which emerge, even if they are contingent and temporary' (Cudworth & Hobden, 2011, p.65). A further property of complex adaptive systems that is inextricably linked to self-organisation, is 'emergence'.

Emergence is what happens as a result of self-organisation within an environment of complex adaptive systems. It can relate to how the characteristics of a system transform over time or to new systems that emerge as a result of interactions of existing systems. Mitleton-Kelly explains that 'Emergent properties, qualities, patterns or structures, arise from the interaction of individual elements; they are greater than the sum of the parts and cannot be predicted by studying the individual elements' (2003, p.19). Emergent systems and characteristics are not reducible to the component level within a system. This is due to the open nature of systems and implies non-linear causality. Emergent properties are therefore often imperceptible and entirely unpredictable by viewing a given system as closed and internally logical and from the perspective of its component parts. Barad's agential realist account argues that emergence 'is dependent not merely on the nonlinearity of relations but on their intraactive nature (i.e.,

on nonseparability and nontrivial topological dynamics as well)' (2007, p.393) which goes beyond classical or even general complexity theory accounts of systemic dynamics in its emphasis on co-constitution and the intra-active unfolding of being.

Allenby & Sarewtitz (2011) offer a useful model for thinking about complexity in the context of technogenesis. They identify three notional levels of complexity at which the implications of technological development can be considered. It is worth noting that there are no hard, clearly delineated boundaries between these levels. In keeping with complexity theory, the levels are necessarily interconnected. Thus, it is a representation only, designed to help think through our embeddedness in complex dynamics. At Level I complexity, a technology is evaluated in terms of its ability to realise a clearly defined purpose, the telos of Newtonian systems. At Level II, general complexity starts to take hold as it

> includes subsystems…that, acting together, create emergent behaviours that cannot be predicted from the behaviour of…Level I…At level 2 one gets such phenomena as technology 'lock-in', which occurs when economic, cultural, and coupled technology systems coalesce around a particular way of doing something (Allenby & Sarewitz, 2011, p.38).

Integral to this second level of complexity is the idea that any technology is embedded in a context of socio-cultural relations, and these relations represent higher levels of intricacy and entanglement. It is not that a simple technology such as a cup is a Level I technology and a more complex technology such as a neural net is Level II. Rather both can be analysed for their ability to fulfil a designated aim, and both are embedded in a wider social context where their implications are far more unpredictable. 'Technologies do not act in isolation; they are connected to other technologies, and to social and cultural patterns, institutions, activities, and phenomena that may interact in ways that no one is able to predict or control' (Allenby & Sarewitz, 2011, pp.38-9). Emergence of new dynamics and unintended consequences become more likely. Thus, even at Level II, 'the consequences of action become very difficult to map out, so that projecting intent becomes at best a matter of trial and error and at worst, close to futile' (Allenby & Sarewitz, 2011, p.44). However, at Level III, analysis itself begins to break-down.

Level III complexity considers the implications of technologies at an earth systems level: ‘a complex, constantly changing and adapting system in which human, built, and natural elements interact in ways that produce emergent behaviours which may be difficult to perceive, much less understand and manage’ (Allenby & Sarewitz, 2011, p.64). Timothy Morton’s (2013) notion of a ‘hyperobject’ is a theoretical conceptualisation of such complexity. At this level, technology does not just potentially give rise to unexpected consequences, rather it can constitute

> a transformative wave that towers above us, ready to crash down – not just an organisational or political or cultural force, but an existential force. At this level…[truth is] too complex to be given in forms (ideology, scientific models, traditional values) that you can process…the world we are making through our own choices and inventions is a world that neutralises and even mocks our existing commitments to rationality, comprehension, and a meaningful link between action and consequence (Allenby & Sarewitz, 2011, p.64).

At an earth systems level there are no agreed upon, discernible or universally valid aims. The reality of our behaviours as a species, already radically ‘enhanced’ in capabilities by our technologies, is plainly seen at the earth systems level in the concept of the Anthropocene. Unfortunately, as Allenby & Sarewitz ruefully acknowledge ‘we have launched ourselves into Level III with only the tools of our vaunted Enlightenment – a mere Level I sophistication’ (2011, p.66). Transhumanist aims evidently have implications at Level 2 and 3 (and potentially beyond in their ambition to counter entropy at a universal scale), but often frame themselves in simple Level I terms such as better memory or longer life. The simplistic trope that these ‘enhancements’ will necessarily bring about better societies is largely based on a category error of analysis. Incommensurable values are one problem: at a high systems level no goal or telos is agreed upon; the idea that choice at an individual level will add up to something desirable at an earth systems scale is highly contestable and indeed undermined by our current parlous state. Radical contingency is another issue: whatever the goal, the outcome is far from guaranteed: ‘We must get beyond the idea that we are imposing our intent, our purpose on the future…“cause and effect” is the opiate of the rational elite’ (Allenby & Sarewitz, 2011, p.71). The application of Enlightenment reason in the context of general complexity is not just impractical, but fantastical.

As such, technogenetic developments are best understood not as a problem to be solved (*a la* transhumanism) but as a *condition* (Allenby & Sarewitz, 2011), and one that is embedded in general complexity beyond any of hope of rational control or engineering. Humility is required and the best that can be hoped for is a partial understanding of our situatedness within this complex unfolding, and the development of flexible, open responses to the emergence of new dynamics and unforeseen problems. The focus must be on 'expanding option spaces', increasing the number of voices involved in the process, and contending with complexity at earth systems levels, all of which 'asks for instincts totally contrary to those that emerge from enlightenment commitments to applied rationality, individuality, and problem-solving' (Allenby & Sarewitz, 2011, p.172). In ecological terms, what is being called for is developing a more tolerant 'fitness landscape' through precautionary practices. Acknowledging complexity, and the leakiness of the notion of the individual requires nothing less than a revolution of Enlightenment thought, starting with humility and a recognition of situated relationality. This revolution is underway with the convergence of natural and social sciences exemplified by complexity theory and critical posthumanism.

Cybernetic Influence on Transhumanist Thought

Such epistemological humility is anathema to transhumanists. Instead, they conceptualise reality through a reductive information frame derived from cybernetic thought (Hayles, 1999; Kay 1995; Levin 2021) that facilitates fantastical claims about the tractability of existence. Transhumanists fetishise science and technology creating a hierarchical view of human reason with technoscience as its apotheosis. This leads to an instrumentalist vision that overextends the capacity of science to determine existential meaning. Sheila Jasanoff argues 'biology and biotechnology have proclaimed themselves as humanity's most compelling instruments for making sense of life' (2019, p.16). She problematises the privileged position of science as the sole arbiter of meaning: 'Science's monopoly on declaring what life is continually segues into judgement about what life is for, in short, into configuring the directions of human progress' (2019, p.135). Transhumanism is an exemplar of a discourse that makes this error. It constitutes a flawed and naïve framing which belies its professed adherence to the pursuit of truth and instead constitutes a misguided ideological commitment. At the same time the hyperbolic narratives it inspires serve economic ends premised on

notions of perpetual progress and growth. Here the grand narrative implicit in capitalism (endless growth is realisable) is supported by the grand narrative of transhumanism (endless progress is realisable).

The fetishisation of science, technology and its instrumentalising capacities is undergirded by the desire for intelligibility and control. Science's goal of a grand 'Theory of Everything' requires that all is ultimately explicable and comprehensible to human reason. Transhumanism can be seen as the ideological manifestation of this desire, aspiring to the control as well as the understanding of everything:

> The pursuit of immortality through science is only incidentally a project aiming to defeat death. At bottom it is an attempt to escape contingency and mystery. Contingency mean humans will always be subject to fate and chance, mystery that they will always be surrounded by the unknowable. For many this state of affairs is intolerable, even unthinkable. Using advancing knowledge, they insist, the human animal can transcend the human condition (Gray, 2011, p.213).

More's desire to transcend all 'natural, but harmful, confining qualities derived from our biological heritage, culture and environment' (More, 2013a, pp.4-5) echoes Von Neumann's claim that 'All stable processes we shall predict. All unstable processes we shall control'. This yearning for epistemological certainty promotes the taming of nature by its reconstitution into the discrete and delineated, rather than the intra-relational and complex, for only that way can reality be made endlessly tractable to human intervention.

Transhumanist thinking is indebted to cybernetics for providing a basis for this misguided certainty. Cybernetics, a term coined by Norbert Wiener, studies the notions of communication and control and utilises an 'information' framing that can be applied to machines as well as living organisms (Hayles 1999; Kay 1995; Levin 2021). Cybernetics brings together a converging range of thought from the theories of von Neumann, Shannon, McCulloch & Pitts, and Wiener, amongst others, and is strongly linked to the Dartmouth Summer Research Project on Artificial Intelligence (Hayles, 1999). In *How We Became Posthuman*, Hayles draws upon a history of cybernetics to show that 'such abstractions as bodiless information' (1999, p.12) are contingent upon historical assumptions. She states,

> At the inaugural moment of the computer age, the erasure of embodiment is performed so that "intelligence" becomes a property of the formal manipulation of symbols rather than an action in the human life-world…Aiding this process was a definition of information that conceptualised information…as an entity distinct from the substrates carrying it. From this formulation, it was a small step to think of information as a kind of bodiless fluid that could flow between different substrates without loss of meaning or form (1999, p.xi).

In analysing this history and revealing its contingency, Hayles attempts to undermine the process that has come to create an 'information/materiality hierarchy' (1999, p.12) in which information takes precedence and can exist essentially independently of any material instantiation. For Lily Kay, cybernetics was not the dawning of an 'age of communication and control' as Wiener (1961, p.39) envisaged it, but rather a 'process of erasure of meaning' (Kay, 1995, p.623). She argues that the cybernetic contention 'that one could, in principle, write and transmit the coded messages that comprise a human being: both communicate and control the book of life' (Kay, 1995, p.624) involved the sacrifice of 'semantics, thus producing a language devoid of meaning' (Kay, 1995, p.625). Kay (1995) also notes the influence of Wiener on proto-transhumanist Haldane who uncritically embraced the cybernetic collapsing of distinctions between biological and electronic information processing.

Hayles identifies the double move required to create this erasure of meaning as a 'Platonic backhand and forehand' (1999, p.12). The former she explains,

> works by inferring from the world's noisy multiplicity as simplified abstraction…this is what theorising should do. The problem comes when the move circles around to constitute the abstraction as the original form from which the world's multiplicity derives. The complexity appears as a fuzzing up of an essential reality rather than as a manifestation of the world's holistic nature (1999, p.12).

Whereas there is a long history to this backhand conceptualization, powerful computers are required to bring about the move from the other direction:

> from simplified abstractions and, using simplified simulation technology techniques such as genetic algorithms, evolve some multiplicity sufficiently complex that it can be seen as a world of its own…The backhand goes from noisy multiplicity to reductive simplicity, whereas the forehand swings from simplicity to multiplicity. They share a common ideology privileging the abstract as the real and downplaying the importance of material instantiation. When they work together… disembodied information becomes the ultimate Platonic form. If we

> capture the Form of ones and zeros in a nonbiological medium…why do we need the body's superfluous flesh? (1999, pp.12-13).

Transhumanists have embraced the informational frame uncritically (Hayles,1999; Levin, 2021) employing naïve, reductive versions of its implications to advocate for fantastical, ungrounded possibilities. Dataism, the 'new religion' of Silicon Valley (Harari, 2017) is a manifestation of this conceptualisation.

Metaphors that are enabled by the informational framing of biology and neuroscience are indicative of the hyperbolic power these sciences promise to yield and the reductive, debasing implications. As Jasanoff explains 'Representing the human genome as *the* book of life, written in the plain four-letter code of DNA, implicitly claims for biologists a priestly role: as the sole authorized readers of that book, those most qualified to interpret its mysteries and draw out its lessons for the human future' (2019, p.8). The metaphor of life as a book characterises it as fundamentally knowable – albeit only to those who speak the language. Furthermore, Kay argues 'Molecular biology became a kind of information science aimed at rewriting the Book of Life' (Kay, 2000, p.279) indicating the promethean aim not just of reading and understanding the meaning of life, but to create it anew. This prescriptive force that biology adopted is manifest in biotechnological pretentions that directly inform the transhumanist imagination. A metaphor prominent in neuroscience can be traced back to McCulloch & Pitts' claim that 'Because of the "all-or-none" character of nervous activity, neural events and the relations among them can be treated by means of propositional logic' (1943, p.115). As such, they were the originators of the idea that neural networks and computing have an equivalency (Maley & Piccinini, 2015), which informs the influential conceptualisation of the mind as an 'information processor'.

Transhumanist thinking is replete with language reconstituting humanity in machinic terms, especially the language of computers. Hence humans are 'suboptimal systems' and 'most people make the mistake of anthropomorphising themselves' (Cannon cited in O'Connell, 2017, p.141). This view reconstitutes 'humans, animals, and machines as information-processing devices receiving and transmitting signals to effect goal-directed behavior' (Hayles 1999, p.37) and leads to 'the unwarranted conclusion that there is no essential difference between thought and code' (Hayles, 1999, p.61). However, as Harari points out,

we have a history of conceiving of ourselves and everything else in metaphors which reflect our contingent and transitory world view:

> In the 19th century, scientists described brains and minds as if they were steam engines…Because that was the leading technology of the day, which powered trains, ships and factories, so when humans try to explain life, they assumed it must work according to analogous principles. Mind and body are made of pipes, cylinders, valves and pistons that build and release pressure, thereby producing movements and actions (2016, p.117).

As well as the danger of seeing the world in its entirety through the lens of a temporary milieu, there is also a risk that we see metaphors, not just as descriptively useful analogies, but as literal facts. As Richard Lewontin points out, 'While we cannot dispense with metaphors in thinking about nature, there is a great risk of confusing the metaphor with the thing of real interest. We cease to see the world as if it were like a machine and take it to be a machine' (2000, p.4). Transhumanists seem to have taken the view of life as a book, and the mind as a mere information processor as literal and incontrovertible realities as the power such metaphors promise underpins the claim that radical technological leaps forward are imminent and can be controlled and directed to the effects desired by humans.

This equating of the human mind to mere information offers transhumanists such as Moravec (1990, 1999) and Kurzweil (2000, 2006, 2010) an escape from the myriad limitations of embodied existence. Kurzweil articulates a form of dataism, which he refers to as 'patternism', that affords his conception of the future human entity maximum plasticity. By insisting that all life is essentially reducible to code he envisions an algorithmic convergence of computer and life sciences. Thus, for Kurzweil, individuals are a pattern of information, replicable in other substrates. An individual is 'the "circuits" of one's general reasoning, attention-span, memories, and so forth…it is a theory of identity that allows for an amortality outside of the body' (Ross, 2020, p.86-87). This reduction to a computerised version of human being disabuses questions of meaning or values through a radical reimagining of consciousness as infinitely plastic. Hayles explains, 'Information viewed as pattern and not tied to a particular instantiation is information free to travel across time and space…it can be free from material constraints that govern the mortal world… we can achieve effective immortality' (1999, p.13). The idea that information itself is the fundamental essence, and its materiality is merely a temporary, contingent and unnecessary factor, is a recurring

assumption in many of the descriptions of the future Kurzweil and Moravec conjure. Kurzweil's (2000) imaginary 2099 fantasises about practically immortal machine-based humans. The wetware of the body has been superseded and upgraded, even displaced. Our minds may be electronic and photonic equivalents. A physical presence can be achieved through endless morphologically adaptable nanobot swarms, or through virtual reality. Infinite plasticity of form (including absence of any material form) has implications that extend beyond the future manifestation of the human. Nature too becomes infinitely plastic and thus 'radically abundant' (Drexler, 2013). Whatever can be imagined can be made manifest if information is higher on the hierarchy than materiality. As Thorpe explains: 'Kurzweil's fantasy…denies limits by imaginatively escaping from the constraints of Earth as the relevant environment…the rejection of spatial limits (of Earth) and temporal limits (via radical life extension) is achieved ultimately through decorporealization' (2016, p.79). Decorporealisation is a further decontextualisation and abstraction, exemplifying the dubious cybernetic world-view that bedevils transhumanist thought. Through the cybernetic fantasy, the human and its environment become liberated from the constraints of embodiment and interconnection.

These metaphors are appealing to transhumanists because they facilitate a hyperbolic form of epistemological certainty as well as fantasising about limitless resources and time. By making things quantifiable and readable, complex, inter-relational aspects of reality which defy reductionism are removed from consideration. As Ross claims, 'this is the transhumanist ontology: a measuring, calculating logic applied in radical ways becomes the answer to all problems' (2020, p.94). The very notion of 'enhancement' becomes slippery when conceptualised within a holistic view of intra-related being. Individual 'enhancements', once contextualised, may cause all sorts of disequilibria or injustices. However, through the heuristic processes of decontextualization, individuation and measurement, 'enhancement' can begin to appear incontrovertible. This helps to explain the appeal of cybernetics to the most hubristic forms of scientific thought. The information frame culminates in a tendency towards dataism which, as Ross explains, 'is meant to free knowledge from any subjective arbitrariness. Following this logic, the un-quantifiable and ambiguous – intuition, wisdom, and the like – are not forms of knowing until they can be supported with the right dataset' (2020, p.83). Transhumanist dataism exemplifies Jasanoff's (2019) concern that scientific progress leads to a de facto privileging of a *prescriptive* view of *meaning* instead of a

descriptive view of *being*. At its core, this prescriptive view is the advocation of instrumental progress in favour of all other forms of meaning-making or 'worlding' (after Barad, 2007).

Utopias, Extropias and Desiring Machines

The zenith of prescriptive conceptions of meaning can be found in notions of Utopia. Hauskeller notes 'transhumanism is without doubt a philosophy of strong utopian tendencies' (Hauskeller, 2014, p.101). Bostrom constructed a *Letter From Utopia* (2008b), Pearce refers to the 'naturalisation of heaven' (1995, 0.1) and Fuller talks of 'becoming God' as a final destination for the human journey. All suggest an end point, a finitude, a settled perfection or totality upon which transhumanist aims can rest, contradicting the value of a continuous questioning. Indeed, all Utopias are totalitarian concepts insofar as they assume a singular perfect ideal. More, meanwhile rejects Utopian accounts arguing that transhumanists are not interested in such a static goal. He states, 'most transhumanists…do not see utopia or perfection as even a goal, let alone an expected future posthuman world…One of the principles of extropy…is perpetual progress' (More, 2010, p.140). Elsewhere, he adds that the 'Idol of Paradise and the idea of a Platonically perfect, static utopia, is so antithetical to true transhumanism that I coined the term "extropia" to label a conceptual alternative. Transhumanists seek…a never-ending movement toward the ever-distant goal of extropia' (More, 2013a, p.14). Extropia must be understood in the context of More's commitment to liberal notions of selfhood and his rationalist fundamentalism. Even with the recognition of no final resting place in the pursuit of knowledge, a linear path forward is presumed. For transhumanists, knowledge and progress imply each other.

Extropia may differ from Utopia in its rejection of stasis and totality but it assumes a single path of instrumentalism is the correct one. It proposes a linear journey to an unreachable destination. The transhumanist commitment to the proactionary principle is not suggestive of a continuous questioning of knowledge but an incessant production of knowledge targeted at realising narrow aims. Transhumanism forecloses a critical, contextual, processual ethical approach to technoscientific practices and insists axiomatically on maximising progress perpetually. There is no inclination to reflect on the unfolding of the webs that are weaved through technoscientific advances, but simply to press ahead: 'forward, onward, upward' as

the motto of extropianism states. The constraining, totalitarian impulse of this singular path can be juxtaposed by Braidotti's commendation of a 'a playful and pleasure-prone relationship to technology that is not based on functionalism' (Braidotti, 2013, p.91). Here she cites Deleuze & Guattari's notion of 'becoming machine' which is 'linked to the project of releasing human embodiment from its indexation on socialized productivity' (Braidotti, 2013, pp.91-2). Desire in Deleuze & Guattari's (2004a; 2004b) schizo-analysis is celebrated for the way in which the unconscious resists assimilation into the organised efficiency of social production and reproduction. Ideas of turbulent and exhilarated affect are anathema to the rigid rationalism that underpins More's notion of Extropia. He is unwilling to ask how 'desiring machines' may contest notions of human enhancement. More's philosophy reveals his 'continuous questioning' as an instrumentalist notion of perpetual progress. Such an instrumentalist relationship with technology has long been critiqued by philosophers reflecting on techno-human relations.

The Enframing of Technology

Various philosophers of technology have long argued that a facet of modernity is its conceptualisation of technology as fundamentally instrumentalist. This narrows the potentiality of a relationship with technology that may enable other forms of human flourishing. In his seminal essay 'A Question Concerning Technology' Martin Heidegger argues that technology is usually conceived of as 'a means to an end' and 'a human activity' (1977, p.4). He identifies this as an 'instrumental and anthropological definition of technology' (1977, p.5) which does not give full credence to the real essence of technology. Heidegger draws on the semantic legacy of the Greeks to highlight the fact that 'techne' was associated with the notions of 'poiesis' and 'episteme'. Episteme identifies the domain of knowledge, in particular scientific knowledge. But 'poiesis' is linked to the sacred process of creation, or 'revealing' (aletheia, in Greek). For Heidegger technology 'is no therefore mere means. Technology is a way of revealing' (1977, p.12). However, modern technology over-emphasises the episteme aspect of techne over and above poiesis:

> What is modern technology? It too is a revealing…And yet the revealing that holds sway throughout modern technology does not unfold into a bringing-forth in the sense of poiesis. The revealing that rules in modern technology is a challenging [herausfordern], which puts to nature the unreasonable demand that it supply

> energy that can be extracted and stored…The earth now reveals itself as a coal mining district, the soil as a mineral deposit (1977, p.14).

Thus, modern technology is an 'enframing' (gestell) that turns the world into a 'standing reserve': the demand for an efficient and limitless supply of energy and resources. This is an instrumental, systematic, reductionist and utilitarian approach that undermines the productive potentialities of poiesis.

The enframing conceals alternative ways of being, limiting nature to the ordering of a stockpile of resources to be drawn upon. This includes humans who also become standing reserves. For Heidegger, humans tend to view themselves mistakenly as the masters of technology and thereby fail to see the limiting 'enframing' that modern technology constitutes. However, Heidegger does not see this as a necessary fact of technology. Rather the essence of technology is ambiguous – it need not constitute the endless quest for instrumental efficiency. A broader approach to technology must be taken that allows for greater emphasis on poiesis and therefore rejects the unyielding demand for efficiency in which technology is understood as being 'based on modern physics as an exact science' (1977, p.13). What is highly pertinent in Heidegger's conceptualisation in relation to the continuing questioning of knowledge is that the instrumental framing of modern technology represents a closing off from other forms of knowing and understanding. The 'continuous questioning' is rather a continuous reconstituting of all matter into standing reserve. Knowledge, in this context, merely constitutes new methodologies of enacting this process, and thus is not a questioning at all. It is a perpetual enclosure rather than an opening.

Many of the ideas Heidegger advances in *A Question Concerning Technology* bear similarity to arguments put forward by a range of other prominent thinkers in the philosophy of technology. For Lewis Mumford technics historically were "broadly life oriented, not work centred or power centred" (1967, p.9). Mumford uses the term 'polytechnics' to indicate technologies that can be used in various ways that reflect a diversity of being, and that can function in a democratic way. Monotechnics, however, are 'based upon scientific intelligence and quantified production, directed mainly towards economic expansion, material repression, and military superiority' (Mumford, 1970, p.155). Unlike Heidegger, Mumford does not singularly identify monotechnics with modern, post-Enlightenment technology. For him, they

began 5000 years ago with the 'megamachine' which is a form of rigid, hierarchical social organisation such as large armies and organised workforces. Nevertheless, much modern technology constitutes monotechnics. Whilst Mumford advocates polytechnics, he is not naïve about the significant material benefits that monotechnics provide. Most notably they are about power: an army can conquer new territory for example. This comes at the expense of the human characteristics of the soldiers – it requires their servitude, dedication and discipline at the expense of other pursuits they may follow such as family life, play or art. The lure of monotechnics leads to the 'myth of the machine' – the idea that such technologies ultimately bequeath a net benefit to society. Just as Heidegger envisions an alternative way of revealing for technology, Mumford aims to demythologise the desirability of a megatechnical society: 'to save techniques itself we shall have to place limits on its heretofore unqualified expansion' (Mumford, 1954, p.39). However, such is the all-pervasive nature of monotechnics and the attitudes it requires and propagates that it constitutes a 'technological imperative' which demands we 'surrender to these novelties unconditionally, just because they are offered, without respect to the human consequences' (Mumford, 1970, p.185-6). Consumerism also bolsters and underpins this logic as does an unswerving dedication to progress. In echoes of Heidegger then, for Mumford, modern technology's relationship to knowledge tends towards a form which closes off other potential ways of being and understanding. Forms of knowledge which privilege power, control, efficiency and progress (all tending towards instrumentalism) prevail over alternative ways of understanding life.

Herbert Marcuse emphasises the economic logic of capitalism as a determining factor in the nature of 'technological rationality'. The rationality demands our social world increasingly utilises scientific and technological processes, with efficiency as a central underpinning. Ultimately the technological rationality with its 'mantra of efficiency' mediates all experience so that 'When technics becomes the universal form of material production it circumscribes an entire culture; it projects a historical totality – a world' (Marcuse, 2007, p.158). Thus, as with Heidegger's view of modern technology or Mumford's monotechnics, for Marcuse too, there is a ravenous, totalising quality to technological rationality. Science utilises formalisation, quantification and instrumentalization to transform what it encounters in the real world into defined entities that can be manipulated by formal laws, transcoding the world into a reified functional entity. It 'projects nature as potential instrumentality, stuff of control and organisation' (Marcuse, 2007, p.157). This process also denies any ethical

evaluation. For Marcuse, domination is at the core of capitalism and therefore technological rationality as it exists in a capitalist context is a reifying vehicle of domination. The supposed value neutrality of capitalism is thus revealed to serve the purposes of the powerful. Marcuse, like Heidegger and Mumford, envisions an alternative 'way of revealing' of technology in Heidegger's terms, but for Marcuse, that would require an alternative social reality to capitalism.

Jacques Ellul echoes some of the themes present in Heidegger, Mumford and Marcuse. He emphasises the instrumental rationality, dehumanising and totalitarian elements of modern technology, arguing that our technological society has produced 'Technical Man'. In his book *Technological Society*, Ellul emphasises the autonomous nature of technology, claiming that in 'the modern world, the most dangerous form of determinism is the technological phenomenon' (1964, p.xxxiii). For Ellul, the ends of technology, which may be interpreted in abstract notions such as progress and wealth, remain strangely vacuous. Simultaneously the means become ever more complex and increasingly beyond the comprehension of those supposedly controlling the machines or determining their ends. Thus, modern technology is 'artificial, self-augmenting, universal, and autonomous' (in Mitcham, 1994, p.59). Ellul emphasises that the problems that technologies bring also seem to demand more technologies as the solution in our highly technical society. He draws attention to the autonomous nature of technology – its expansion beyond the auspices of controlled human will: '[technique] has been extended to all spheres and encompasses every activity, including human activities' (1964, p.78). Ellul also emphasises the role propaganda plays in creating complicity with technique. This is similar to Langdon Winner's notion of 'reverse adaptation' which is also suggestive of the autonomous aspect of technology as it describes how technological systems acclimatise social systems rather than the other way around.

The instrumentalism that characterises our relationship with technology indicates a focus on forever increasing the means of our capacities with little holistic consideration of the ends. In transhumanist discourse the ends are often expressed in such overtly fantastical terms (such as Kurzweil's immortal nanobot swarms or Pearce's hedonically blissful entities) that they avoid a grounded analysis of our complex relational embeddedness or the implications of the processual journey that would facilitate such transcendence. The enframing of instrumentalist

technological progress suggests a uni-directional, closed and linear path towards a totality rather than a contested, self-critical, contextually reactive, radically open, and ethically responsible process. Transhumanism conceptualises the human as master of technology, that is determiner and beneficiary of instrumentalist aims. However, the philosophers above all recognise that the co-evolution of humanity and technology has its own processual dynamics which extend beyond human will. Technological developments shape humans, just as humans shape technology. As well as the transhumanist failure to fully consider the implications of this, they also fail to contend with the fact that humans are also the object of scientific and technological knowledge in this process, and thus the attitude of standing reserve applies to them too. Whilst More fantasises about the 'cognitive independence' of humans, a much more nuanced philosopher develops an 'archaeology' of the contingent methods by which science 'grounds its positivity…its conditions of possibility' (Foucault, 1994 [1970], p.xxii). Of particular interest to Foucault are the methods of separating the 'human' as object of knowledge from the human that it is the subject of this knowledge.

Technologies of Power

Foucault's understanding of power and its inextricable relationship with knowledge ('power and knowledge directly imply one another' (Foucault, 1995, p.29)) renders his thought highly relevant to the questions raised in this chapter. His use of the term technology or the related 'technique' rarely refers to tools, machines, and other conventional notions of technology, but rather to ways of ordering, controlling and regulating human behaviour. For Foucault, the network of power relations that function to 'discipline' individuals include ideas and methods of measurement that seek to 'normalize' certain ways of being. Foucault is concerned with the way 'technique' is used as a method of control that normalises certain behaviours and therefore functions to frame the possibilities open to individuals. His notion of governmentality considers 'the ensemble formed by the institutions, procedures, analyses, reflections, calculations and tactics that allow the exercise of this very specific albeit complex form of power, which has as its target population' (2007 [1978], p.108). That is, the rationality that comes to define the 'conduct of conduct' and 'to control the possible field of action of others' (1982, p.770). Foucault's pluralistic notion of power also conceptualises it

not just as a 'sovereign' force exerted downwards, but as a creative, multivalent force. Thus, technologies have potential as forms of resistance as well as forms of domination.

Foucault's critique of science and technology is primarily focussed on the 'human' sciences. Whereas 'techniques of physics, chemistry, and biology are utilizable,' it is the techniques of psychology and those disciplines that claim applicability and universality to the human condition that cause Foucault consternation. As Behrent explains,

> For Foucault, the fundamental problem with psychology…lies in…improper 'positivism': specifically, its view of human beings as measurable and objectively knowable rather than as intrinsically hermeneutic...it seeks positive knowledge of a being – 'man' – that is not positively knowable. The very task of seeking positive knowledge of human beings is condemned to failure…claims made in the name of 'man'… ultimately authorize and enable the technical control of human existence (2013, p.72).

Foucault is highly critical of the 'political technology' of discipline: subtly coercive methods of social control which, 'provide, at the base, a guarantee of the submission of forces and bodies' (1995, p.222). Whilst such technologies can be constraining, oppressive and dangerous, there is no solution in the concept of the liberated human subject, something essential to 'man' that must remain untainted. Foucault's 'death of man' thesis rejects the notion of an essentialism to human beings, seeing 'man' as a construct. Foucault links these two ideas – modern knowledge or technique that can be used for purposes of social coercion, and the construction of 'man' as an object of this knowledge. For Foucault, this notion of 'man' as object of positive knowledge coupled with 'man' as the subject which can attain this knowledge underpins the modern 'episteme', following the focus on the obsession with 'measurement' and 'order' of the classical episteme.

In *Discipline and Punish* Foucault uses the notion of the panopticon as the exemplary, technical ideal of disciplinary power. Central to the potency of the panopticon is visibility: Jeremy Bentham's prison architecture envisages a central tower which yields the possibility for every cell to be seen at any given time. Foucault warns 'Visibility is a trap…Each individual…is seen but he does not see; he is the object of information but never the subject of communication…this invisibility is a guarantee of order' (1995, p.200). The effect of this arrangement 'assures the automatic functioning of power' (1995, p.201). The relationship

between visibility/invisibility, subject/object, automation and power are integral concepts to surveillance capitalism, and the totalising implications of the transhumanist conceptualisation of knowledge this chapter explores. Foucault states, 'It is an important mechanism, for it automizes and disindividualizes power. Power has its principle not so much in a person as in a certain concerted distribution of bodies, surfaces, lights, gazes' (1995, p.202). This position emphasises the environment in which an individual finds themselves in defining their horizons of possibility.

The resultant lack of agency extends beyond the prisoner of the panopticon, for the director too is bound up within the workings of the machine. Thus, it is a 'laboratory of power' from which there is no escape. Foucault states it is 'closed in upon itself' which is reminiscent of Heidegger's notion of framing ('gestell'). 'The panoptic schema makes any apparatus of power more intense: it assures its economy (in material, in personnel, in time); it assures its efficacy by its preventative character, its continuous functioning and its automatic mechanisms' (1995, p.206). There is a distinctly machinic quality to the social functions Foucault analyses: efficiency, autonomy, economy; notions which echo the thought of Ellul, Marcuse and Mumford. Indeed, the panopticon offers a breadth of coercive possibilities: 'it is a marvellous machine which, whatever use one may wish to put it to, produces homogenous effects of power' (1995, p.202). The motivation of power can be manifold: 'curiosity…malice…or a thirst for knowledge' (1995, p.202), 'it could be used as a machine to carry out experiments, alter behaviour, to train or correct individuals' (1995, p.203). Part of the process by which these experiments of coercion can be undertaken is that they provide ample opportunity to 'map aptitudes, to assess characters, to draw up rigorous classifications…in relation to normal development' (1995, p.203). Classification or 'normalization' are fundamental aspects of the disciplinary machine: 'Whereas the judicial systems define juridicial subjects according to universal norms, the disciplines characterise, classify, specialise; they distribute along a scale, around a norm, hierarchise individuals in relation to one another and, if necessary, disqualify and invalidate' (1995, p.223). These can be seen as attempts to define essentialism through perceived normality, that is to quantify the normal and to demand it as a yardstick.

The functioning of the panopticon at once reaches ever outwards and seeks greater efficiency, but at the same time does so with subtlety as it does not require 'sovereign' force or performative violence. As Foucault says, it is 'a machinery that is both immense and minute' (1995, p.223) and 'Our society is not one of spectacle, but of surveillance' (1995, p.217). It is the 'nonegalitarian and asymmetrical' (1995, p.222) nature of these systems of micro power that are especially problematic, further explored later in the chapter through the notions of the 'black box' and the 'division of learning in society' (Zuboff, 2017). This is exacerbated by the system's tentacular spread which is enabled by its

> tactics of power that fulfils three criteria: firstly, to obtain the exercise of power at the lowest possible cost… Secondly, to bring the effects of this social power to their maximum intensity and to extend them as far as possible, without either failure or interval; thirdly, to link this economic growth of power with the output of the apparatuses (educational, military, industrial or medical) within which it is exercised; in short, to increase both the docility and utility of all the elements of the system (Foucault, 1995, p.218).

This points towards the tendency to totality that is implicit in the disciplinary panopticon in which we are caught. That 'the panopticisms of every day may well be below the level of emergence of the great apparatus and the great political struggles' (1995, p.223) ensures it is difficult to engage with and counteract these processes by traditional means. There is an almost viral quality to the disciplinarity, further emphasising the notion of invisibility.

Foucault's notion of biopower focusses on the task of administering life, going beyond the level of the individual to the 'biopolitics of populations' (1990, p.169). Thus, 'after a first seizure of power over the body in an individualizing mode, we have a second seizure of power that is not individualizing, but, if you like, massifying, that is directed not at man-as-body but at man-as-species' (Foucault, 2003, p.243). The move from sovereign society to one of biopolitics should not be read as the replacement of sovereignty, but its displacement via 'an explosion of numerous and diverse techniques for achieving the subjugation of bodies and the control of populations through the use of statistics and probabilities' (Foucault, 1990, p.39). These multivalent forces render the repressive aims of sovereign power ever more acute: 'biopolitics is the strategic coordination of these power relations in order to extract a surplus of power from living beings' (Lazzarato, 2006, p.14). The questions that Foucault wrestled with in relation to biopolitics remain vital, albeit the 'explosion of techniques' has multiplied and mutated through technogenetic developments. Lazzarato rightly notes that the

‘patenting of the human genome and the development of artificial intelligence; biotechnology and the harnessing of life's forces for work, trace a new cartography of biopowers’ (Lazzarato, 2006, p.11). Evolving advanced capitalist relations leave their mark: ‘in neoliberalism an extralegal administrative discourse has turned the legitimacy of governance over to technical systems of compliance and efficiency that underwrite the relationship of the state and the economy with a biopolitics of war, terror, and surveillance’ (Clough & Willse, 2012, P.1). These materialisations are integral to the questions explored in this chapter: fundamentally how Big Data, as ‘a “fourth paradigm” of knowledge production (beyond theory, experiment and simulation)’ (Chandler, 2015, p.836), has significant biopolitical implications.

The Logic of Control

In his *Postscript on the Societies of Control*, Deleuze argues that Foucault’s disciplinary societies are being replaced by societies of control. He explains,

> the different control mechanisms are inseparable variations, forming a system of variable geometry the language of which is numerical (which doesn’t necessarily mean binary). Enclosures are molds, distinct castings, but controls are a modulation, like a self-deforming cast that will continuously change from one moment to the other, like a sieve whose mesh will transmute from point to point (1992, p.4).

Thus, there is something more nebulous about existing in societies of control. Deleuze points out the corporation has replaced the factory and the corporation ‘is a spirit, a gas’. The indistinct nature of societies of control move away from the ‘two poles’ of disciplinary societies which are the identifying ‘signature that designates the individual’ (Deleuze, 1992, p.5) and the identifying number that situates the individual’s position within the mass. It is ‘code’ that replaces the signature and number, and these codes ‘mark access to information, or reject it. We no longer find ourselves dealing with the mass/individual pair. Individuals have become ‘dividuals’, and masses, samples, data, markets or “banks”’ (Deleuze, 1992, p.5). Deleuze also makes explicit how both the human and technology are exemplified in each case:

> The disciplinary man was a discontinuous producer of energy, but the man of control is undulatory, in orbit, in a continuous network…The old societies of sovereignty made use of simple machines – levers, pulleys, clocks; but the recent disciplinary societies equipped themselves with machines involving energy, with the passive danger of entropy and the active danger of sabotage; the societies of control operate with machines of a third type, computers, whose passive danger is jamming and whose active one is piracy and the introduction of viruses (1992, pp.5-6).

Capitalism too is rendered differently by this shift, from a 'capitalism of concentration, for production and for property' to a 'capitalism of higher order production. It no longer buys raw materials and no longer sells the finished products…What it wants to sell is services and what it wants to buy is stocks' (Deleuze, 1992, p.6). The shift in the function of money from 'minted money that locks gold in as numerical standard' in disciplinary society to 'floating rates of exchange, modulated according to a rate established by a set of currencies' (1992, p.5) is also expressive of the wave-form of societies of control, everywhere shifting, twitching, regulating and 'self-deforming': ubiquitous and processual. For Deleuze the market form is a determining force in the new logics of control:

> The operation of markets is now the instrument of social control and forms the impudent breed of our masters. Control is short-term and of rapid rates of turnover, but also continuous and without limit...Man is no longer man enclosed, but man in debt (1992, p.6).

The market logics that thus underpin Deleuze's notion of control reach an apotheosis in new developments of techno-capitalism.

Del Val (2020) links the trajectory of the market to transhumanist aims and identifies the urge to control as its fundamental impulse. He argues that modern society is transhumanist already, as large tech corporations, 'perhaps the most powerful agents on the planet' (2020, p.1), have a transhumanist agenda and are engaged in framing our perceptions in a digital shift that has been hastened by the COVID-19 pandemic. For Del Val, this is a movement towards 'hypercontrol' which is premised on quantification: 'a model of implicit social credit where every action gets quantified' (2020, p1). Del Val (2018) maintains that the desire for 'hypercontrol' underpinning the politics of Facebook, as well as the Russian, US and Chinese governments, is core to the technological paradigm. Del Val's analysis is perceptive and clear in this regard: he rightly identifies the process of quantification as fundamentally reductive

and recognises the loss it implies. He also perceptively understands the urge to control and order as fundamental to the transhumanist paradigm, and its advocacy of surveillance as symptomatic of this.

The biopolitical implications of Big Data and the related surveillant practices have inspired more extreme conceptions of control. For Parisi & Goodman (2011) this constitutes a 'mnemonic control' whereby 'Power no longer leaves the future unoccupied and open' (2011, p.165). They argue that biopower bolstered by cybernetics has reached a state which 'moves beyond human-machine interaction and engages with the mechanisms of virtual control, the control of the future, of the not yet experienced, of the unlived' (2011, p.168). The pre-emptive potency of mnemonic control is not simply predictive but intuitive and actuating in ways that require reconceptualisations of time itself. They state, 'Memories are genetically transported across species and scales. Biological programming is folded into unintended host bodies, forming a mnemonic symbiosis. All these layers of memory are stratified into a geology of achronological time' (2011, p.173). The will to control tends towards the absolute thus extending beyond the present moment towards capturing the future.

Surveillance Capitalism: The Human as Information Object

J.B. Watson pioneered behaviourism as a field of psychology that claimed to be 'a purely objective experimental branch of natural science. Its theoretical goal is the prediction and control of human behavior' (Watson, 1913, p.158). Thus, there is a significant shift of emphasis in behaviourism from the inner world of human thought and experience to the outer world of observable action. Any meaning that exists in the inner world that is not manifest in the outer world is lost – in other words behaviourism undertakes an act of selection for social purposes: the creation of 'data'. Watson endeavoured to deny any such selection was occurring by denying the reality of consciousness itself. He saw consciousness as a pre-scientific idea, an attempt to imbue humanity with a greater sense of worth. Essentially for Watson we are all just machines, acting in predictable ways which can ultimately be understood and even controlled or 'conditioned' by manipulating the environment.

This attitude was taken further by Watson's compatriot and critic B.F. Skinner. Inspired by Max Meyer's *Psychology of the Other-One*, the key to success for Skinner's 'radical behaviourism' lay in its conceptualisation of humans as 'others'; to apply the viewpoint of observation in order to realise the objective science of human behaviour. Skinner defines behaviour as 'what an organism is doing – or more accurately what it is observed by another organism to be doing' (1938, p.6). There is a clear emphasis, not only on shifting the frame from the internal workings of consciousness to the outer traces of behaviour (data), but as importantly, transferring the power away from the observed individual and towards the observer. This is a significant power shift – the 'operant behaviour' of the observed, through the observer's selection, becomes data. The data is the source of new knowledge: the science of radical behaviourism, which itself produces the knowledge of how to control people and societies. Skinner calls for the 'minimum of interaction between subject and scientist' (1965, p.21); indeed the less the subject is aware of the process, the purer the data, the closer the scientist comes to laboratory conditions. This brings to mind Foucault's panopticon in which an individual 'is seen, but he does not see; he is the object of information, never a subject in communication' (1995, p.200). In *Beyond Freedom and Dignity* Skinner argues that knowledge results in the obliteration of freedom – indeed freedom is simply ignorance. By understanding the behaviour of humans we can interpret and control their entire being, and therefore the *knowledge* created through behaviourist techniques necessarily leads to the impossibility of freedom. The lacuna in knowledge of how the environment conditions and determines behaviour is the very thing we rely on for a sense of freedom – but if we are to fill that gap with knowledge and understanding, freedom disappears. For Skinner, this is nothing to regret: freedom, like consciousness for Watson, is a pre-scientific notion, a fantasy dreamt up to dignify humanity.

Central to the behaviourist notion is instrumentality, with the human conceptualised as the object or instrument, and human scientific reason as the separate, hierarchically privileged master in a distinct, demarcated realm. Skinner explains, 'We need to make vast changes in human behaviour…What we need is a technology of behaviour…comparable in power and precision to physical and biological technology' (2002, pp.4-5). Skinner's instrumentalism imagines a totalitarianism of means: absolute control. The ends such powerful means serve can be glimpsed in his novel *Walden Two*: all environmental, social and economic problems

can be solved with perfect knowledge achieved. But there is an anaemic quality to the plodding predictability. After all, by omitting consideration of consciousness, our docility is the only testament to our contentment. The very notion of absolute order, the obliteration of conflict, danger, dissonance is suggestive of the obliteration of minds with their temporary disquietudes, inevitable social contestations, irrational contrariness, illogical capriciousness. All suffering can surely only be expunged when accompanied by the eradication of all joy.

Zuboff sees in Skinner's ideas the core of 'surveillance capitalism' whereby 'the new digital apparatus – continuous, autonomous, omnipresent, sensate, computational, actuating, networked, internet-enabled' constitute 'Skinner's call for the "instruments and methods" of "a behavioural technology comparable in power and precision to physical and biological technology". The result is a panvasive means of behavioural modification' (2017, p.375). Zuboff claims that capitalism is now in a new stage, characterised by the profitable extraction of data for the purposes of predicting and shaping human behaviour. This development is based on a conceptualisation of humans as reified knowledge objects, and legitimate targets of capitalist interests. Zuboff (2017) relates how 'data exhaust', the information left behind when people interact with websites, was discovered to have potential as a powerful predictor of future behaviour when analysed by increasingly capable prediction algorithms. As Zuboff explains, these 'prediction products became the basis for a preternaturally lucrative sales process that ignited new markets in future behaviour' (2017, p.337). As the volume of data increased hugely with the growing uptake of internet users, algorithms also improved, producing ever more effective prediction products. The data became increasingly valuable as the fuel that feeds the algorithms, which created an 'extraction imperative', namely the need to accumulate more data and thus find ways of extracting it more effectively.

This renders a perpetually wider range of real human activity as valuable - stripped of its context, its meaning, its intentionality and abstracted into data that can be interpreted *en masse*, aggregated and utilised to identify what behaviour may follow. Automated systems were increasingly developed that 'relentlessly track, hunt, and induce more behavioural surplus' (Zuboff, 2017, p.337). The smartphone was a major boon in this process. Zuboff claims Google and its competitors developed a 'logic of conquest, defining human experience as free for the taking' (2017, p.337). This was no small task as the taking of such data as a

legitimate asset of appropriation was not a law-given necessity but a contingent societal complicity attained through 'a range of rhetorical, political, and technological strategies to obfuscate these processes and their implications' (Zuboff, 2017, p.337). Zuboff argues that, as an entirely new phenomenon, the implications of this conquest were not well understood. Governments and legal systems were slow to understand what was happening, and the public too was habituated to these new norms. Bewitched by shiny products, addictive apps and unreadable, tome-like terms of service agreements, the public clicked their way to submission. The advertising industry, benefitting enormously through the new powers of prediction, poured cash into this new economy demanding the prediction products become increasingly effective.

Prediction products by their nature imply imperfection – they predict, not determine. The predictions become more accurate as the demand for certain outcomes intensify, the data becomes ever richer and the algorithms more effective. Tools were developed 'aimed at your personality, moods, and emotions, your lies and vulnerabilities. Every level of intimacy would have to be automatically captured and flattened into a tidal flow of data points for the factory conveyor belts that proceed toward manufactured certainty' (Zuboff, 2017, p.199). Zuboff's analysis shows that over the course of fifteen years the interests of surveillance capitalists have escalated from the process of utilising machine learning and data for the purposes of predicting behaviour to the purposes of shaping it. The surveillance capitalism 'trajectory has taken us from *automating information flows about you to automating you.* Given the conditions of increasing ubiquity, it has become difficult if not impossible to escape this audacious, implacable web' (Zuboff, 2017, pp.338-9). This is not so much about a continuous questioning of knowledge as a rapacious collecting of data that can lead to a specific kind of knowledge: that which is aimed at social control for commercial imperatives.

The type of knowledge and its use is defined by its instrumental character. Information that is useful for commercial purposes is privileged: 'societal optimisation for the sake of market objectives' (Zuboff, 2017, p.399). Surveillance capitalism has an actuating logic as well as an extractive one: it is not just about boiling information down to commercially potent data, but turning that data into tools which construct the social world as more pliable to its aims. The asymmetry of access to knowledge is a fundamental factor in the process of control, thus,

‘ubiquitous computing is not just a knowing machine; it is an actuating machine designed to produce more certainty *about us* and *for them*’ (Zuboff, 2017, p.201). The recognition of the interconnection of knowledge and power has never been more explicit, and the asymmetry of knowledge is a prerequisite in the quest for the concentration of power than underpins the logic of surveillance capitalism. This asymmetry is referred to by Zuboff as the ‘division of learning society’ which constitutes ‘the ascendant principle of social ordering in our time’ (2017, p.182). The very production of the kind of knowledge required for a social world governed by algorithm is premised on the sources of that knowledge being unaware of what is extracted from them, and excluded from the possibility of accessing and learning from that knowledge. It is a privileged and demarcated realm which ‘drifts into pathology and injustice’ (Zuboff, 2017, p.185). The quest for certainty and control fundamentally requires the repression of self-awareness and agency for the majority, ossifying a societal structure of ‘us’ and ‘them’. A further point emphasised by Zuboff goes to the heart of the means-ends question. As Zuboff argues, ‘The knowledge that now displaces our freedom is proprietary. The knowledge is *theirs*, but the lost freedom belongs solely to *us*’ (2017, p.375). If freedom is the sacrifice to be made for knowledge and order, peace and sustainability in *Walden Two,* in surveillance capitalism that same price is made ‘in the service of others’ wealth and power’ (Zuboff, 2017, p.374). The shift of focus from the inner workings of a subject, to their measurable actions transcribed to data, ideally appropriated with as little knowledge or understanding on their part as possible, sees a commensurate shift in economic and social power between the observer and the observed in the social reality of our times.

Heuristics and Instrumentality – What is Lost?

British statistician George E.P. Box (1976) claimed that all ‘models are wrong, but some are useful’. This simple idea gets to the heart of how power functions in surveillance capitalism. On the one hand the wrongness of models speaks to the heuristic process of data collection. The selection process in extracting data means other information is always left out. As Cheney-Lippold points out, ‘“raw data is an oxymoron”. The production of data, at its genesis, is encased in a web of pre-existing meanings, in which data “are not given; they are made”’ (2017, p.54). In the tradition of positivism, data seemingly denies its own social construction and assumes a sense of scientific neutrality that belies the interest-laden and

technically delimited way in which it reindexes categorical meaning. The wrongness and usefulness are difficult to separate as the usefulness in large part informs the wrongness. This raises the important question of interests: to whom is it useful and for what end? If 'Algorithms are devices for allocation, and the allocation will always be empowered, functionalist, and incomplete' (Cheney-Lippold, 2017, p.233), the power is held by those who own the algorithms and the function is their ends. Hence, put simply, 'What these algorithms do "unlock" is the ability to make your life useful on terms productive for algorithms' authors' (Cheney-Lippold, 2017, p.253). Usefulness is thus predicated on the basis of capitalist relations, and interests are necessarily pitted against each other. However, the abstraction of data, the perceived efficacy of algorithms, cover up ethical questions inherent to the social relations from which data are extracted: 'numbers turn people into objects to be manipulated' (Porter, 1995 p.77). The manipulation of numbers appears far less controversial than the manipulation of people; but if 'we are data', they amount to the same thing.

The process that translates information into data has technical limitations. The quest for more useful data underpins the logic of many technological developments. The internet of things, augmented and virtual reality, smart meters and wearables all provide sites of furthering extraction for surveillance capitalists. Cheney-Lippold uses the term 'measurable types' to describe the 'actionable analytic constructs of classificatory meaning, based exclusively on what is available to measure' (2017, P.24). As well as the technical constraints which define or limit what is selected, the ultimate usefulness of those aspects of the human lifeworld will also inform the selection. Advertising has functioned as a vital source of funding in the surveillance capitalist paradigm, and thus data which can be utilised for creating knowledge products that increase consumption are valuable. This is an example of how simple capitalist interests come to define the algorithmic world. As Cheney-Lippold explains,

> Any measurable type is necessarily incomplete, much like any attempt to represent the world in abstraction. Accordingly, a measurable type's aim is instead directed toward operability and efficiency, not representative exactness…This reindexing of categorical meaning away from the human centred complexities of narrative, context, and history and toward measurable datafied elements within a closed set…casts the measurable type as a discursively contained, and empirically defineable, vessel of meaning (Cheney-Lippold, 2017, p.48).

As danah boyd and Kate Crawford state, big data relies in part on the mythology that, 'large data sets offer a higher form of intelligence and knowledge that can generate insights that were previously impossible, with the aura of truth, objectivity and accuracy' (2012, p.663). Meaning is reframed as a tractable engineering problem, but the complex messiness of experience is bled out during the process of datafication, with rich relationality lost.

Engineering problems and mathematical questions have final answers that can be arrived at, human meaning does not. 'Algorithmic governmentality' (Rouvroy, 2012) relies on the control of a 'statistical body' rather than a human one, and in doing so enables a process of manipulation which appears freer from the ethical complexities of non-algorithmic governmentality. The creation of a more efficacious and pliable world is made possible because 'these identificatory systems reject the organic. They deny the analogue grey between the digital polarities of +1 and 0' (Cheney-Lippold, 2017, p.197). But from within the analogue grey it is possible to feel uneasy about this digital re-rendering of social reality. Cheney-Lippold uses the term 'the else' to refer to what is lost, and the uncanny sense that can be felt:

> This else, or the fact that something "else" is up that we sense or indirectly know about, reifies the contemporary impossibility to perfectly transcode life/control into a digital form…Overall, the else serves as the procedural moment when human reflexivity enters into this datafied subject relation…we experience the world on two fronts which cannot be collapsed into one (Cheney-Lippold, 2017, pp.179-80).

It is when we no longer feel this 'else', or cannot express it, that the enframing of datafication is most pernicious. Much of life has become almost unthinkable outside of the structures of advanced capitalism, and with the same sense of inevitability that is brought to mind by the slogan 'there is no alternative', algorithmic governmentality, surveillance capitalism and the datafied-self function most efficiently when they are beyond mindful recognition and thus unquestioningly accepted.

> The control at the heart of algorithmic identification, soft biopolitics, is a factual inasmuch as it hides these ghosts in the machine and that dampens the else. Like shocks on the car, our lives, as conditioned by the physics of the road, appear unconditioned by technological intervention. We are unknowing of the reality that exists beneath us. A car with perfect shocks would make even the rockiest of roads seem impossibly smooth (Cheney-Lippold, 2017, p.260).

This is the fitness landscape that these processes seek to create, one that feels imperceptible. For this is what maximises instrumental power.

Expanding instrumental power requires a focus on means but it also results in certain ends. The inextricability of instrumental rationality from the implicit values it embeds in the social world is evident. Lisa Nakamura refers to surveillance as 'a signifying system that produces a social body, rather than straightforwardly reflects it' (2009, p.150). This gets to the heart of the heuristic/instrumental relation: on the one hand it is not directly representational and on the other it is itself productive. Identities, ever shifting, have their movement infused by productive algorithmic interpretations of identity: 'Over time, then, we do not typically hold onto an algorithmic identity…Rather, it is algorithmic knowledge that temporarily incorporates us within its models…Gender is first and foremost a cybernetic system, not a gendered politics' (Cheney-Lippold, 2017, p.143). In other words, algorithmic understandings of notions like gender shape notions of identity in the real social world. Instead of political contestations of identity formed by experience, algorithms 'leak [their] contested meanings across the gap' (Cheney-Lippold, 2017, p.143) from the virtual to the real. The subtle and not so subtle shifts of social reality that are produced serve particular interest groups, namely those who own algorithms and those who pay for what these algorithms produce, 'making identified life useful for the various neoliberal incarnations of marketers and governments' (Cheney-Lippold, 2017, p.143). Zuboff echoes the role of the commercial imperative behind algorithmic relations:

> Digital connection is now a means to others' commercial ends. At its core, surveillance capitalism is parasitic and self-referential. It revives Karl Marx's old image of capitalism as a vampire that feeds on labor, but with an unexpected turn. Instead of labor, surveillance capitalism feeds on every aspect of every human's experience (2017, p.9).

The interest-based underpinning of the heuristic reconstitution of reality hides myriad injustices and imbalances of power.

> By reframing knowledge creation as an algorithmic phenomenon, one in which "models are wrong" but still employed, we see the swindle of big data's theoryless objectivity. What is useful is what is decided to be useful. Use isn't contingent on anything outside the models authors' intentions or haphazard creations (Zuboff, 2017, p.148).

Whilst in the everyday, use is determined by the commercial imperative, the potential for injustice is perhaps brought into sharpest focus in the military context: 'we kill people based on metadata…we don't target people, we target their phones in the hope that on the end of that phone is a bad guy' (in Scahill & Greenwold, 2014, n.p.). Patterns of behaviour render people targets, life and death are determined by the probabilistic decision making of algorithms. 'The else' is the gap between the calculation of probability and the actuality of the social world. The fact that the veracity of the target is based on 'hope' suggests the ethic of justice is sacrificed to the efficient instrumentality of probability. The complex task of identifying guilt is simplified to a probabilistic approximation of truth, and the automated process of death that follows constructs reality with fatal certainty. This is symbolic of the wider process by which 'truth' becomes filtered through the interests of algorithms' owners, and the new reality that follows creates its own truth, the basis of which is often invisible – an algorithmic calculation, too complex to comprehend or else hidden behind proprietary legislation.

Black Boxes - the Inscrutability of Algorithmic Power

Sassen describes how power is comprised of increasingly complex assemblages that function as a 'kind of haze' (2014, p.13). Territory, authority, rights and technical capacities function together to reconstitute the spatio-temporal construction of power (Sassen, 2008). An amorphous centrelessness is integral to these processes, in which even humans are 'undulatory, in orbit, a continuous network' (Deleuze, 1992, p.5) in the 'self-deforming', ubiquitous nature of societies of control. Alan Greenspan suggests such complexity has rendered the market irredeemably opaque and that it is impossible to attain 'more than a glimpse at the internal workings of the simplest of modern financial systems' (in Pasquale, 2015, p.2). Such a view enables libertarian thinkers such as von Hayek to claim that this knowledge problem is 'an insuperable barrier to benevolent government interventions in the economy' (in Pasquale, 2015 p.2). This knowledge problem is a contingent construction and a convenient excuse for inequalities of access to knowledge:

> What we do and don't know about the social (as opposed to the natural) world is not inherent in its nature, but is itself a function of social constructs. Much of what we can find out about companies, governments, or even one another, is governed by law. Laws of privacy, trade secrecy, the so-called Freedom of Information

> Act—all set limits to inquiry. They rule certain investigations out of the question before they can even begin. We need to ask: To whose benefit? (Pasquale, 2015, p.2).

The fact that decisions are increasingly made algorithmically has significant implications for the haze in which power is concealed. It broadens the scope for the decisions, which are laden with vested interests and social biases, to exist beyond the purview of social examination. The challenge of unpicking the catalysed complexity of modern systems from the intentional obfuscation of their inner workings is sufficiently onerous to allow such obfuscation to flourish.

Two pertinent and widely used metaphors for this process are the 'black box' and the 'one-way mirror'. The black box has a dual meaning as explained by Pasquale in his book *Black Box Society*: 'It can refer to a recording device, like the data-monitoring systems in planes, trains, and cars. Or it can mean a system whose workings are mysterious; we can observe its inputs and outputs, but we cannot tell how one becomes the other' (2015, p.3). The one-way mirror points to the same duality. It illuminates the fact that datafication is a process which enables increasingly intrusive scrutiny of our daily activities at an ever more granular level, while those who own that data enact ever more inscrutable activities that exacerbate inequalities. These metaphors for the functioning of data are best understood as a radical new step in a process by which power extends its own legitimacy by attempting to avoid scrutiny whilst claiming the right to apply scrutiny towards others through surveillance practices. Foucault's claim that knowledge and power imply one another is perfectly apt for these new societal logics. Pasquale states 'while powerful businesses, financial institutions, and government agencies hide their actions behind nondisclosure agreements, "proprietary methods," and gag rules, our own lives are increasingly open books' (2015, p.3). Meanwhile Zuboff explains how corporate giants such as Google and Amazon used nefarious means to legitimise the processes of extraction. This process drew upon long established means of corporate realpolitik:

> They camouflaged their purpose with illegible machine operations, moved at extreme velocities, sheltered secretive corporate practices, mastered rhetorical misdirection, taught helplessness, purposefully misappropriated cultural signs and symbols associated with the themes of the second modernity – empowerment, participation, voice, individualisation, collaboration – and boldly appealed to the frustrations of second modernity individuals thwarted in the collision between psychological learning and institutional indifference (Zuboff, 2017, p.192).

The asymmetry of access to knowledge protects actors from scrutiny whilst providing them with unprecedented power: an unaccountable force. Bridle argues, 'A close reading of computer history reveals an ever-increasing opacity allied to a concentration of power, and the retreat of that power into ever more narrow domains of experience' (2018, p.34). The implications for such radically divergent access to power within the techno-human condition will be further analysed in chapter 6.

The interests served become ever more distanced from the loci of extraction and exploitation through the digital and legal fog, rendering it ever more protected. The logic of algorithmically constructed society extracts itself from public discourse and analysis because its workings are hidden and it professes to function with a scientific neutrality. In *Weapons of Maths Destruction*, Cathy O'Neil uncovers a range of algorithmic biases including race and gender biases. She states,

> many of these models encoded human prejudice, misunderstanding, and bias into the software systems that increasingly managed our lives. Like gods, these mathematical models were opaque, their workings invisible to all but the highest priests in their domain: mathematicians and computer scientists. Their verdicts, even when wrong or harmful, were beyond dispute or appeal. And they tended to punish the poor and the oppressed in our society, while making the rich richer (O'Neil, 2016, p.3).

Typically, the corporate line on this process is to speak of transparency – as David Brin (1999) puts it, *The Transparent Society*. Whilst this notion implies a type of co-veillence, thus legitimizing the undermining of privacy by claiming such visibility is reciprocal, in reality we see the interests of the powerful served behind a veil espousing efficiency and scientific certainty whilst shielding its real workings by claims of propriety. What should be contestable values for political debate are increasingly cloaked. This 'shadowy network of actors who mobilize money and media for private gain, whether acting officially on behalf of business or of government' (Pasquale, 2015, p.10) has been evocatively termed 'the blob' by Jeff Connaughton (2013). The blob emphasises the complexity, pliability and amorphous quality of power. The construction and maintenance of such asymmetric power relations are premised on a reconstitution of the 'real' – that is, datafication of the real world and processes of legitimization that enables data to construct the world anew. That surveillance so

regularly features in transhumanist imaginaries speaks to a complicity with or an ignorance of the divergent implications for empowerment that surveillance technology augurs.

Weaponised Narrative and the Complex Media Ecology

This chapter is framing the continuous questioning of knowledge in the advanced capitalist, technogenetic context as a totalitarian desire for the re-construction of reality as a tractable, predictable and controllable state. Whilst the heuristic, enframing and instrumentalist logics are evident, it is not the contention here that this desire will be realised. The yearning for control is built upon the fantasy of living beyond an entanglement within multiple complex relations. It thus aspires to a false and meaningless transcendentalism. The social complexity, which is the target of its tractable aim, reveals itself as untameable. Likewise, the continuous development of the technologies upon which it is premised unleashes greater complexity into the system. New, unpredictable dynamics emerge which highlight the futility of the impulse towards prediction and control. Furthermore, a simplistic binary dichotomy of elite actors versus disempowered, objectified dividuals, is somewhat problematised and undermined by a more nuanced reflection upon the complex power relations of companies, states and individuals.

Allenby & Garreau's (2017) notion of the 'weaponised narrative' indicates a new form of asymmetric warfare being conducted by states which exploits the confluence of the fractured understandings of reality precipitated by the new media ecology and the increasing social complexity of the world. Allenby (2019a) emphasises the chaotic nature of the current geopolitical order and further highlights that 'private firms, networked tribal communities, and globalized criminal syndicates, often associated with existing states, city-states, and ultrawealthy individuals, combine to generate ecosystems of power relationships, which leach away at the current state-based world order' (2019a, p.413). It is unsurprising that, in the face of such complexity, reassuring and simplistic narratives are increasingly attractive to make sense of the world. Such narratives are often extremely reductive and enable political contestations to be played out by proxy through the utilisation of identity as a battleground. The most effective use of this method is not to create confluence, control and coherence, but rather chaos and contestation. Emotion is drawn on to bring grievances to the fore, and

political debate often becomes fraught, nuance seeps out, replaced by identitarianism. There has been a related rise in so called ‘strongmen’ leaders further destabilising the international political landscape (Rachman, 2022). The basic tenets upon which legitimate contestation may be based are undermined by an increasingly fractured sense of truth and reality.

New technologies are integral to the creation of this parlous state. Schick (2020) uses the evocative term ‘infocolypse’ to capture the pathological state of the information ecology. Allenby (2019b) identifies an emergent cognitive infrastructure, the implications of which are unknown, and its diffuse, complex distribution renders it difficult to even recognise as an infrastructure. It is a ‘meta-infrastructure’ with

> accelerating capability and capacity across a number of seemingly unrelated systems and technologies, including 5G communications networks, artificial intelligence and big-data analytics programs, social media, internet-connected appliances and devices, media creation and manipulation tools, cloud storage, and more. Moreover, it is institutionally complex; communities and institutions ranging from activist groups to private firms to militaries develop and use elements of cognitive infrastructure (2019b, n.p.).

This cognitive infrastructure in 2020 was comprised of 425 million servers, between 25 and 50 billion internet connected objects, up to 1 trillion sensors, with AI fundamental to the integration of these systems (Allenby, 2019b). All of this constitutes a realm of complexity vastly beyond human cognition, where the speeds of processing and memory requirements (estimated to be 175 zettabytes by 2025 (Allenby, 2019b)) far outstrip human capacities.

These technological developments are conjoined with ‘[r]apid progress in evolutionary psychology, behavioral economics, neuroscience, and related fields [which] is fuelling accelerating capabilities to manipulate people, communities, institutions, and states’ (Allenby, 2019a, p.417). Together this has contributed to the emergence of a radically new political landscape. These emergent dynamics are themselves entangled with the further complexity of other social, economic and cultural developments: the fragility of the neoliberal model of capitalism, impacts of climate change, a global pandemic, and the spectre of nuclear war following the Russian invasion of Ukraine, to name just a few.

It is becoming increasingly evident that the 'infocolypse' is having a profound effect that is likely to increase. In part this is because the technologies that are giving rise to these dynamics are accelerating exponentially in potency and effect.

> Social media platforms are increasingly powerful and ubiquitous; virtual reality and deepfake technologies that eclipse the difference between real world events and CGI fakes are becoming indistinguishable from reality; firms such as Cambridge Analytica, the Russian Internet Research Agency, and their successors enable psychological profiling, targeting, and manipulation of individuals based on data scraped from the Internet (e.g., for voter suppression); and above all the integrative power of AI combined with big data and analytics techniques enables everything from weaponized narrative to social credit mass surveillance and control (Allenby, 2019a, p.418).

Vitally, these novel interlinked techno-human systems provide greater potentiality for fragmentation than coherence, especially in already complex environments such as the socio-political realm giving rise to emergent patterns. The urge to control that underpins much of the development of this infrastructure creates a paradoxical catalysing effect on social complexity.

Weaponised narratives build upon disinformation campaigns of the Cold War era (Pomerantsev, 2017; Schick, 2020; Allenby, 2019a), but the new cognitive infrastructure creates an ecology in which such effects are considerably more impactful. Allenby defines weaponised narrative as 'the use of information and communication technologies, services, and tools to create and spread stories intended to subvert and undermine an adversary's institutions, identity, and civilization…by sowing and exacerbating complexity, confusion, and political and social schisms' (2017, p.69). He explains that the covert nature of such conflict, its relative cheapness and its multifaceted capability to undermine any aspect of a civilisation from financial and software systems through to social vulnerabilities such as identity politics, make it such a popular and ubiquitous method of 'civilisation conflict'. The chaotic nature of the world, a 'complex pastiche of private, public, non- and quasi-governmental, and ad hoc institutions, power centers, and interests' (Allenby, 2017, p.68) creates a fertile environment for weaponised narratives as individuals grasp at stories that counterbalance the increasing social complexity and novelty in which we are enmeshed. Fundamentalisms and authoritarian leaders seem to appeal in part due to their simplistic, emotive messages that belie the unsettlingly perplexing landscape.

At the level of institutions or states, vulnerabilities can be identified that open up the potentiality for destabilising tactics and undermine systemic cogency. Allenby states,

> Wikileaks, internal media, Cambridge Analytica, theft of personal data, integration of criminal and state cyberespionage assets, bot armies supporting alt-right twitter feed and websites, media spoofs, and sockpuppet sites are all nonmilitary, and most engage private firms and infrastructure. That's part of why the West doesn't understand weaponized narrative and is having a hard time responding: it jumps legal and operational domains, especially the Constitutional divide between civilian and military functions, and the equally strong differentiation between the private and public spheres (2017, p.69).

Despite the desire for control and predictability that underpins instrumentalism, the instability of geo-politics suggests it is not having the desired effect. Above all, this emphasises the fact that instrumentalism cannot be extracted from the social world in its totality. Just as humans cannot escape their embeddedness in manifold natural systems, human instrumentalism cannot transcend its imbrication in human social systems. It is utilised by the multifarious pastiche of actors, with different interests, ethics and identities in a complex web of emergent dynamics. The catalysing of complexity brought about by the aspiration of control, interacts with social complexity, making control itself an increasingly forlorn aim. Computer scientist Danny Hillis (2016) argues that computing technologies have reached a level of complexity that takes us out of the age of Enlightenment, and into an 'age of Entanglement' where the digital jungle that we have wrought is beyond the understanding of our cognition. Whilst it is symptomatic of the technological mindset not to have noticed that we have always been entangled in such complexity, the ecological metaphor that Hillis draws on in describing the new info-tech environment is testament to the implacable technical complexity in which we are now embedded. The human quest for knowledge is not a simple teleological journey towards completeness but an emergent unfolding into deeper webs of entanglement.

Data Colonialism

With the inherently extractive and exploitative logics of surveillance capitalism, some thinkers have understandably linked it to colonial practices. Thatcher, O'Sullivan & Mahmoodi (2015) and Couldry & Mejias (2018; 2019) have employed the term 'data

colonialism' which: 'combines the predatory extractive practices of historical colonialism with the abstract quantification methods of computing' (Couldry and Mejias, 2018, p.1). Couldry & Mejias emphasise that their aims are not to draw overly simplistic parallels to the form or violence of historic colonialism but rather 'to explore the parallels with historic colonialism's function within the development of economies on a global scale, its normalization of resource appropriation, and its redefinition of social relations so that dispossession came to seem natural' (Couldry & Mejias, 2018, p.5). The asymmetry of power relations between those who provide data and the corporate institutions that collect and own the data are reflective of prior capitalist methods of primitive accumulation and privatisation and colonization of space and time (Thatcher et al, 2015). Heidegger warned that technology's enframing turns nature into a 'standing reserve' and that humans too would also be consumed in this process. The colonial nature of extracting this new manifestation of value from human behaviour in the form of data is bolstered by the supporting logics of advanced capitalism which entails a 'corporeal corkscrewing inwards' (Beller, 2012, p.8). It is a new frontier of exploitation, an expropriation of a novel form of 'cheap nature' (Moore, 2015). Zuboff's rhetoric captures the pathological vampirism: 'forget the cliché that if it's free, "You are the product". You are not the product; you are the abandoned carcass. The product derives from the surplus that is ripped from your life' (2017, p.377). This extraction, or ripping, is normalised and rationalised within the logics of surveillance capitalism.

There is a contingent array of social, technical and economic factors that have made this normalisation possible. The creation of technologies that enable the transformation of social activity into data is one aspect. The post-911 climate of government and private sector collaboration in the context of a heightened appetite for surveillance driven by a paranoia about uncertainty (especially in the context of terrorism) is another. The unprecedented commercial value of data as a tool of prediction, manipulation and control is a considerable force in escalating the logics and driving nefarious rhetorical work including vast lobbying efforts (Zuboff, 2017; Klein, 2020). This feeds into the ongoing development of technologies that enable ever increasing extraction of data at scale and scope: innovation driven by rich financial rewards. That value is created by vast quantities of data linked together, the network effects of ever larger data sets, results in those few companies that can gather data at massive scale having a huge competitive advantage. Smaller organisations are not able to compete in

such a market (Golumbia, 2009). Thatcher et al. suggest how three factors underpin the colonialist project of big data:

> First…the emergence of 'big data' as part of a market-orientation towards continual growth…Second, decisions concerning what data are meaningful…are created and exchanged are processes of capitalist accumulation by dispossession…Finally…the asymmetrical extraction of value is shown to presume both quantification and surveillance of the life-world, of lived experience, as a natural, desired outcome of modern life… the common metaphor of 'big data' – and the 'digital' in general – as new frontiers to be explored, expanded, and conquered (2015, p.3).

Furthermore, the profit motive, linked to the network effects of large data sets shift its extraction:

> from an engineering problem to an epistemological orientation in which more data and better algorithms unveil a greater understanding of the world… this epistemological orientation towards the relentless pursuit of 'bigger' data is driven by intense profit-seeking competition within capitalist markets and industries…the epistemological orientation of 'big data' enforces an algorithmic linking of data to create meaning that presumes the quantification of life as capital (Thatcher, et al., 2015, p.4).

The quantification of life as capital establishes the posthuman character of life in a surveillance capitalist context: 'Sensors quantify, alienate, and extract conceptions of self, reducing life as seen by capital to what can be recorded and exchanged as digital data…the sum total of data produced by an individual marks them into an abstracted bucket' (Thatcher et al., 2015, p.17). The transmogrification of the human subject into data, an abstract bucket of markers, as a formative process in the creation of social reality, and its parallel loss of agency fundamentally emphasises the posthuman condition under advance capitalist conditions. Notably, this is not the rebellious cyborg form, rejecting conformity, but rather a literal information flow: a capital-defined, abstracted entity that is at once reified, reduced and manipulable, 'a digital commodity that may be continually bought and sold in order to call forth an orderly, predictable stream of consumption' (Thatcher et al., 2015, p.17). Through this reorientation, life is established as an ever-intensifying process of data extraction and heuristic interpretation leading to a recreation of the social world directed towards wealth extraction. It is an entirely amoral and instrumental orientation. It is also self-perpetuating.

The extraction is fundamentally exploitative and relies on the passivity of those it exploits. As Zuboff argues,

> Surveillance capitalism runs contrary to the early digital dream…it strips away the illusion that the networked form has some kind of indigenous moral content, that being "connected" is somehow intrinsically pro-social, innately inclusive, or naturally tending toward the democratization of knowledge (2017, p.9).

Rather, this represents a new period of capital accumulation, one in which, the exploitative and dominating attitude towards nature explicitly extends to the human as an object and resource. The exploitation is not premised on the use of human labour in the traditional sense. This extends beyond the idea that labour is becoming deterritorialized, dispersed and decentralised so all the workings of society are geared towards the generation of profit. Such theories focus too narrowly on labour to capture the pathologies of this new capitalist paradigm. All human life, social time as well as labour time, sleeping hours as well as waking hours, provide extraction value for this new manifestation of an old process. Platforms provide increasingly ceaseless access to these forms of value. As Couldry & Mejias perceptively argue the more apt analogy does not concern labour, but 'the appropriation of physical nature within processes of capitalist production… the most useful overall framing here is of a new phase of colonialism that is deeply intertwined with the long-term development of capitalism' (2018, p.4). Much as the despoiling of nature through exploitative anthropocentric social relations is increasingly evident, enabling capital to direct our process of technogenesis will leave most humans exploited in similar fashion.

Decolonial thinking can play a useful role in identifying the patterns of exploitation, problematizing the ethical assumptions and justifications for oppression, exploitation, extraction and misuse. Indeed, such thought can represent a genuine continuous questioning of knowledge which countervails the linear, enframing knowledge of the advanced capitalist technogenetic trajectory. Couldry & Mejias argue,

> colonialism — whether in its historic or new form — can only be opposed effectively if it is attacked at its core: the underlying rationality that enables continuous appropriation to seem natural, necessary and somehow an enhancement of, not a violence to, human development (2018, p.16).

The groundwork undertaken to rationalise and normalise these extractive processes by some of the world's largest companies, and the radical asymmetry of knowledge in society that they produce, can be seen as synonymous with the process of historical colonialism and the idea that it was a 'civilizational' project (Couldry & Mejias, 2018). The asymmetry in the context of the new media ecology ultimately threatens human agency, democracy, and shared basic foundational beliefs through targeted, nefarious, covert, commercially motivated interventions that potentiate irreparable divisions and a weakened demos. Couldry & Mejias (2018) draw attention to the parallels between historic and data colonialism in both this general sense of normalisation, the processes of preparation and with specific examples which echo the past. They state, for example, 'the legal fiction that land inhabited for millennia...was terra nullius or 'no man's land' in English law, and thus available for exploitation without legal interference, has its strong parallels today' (2018, p.6). Likewise, today's Terms of Service Agreements are replete with appropriative claims, whilst being written at a length and in legal language that most people have neither the time, capacity nor inclination to engage with. They relate this to the Spanish empire Requerimiento which was read in Spanish to non-Spanish speakers to demand their compliance or face extermination. The concept of 'data colonialism' is apt beyond the metaphorical realm and is a justifiable conceptualisation of the process. However, it perhaps does not go far enough in expressing the logical conclusions of the process and capturing the epistemological assumptions that underpin these aims.

Data Totalitarianism

Whether it is considered as a new era of capitalist relations (surveillance capitalism), a form of colonialism where the expropriation is centred on the commercially objectified human (data colonialism) or a process which offers new forms of biopolitical manipulation and control (perhaps 'data authoritarianism'), all these labels accurately capture a facet of this novel technogenetic, capitalist development. The transhumanist value of a 'continuous questioning of knowledge' is undermined by the fact that this unfolding is based on the reverence of instrumentalist forms of knowledge production aimed at an ever-increasing potency of means geared towards ever more problematic ends in the form of control and power. In order to privilege instrumentalism more effectively, the messy complexity and

contestability of normative questions derived from human experience must be annulled. Instrumental knowledge seeks to move towards a totalizing state. Like capital, and bolstered by its logics, it must expand. The capitalist requirement for perpetual growth creates instrumentalist rationality and transhumanist aims of absolute control of nature, limitless resources, endless lifespans and perpetual progress build on and prop up the capitalist aims by offering fantastical narratives of continued forward momentum. But the desire within transhumanism to control all unstable processes, and to transcend all confining qualities, requires a world limited in its complexity so the entirety is tractable to human reason and will. It is this totality which demands its conceptualisation as 'Data Totalitarianism', a conceptualisation that echoes the thought of Heidegger, Ellul, Mumford and Marcuse amongst others: those that pointed to the ravenous, machinic enframing of technology.

Techno-Utopian Chris Anderson believes that big data could bring about an 'end to theory':

> Forget taxonomy, ontology, and psychology. Who knows why people do what they do? The point is they do it, and we can track and measure it with unprecedented fidelity. With enough data, the numbers speak for themselves. The big target here isn't advertising, though. It's science (Anderson, 2008, n.p.).

Anderson is suggesting that big data will give us answers for everything as long as we ask the meaning of nothing. The utopia of certainty is a fantastical realm where divisions, different viewpoints, clashes of interest, political debates are all dispatched from reality. There is no need for 'theory' in this fantasy, because everything is *known*, though nothing may be understood. In order to create such a 'Utopia', it is not only the human that must be colonised, but the wider environment too. If it is to become fully malleable and tame, the Earth must also go through the process of heuristic interpretation, reduction and reconstruction to the demands of utopian certainty.

The digital apparatus through which data are extracted must not only correlate to but come to define the physical world. The internet of things is a key enabler of the ubiquitous apparatus of data extraction. Couldry & Mejias state,

> Human inputs are only part of the territory that data colonialism seeks to annex to human capital. Machine-to-machine connections significantly deepen the new web

> of social knowledge production. Consider the fast-growing 'Internet of Things.' The goal is clear: to install into every tool for human living the capacity to continuously and autonomously collect and transmit data within privately controlled systems of uncertain security (2017, pp.14-5).

Furthermore, they recognise that the 'value of those extractive processes depends on the comprehensiveness of the data generated. Nothing should be excluded' (2017, p.13). In the same way as capitalism has a growth fetish, dataism has an extraction fetish. These two processes complement or perhaps more accurately exacerbate each other. Capitalism conceptualises limitlessness as a logical presupposition for its proposed endless growth, whereas dataism has totality in mind. In order to reach Anderson's proposed 'n = all world' (in Cheney-Lippold, 2017, p.147) whereby there is no longer space for theory, everything must become data: the heuristic process by which reality is reconstituted into computational objects. This emphasises the important but subtle point that totality is, in fact, *a totality* but not *the totality*. The totality it seeks to create (a reality entirely mediated, controlled and defined by the interpretation of data) can never be the totality of the physical world, or the complexity of human social reality. The Platonic backhand and forehand elucidated by Hayles (1999) function as a transmogrification of reality: a simplifying swing turning all of nature into a computational object, and then a complexifying swing altering physical reality into a new state that adheres to the demands of datafication driven by capital accumulation. The process is self-referential and endless, there is 'no limit to the appropriation, since what is appropriated is what is increasingly constructed to be ready for appropriation' (Couldry & Mejias, 2017, pp.8-9). It is revealing to consider what a reality that is ready for appropriation would ideally look like.

Instrumentalism is at the heart of such a construction. Action takes precedence over meaning. A homeostatic world without theory is one in which there is no politics. If interests digress then they can be reconstituted to cohere. Along with theory, ethics is expelled from this utopia. There is no need to ask 'why' when 'what' is guaranteed. Zuboff (2017) refers to the power that seeks to appropriate and construct reality in this image as 'instrumentarian power', which 'cultivates an unusual "way of knowing" that combines the "formal indifference" of the neoliberal worldview with the observational perspective of radical behaviourism' (2017, p.376) This 'formal indifference' of neoliberalism constitutes an amorality at the core of capitalism that bolsters its instrumentalism. It is the supposedly efficient, self-correcting

intelligence of market systems that neoliberalism celebrates whilst its devastating impacts remain exogenous to legitimate reflection. A fervent neutrality to ethical questions avoids ever having to address them. Zuboff continues, 'instrumentarian power reduces human experience to measurable observable behaviour while remaining steadfastly indifferent to the meaning of that experience. I called this new way of knowing *radical indifference*' (2017, pp.376-7). Human experience, and indeed the experience of all of nature at large is reduced and transformed. The transformation is the reconstitution of humanity and nature in a form more apposite for appropriation as data. As values and ethics are unquantifiable, like an evolutionary relic they are deemed redundant. What gets measured, gets made. Individuals suffer the havoc reaped by 'the remote and abstracted contempt of impenetrably complex systems and the interests that author them, carrying individuals on a fast-moving current to the fulfilment of others' ends' (Zuboff, 2017, p.377). Humans in this system have come to share the same catastrophic destiny as the rest of nature under capitalist relations: a resource, abstracted and banal.

The process serves a small subset of human interests. This is not a self-actualising cabal that stands above the wider technogenetic circumscription of a totality. Those that enjoy privileged access to data can reap the material benefits of the asymmetries involved, but like Foucault's panopticon controllers, or Marx's capitalists, they too are locked into systemic relations governed by the enframing nature of the overall trajectory of technogenesis under capitalist relations. Thus, 'anthropos' loses its potency as the site of the problem. In the same way the 'anthropocene' does not fully capture the pathologies of our environmental relations, anthropocentricism does not capture the pathologies of surveillance capitalism. Firstly, because the pathology is driven by the never-ending quest for profit and the never satiated guarantee of certainty; and secondly because it enables a fundamental division between the subset of society that has access to the algorithmic tools and the gargantuan sources of data that feed them, and those who do not. This is why 'surveillance capitalism's operations [are] a challenge to the elemental right to the future tense, which accounts for the individual's ability to imagine, learn, promise and construct a future' (Zuboff, 2017, p.20). The point is coterminous with the notion of 'mnemonic control' suggesting a foreclosing of future possibilities as the future too is circumscribed within the logics of totalitarian control. Thus, the continuous questioning of knowledge is a process of enframing that encloses the questioning of ethical knowledge or alternative 'ways of revealing', in favour of an

instrumental knowledge that serves the narrow interests of a tiny minority. This division of learning means the new knowledge constitutes a radical power for a minority which is dependent on the removal of self-awareness and self-actualisation of the vast majority – and thus a 'future tense' for this group.

The competitive pursuit of guaranteed outcomes within surveillance capitalism pushes the social world ever deeper into this division. It dictates that human action and thought must be colonised as well as the wider environment in which they are set. As Couldry & Mejias explain, 'If successful, this transformation will leave no discernible "outside" to capitalist production: everyday life will have become directly incorporated into the capitalist process of production (2017, p.12). It is this tendency towards leaving nothing 'outside' whilst reconstituting what is inside, to render it more pliable to inclusion, that is the most salient feature of this aspect of technogenesis. It is also a familiar refrain from within the logics of capital with its endless quest for new frontiers of cheap nature (Moore, 2015). The abstraction of information to data and the reconceptualising of that data into knowledge which is privatised and unprecedently instrumental is paramount. Whilst totalitarianism is traditionally defined as a system of government that is dictatorial, centralised and requires subservience to a despotic state, this new form of totalitarianism has some key differences. It is market imperatives that demand subservience in this instance. Despite this, it would be a mistake to deny the historic confluence of market and state dependence on surveillance-based knowledge that has led to the dominant role of surveillance capitalists in the economy.

It is this vision of totality along with its fetish for order and dominance that aligns surveillance capitalism alongside aspects of transhumanist aspiration. Concerningly, it is also this vision of totality that links it to the context of historical colonialism, a history we have seen that is also ominously prominent in transhumanist thought. Couldry & Mejias (2018) draw attention to decolonialist thinker Quijano's recognition that 'absolute universality…[is] characteristic of European modernity' (2018, p.17). Furthermore, they find this explicitly 'reproduced in data colonialism, and its logics of universal data extraction and management of human beings through data' (2018, p.17). Meanwhile Quijano states,

> Outside the 'West'…the perspective of totality in knowledge includes the acknowledgement of the heterogeneity of all reality; of the irreducible,

> contradictory character of the latter; of the legitimacy, i.e., the desirability of the diverse character of the components of all reality — and therefore, of the social. The [better, alternative] idea of social totality, then, not only does not deny, but depends on the historical diversity and heterogeneity of society, of every society. In other words, it not only does not deny, but it requires the idea of an 'other' — diverse, different (in Couldry & Mejias, 2018, p.17).

The urge toward total algorithmic control underpinning surveillance capitalism and transhumanist dataism contains no such acknowledgement of heterogeneity. Humans are perceived as objects in the tradition of radical behaviourism, and diversity has no fundamental or ethical value in this instrumentalist framework. The continuous questioning of knowledge in the context of surveillance capitalism constitutes a thirst of a singular kind: narrowly focused, radically normatively indifferent, and offering a potent reconstruction of social reality premised upon a small subset of humanity having privileged and powerful knowledge over the rest of humanity.

Conclusion

The instrumentalism that defines modernity can be read as a contingent 'way of revealing'. There are other possible relationships that can be had with technology, alternative conceptions that could potentiate a different co-evolution of technology and humans, that is, other ways of *being*. But if ours is an onto-epistemology of instrumentalism, our technogenetic trajectory reveals the human as well as all of nature becoming 'standing reserve'. In advocating the human becoming an object of techno-scientific design, transhumanists perceive no danger in this ontology of instrumentalism. Their claim to advocate the continuous questioning of knowledge is spurious because the proactionary stance towards instrumental progress precludes the possibilities of other 'ways of revealing' being explored. The instrumentalist relationship to knowledge conceptualises a linear path of 'bringing forth' of *techne*, and an enclosure of *poiesis* in Heidegger's terms. In particular, the question of what is the 'human' is answered definitively: the human is a radically reified knowledge object. The continuous questioning of knowledge is revealed as the legitimation of the colonial mining of this 'resource', whether the extraction is for the purposes of instrumental progress or capital accumulation. This constitutes a paradoxical postanthropocentricism. On the one hand, the human as knowledge object is regarded with the same objectivity and disdain as everything else and thus there is no special treatment for

humans here. On the other hand, the proposed observer is that essentialised and supposedly unique human quality: human scientific rationality. And thus, the privileged and discriminatory humanist and anthropocentric pattern creeps back in, albeit with a cannibalistic tinge.

Transhumanism reflects and co-conspires with capitalism: each advocating instrumentalism, and projecting a world, a totality for exploitation. Each is myopic in what they potentiate as ontology: all is standing reserve. Surveillance capitalism is thus a predictable manifestation of capital-produced technogenesis. Capitalism's ceaseless hunt for new frontiers of cheap nature to perpetuate its limitless growth pushes its dominion of exploitation towards totality, consuming human agency *en route* via the ability to predict, nudge, and control human will in the interests of capital. Therein lies the symbiotic relationship between capitalist and transhumanist aims: control. Transhumanists desire to break free of human embeddedness within a complex ecology with all the limitations, co-constitutions and the responsibilities that relatedness might entail. In order to do so they must make the ecology and the techno-scientific object of the human anew. Capitalism is doing its part by ravaging the ecology that transhumanists wish to deny. The Anthropocene represents a stark enclosure of the fantasy of endless growth, and yet capitalism refuses to come to terms with its own end. It turns inward on humans, leaching away at the last remnants of cheap nature, the next frontier, undermining the cogency of the liberal entity it interpellates, just as it undermines the cogency of the nature it despoils.

The concept of Data Totalitarianism expresses the spurious desire for totality that is underpinned by the yearning for control. The transhumanist desire for epistemological certainty projects the world as a knowledge object that is manipulable and controllable by human reason. It constitutes an instrumentalising knowledge over, not an ethically responsible knowing with, emphasising an underlying disdain for relational complexity. Whereas Harari suggests homo sapiens (wise man) is becoming God-like (Homo Deus), I would argue that we are best characterised not by wisdom or divinity but by instrumentalism. We are *homo instrumentalis*. In this state the techno-human condition is an enclosing and enframing, it is a co-evolution closing possibilities and narrowing creative and ethical spaces to rethink Anthropos. It is this pervasive instrumentalism that crowds out the potential for

alternative ethical perspectives to be realised. *Homo humilitas*, would constitute not a defeatist submission to this enclosing, but rather a systemic unpicking aimed at doing less harm primarily, and more cautiously and lightly directing our capacities and intentions with a focus on leaving space for pluralistic ways of both human and non-human being. This pluralism is a concept the next chapter will consider in more detail.

Chapter 5: Transcendent Conformity

Introduction

This chapter considers the notion of 'pluralism' (More & Vita-More, 2013 p.1) and argues that as a transhumanist value it is unlikely to be realised as it is underpinned by a naïve liberal framing of the individual. Transhumanists' failure to contend with general complexity and their dubious, hubristic understanding of the potency of human reason (More, 2013c) was explored in the last chapter. A further limitation is the application of this blind spot to individual humans. A richer appreciation of interconnection would facilitate an understanding of our relations with technology as a co-evolving techno-human *condition*. By attributing freedom of choice to every individual via the concept of morphological freedom transhumanist conceptualisations underplay contextual influences, power inequities and the processual nature of techno-human developments. Most importantly by ignoring the relational complexity in which we are embedded, especially the advanced capitalist logics within the technosystem, transhumanists underplay the extent to which technogenesis would be directed by the competitive and instrumentalist fitness landscape of vying nation states and advanced capitalist competition. This constitutes a serious constraint on plurality and is captured by the concept of Transcendent Conformity: the requirement to enhance oneself according to the systemic dynamics of capitalist competition.

The chapter will begin with an analysis of the transhumanist concept of 'morphological freedom' which characterises individual humans as having free choice and agency to adopt or reject human enhancement possibilities. Posthumanism and Postphenomenology will then be drawn upon to emphasise the relational ontology of human being and the co-constitution of techno-human relations. An analysis of the technosystem follows revealing how its competitive logics yield an unforgiving fitness landscape which structures the subjectivity that transhumanists characterise as 'free'. Advanced capitalism's influence on biotechnology and neuroscience reveals a disaggregating, objectifying deconstruction of the human that once more undermines the conceptualisation of the liberal individual interpellated by transhumanist and capitalist discourse. This gives rise to the figure of the posthuman subject:

the human transmogrified into code. The thought of Barad and Hayles will then be drawn upon in an attempt to frame a critical posthumanist position that can fruitfully account for agency and ethics in the context of a relational, post-liberal notion of the human. Finally, the potentially destructive implications of technological advance will be analysed finding its apotheosis in the competitive dynamics of warfare. This highlights the import of context in developing radically potent tools and again emphasises the limitation of the liberal individual framing of choice and the necessity for deep ethical reflection on technogenetic developments, and the potential for emergent inhuman outcomes.

Morphological Freedom

Morphological freedom is the central idea within transhumanist discourse that champions individual human agency in the context of technogenesis. It serves as a kind of proxy for 'pluralism' as it contends that each individual should be in control of their own enhancement and that no top-down imposition should define or narrow the possibility space of transhuman becoming. Anders Sandberg, a prominent transhumanist thinker, defines it as 'an extension of one's right to one's body, not just self-ownership but also the right to modify oneself according to one's desires' (2013, p.56). Sandberg conceives of:

> a subject that is also the object of its own change. Humans are ends in themselves, but that does not rule out the use of oneself as a tool to achieve oneself. In fact, one of the best ways of preventing humans from being used as means rather than ends is to give them the freedom to change and grow (2013, p.63).

Such a notion is contingent upon a conceptualisation of the Enlightenment liberal human employing their individual rationality, free from influence, to enable forms of self-determination. This typifies a transhumanist tendency for avoiding analysis of social context and relational entanglement. As transhumanism is often identified as a future state or possibility, the social dynamics at the time of its realisation are undefined. The systemic, relational dynamics of a cultural context that structure subjectivity are simply removed. The focus becomes the liberally conceived individual who has all the possibilities afforded by radical technological leaps forward, and none of the limitations rendered by wider systemic factors a social context implies. Technologies are conceptualised by Sandberg as neutral methods for increasing pluralism through self-actualisation. Thus, they constitute 'new tools

for expressing individuality and uniqueness…We express ourselves through what we transform ourselves into' (Sandberg, 2013, p.59). But Sandberg fails to note the co-evolution of this unfolding. Instead of understanding the ways in which technologies mediate and co-constitute humans, he conceives of ontological hygienic human subjects in control of inert objectified technologies.

Sandberg conceptualises human reason as free floating, and self-aware, separate from the world and thus able to successfully arbitrate in its own self-interest. He argues, 'Our freedom of thought implies a freedom of brain activity. If changes of brain structure (as they become available) are prevented, they prevent us from achieving mental states we might otherwise have been able to achieve' (2013, p.57). However, he fails to acknowledge that brain activity is never free. It is contingent on its contextual embodiment – and this relational context extends well beyond the individual human body. Sandberg's intention is to make a normative claim that morphological freedom should extend to cognitive faculties, but his failure to recognise the relational complexity of cognition renders the claim almost meaningless. Whilst Sandberg (2013) recognises the possibility for potent technologies to be used coercively as means of enforcing cultural norms and controlling human conduct, his simplistic humanist framing leaves his solutions to these dangers deficient. He calls on morphological freedom as a negative right, that is a freedom from rather than a freedom to, calling this 'possibly the most compelling argument for the acceptance of morphological freedom as a basic right that may not be infringed' (2013, p.60). However, by failing to recognise how cultural context structures subjectivity, as explored by Foucault, Sandberg's 'negative right' constitutes an entirely inapt premise for counteracting abuses of coercive power. Without recognition of the myriad ways in which individual autonomy is compromised by aspects of technological development, such rights discourse is unlikely to constitute much protection. Algorithmic biopolitics, data colonialism, surveillance capitalism – all concepts explored in the previous chapter - reveal the paucity of Sandberg's understanding of the problems raised by technogenesis.

The liberal notion of the consumer is implied in Sandberg's conceptualisation, in which enhancements are essentially conceived of as products which would only become dangerous in the hands of coercive states. Allenby & Sarewitz note that the 'libertarian approach to

technological enhancement…resonates well in modern market democracies, in which individual autonomy is a fundamental value' (2011, p.21). More's devotion to markets is evident in his original Extropian principle of Spontaneous Order which he says embodies the free market system,

> a system that does not yet exist in a pure form…The free market allows complex institutions to develop, encourages innovation, rewards individual initiative, cultivates personal responsibility, fosters diversity, and decentralizes power. Market economies spur the technological and social progress essential to the Extropian philosophy (1995, n.p.).

Meanwhile, Sandberg identifies a 'right to ownership' as part of his conception of morphological freedom, implicitly linking transhumanist aims to capitalist conditions. He states, 'We are technological beings who cannot survive without the tools and resources we employ, and if we are denied them, we cannot thrive' (2013, p.56). However, this point can be flipped to question the desirability of capitalist logics – if all transhumanist technologies are not a freely and equally available public good, not just the ability to thrive but to survive becomes undermined. This is not so much an intentional ambiguity or anti-capitalist provocation on Sandberg's part but rather a telling indication that reveals the paucity of rigour in the transhumanist conceptualisation of power, rights and self-realisation. He does not engage sufficiently with the complex social structures in which his ideas are necessarily embedded. Sandberg's concept of 'morphological freedom' is an attempt at an eighteenth-century *solution* to a twenty first century *condition*. It draws on the very Enlightenment assumptions that require a radical rethink if value pluralism is to have any chance of survival.

Relationality – Rethinking the Human Beyond the Individual

Humans are permanently in a state of flux and are constantly co-constituted by the world around us: we have a fundamentally relational ontology. The notion of the liberal human subject attempts to extract the individual from these co-constituting relations and imagine a person as separate from the intricate web of being in which we find ourselves encompassed. Posthumanist notions of subjectivity offer a richer perspective of the human by foregrounding our inter-relational, processual nature. As Barad puts it, 'Existence is not an individual affair. Individuals do not preexist their interactions; rather, individuals emerge through and as part

of their entangled intra-relating' (2007, p.ix). By opening up the self in this way, the human diffuses into rich complexity. Its existence is inclusive, processual and open, not bounded, ossified or reductive. As Richard Lewis states 'We are always in relation, not only with other humans but also with technologies and the world…These relations are complex, situated, dynamic, and emergent' (2021, p.74). Lewis also insightfully emphasises complexity theory and postphenomenology as complementary to the notion of the posthuman subject. Postphenomenology takes 'human-technology relations as its starting point' (Rosenberger & Verbeek, 2015, pp.12-13) and in doing so it maintains the focus on processual relations that underpins posthumanism. As Don Idhe explains,

> in each set of human technology relations, the model is that of an interrelational ontology. This style of ontology carries with it a number of implications, including the one that there is a co-constitution of humans and their technologies. Technologies transform our experience of the world and our perceptions and interpretations of our world, and we in turn become transformed in this process. Transformations are non-neutral (2009, p.44).

The non-neutrality of technological development constitutes a vital recognition that technologies are not just tools that can be used for good or bad, but are forces that contribute to the constitution of subjectivity. They alter the contexts in which we find ourselves, changing the spectrum of possibilities. They intra-act with other relations such as social, economic or cultural factors, all of which constantly influence and inform decision-making at individual levels. As Lewis recognises both posthumanism and postphenomenology

> are anti-essentialist and relational, concentrating on situated and embodied beings-in-the-world. Both are amodern, avoiding Cartesian dualism and the idea of an autonomous and independent individual…postphenomenology directs its focus primarily on technologies while posthumanism concentrates more on understanding the subject (2021, p.65).

The openness of an intra-relational ontology reveals multi-layered entanglements that propagate the emergence of new dynamics. The techno-human condition is thus a complex, relational unfolding.

In the previous chapter the concept of general complexity was introduced to question the hubristic pretentions of transhumanist epistemology. The propensity of systems to self-organise was identified as a property of complex systems. Maturana and Varela's (1972)

concept of autopoiesis, which is a quality of all living complex systems (Capra, 1996), identifies a system's capacity to reproduce itself, regulating and maintaining itself as a coherent system. Haraway (2016) suggests the notion of *sympoiesis*, 'Nothing makes itself; nothing is really autopoietic or self-organizing…Sympoiesis enfolds autopoiesis and generatively unfurls and extends it' (2016, p.58). Haraway's claim is that systems are both autopoietic and simultaneously co-constitutive. They make-with rather than self-make, even as they function to maintain their own integrity. Haraway's framing is constructive when considering the agential capacities of people to employ enhancement technologies to remake themselves. The conception of morphological freedom has a tendency to ignore the context in which decisions are made, imagining a radically free-willed, autopoietic entity. Transcendent conformity foregrounds the context of techno-social relations which influence and delimit choice, thereby understanding enhancement trajectories as a more-than-human, sympoietic unfolding. The notion of 'transcendent conformity' attempts to create a more nuanced and contextualised analysis of the limitations of individuals' capacity for self-creation by emphasising the systemic capitalist relations in which we are enmeshed.

The Technosystem

Feenberg's notion of the 'technosystem' emphasises the embeddedness of technogenetic progress within the systemic relations of capitalism and in particular how markets, administrations and technologies together form a technical, scientific rationality that functions as the grounding of modernity. It represents a fitness landscape which delimits the possibilities of 'morphological freedom' functioning as a significant agential mediator of decisions and privileging instrumental progress over ethical considerations. Feenberg states,

> The new scientific a priori has three essential features – formalization, quantification, and instrumentalization. Science does not address experience in its immediacy but transforms everything it encounters in quantities subject to formal laws. Things have no essence but are composed of functional units awaiting transformation and recombination. This stance eliminates purpose and hence also potentiality from the world. This is the basis of the value-neutrality of science, its indifference to the good and the beautiful in the interests of the true (2017, p.125).

The technosystem privileges instrumental reason over 'experiential' reason which may proffer alternative values. Although Feenberg makes a distinction between these two realms

of reason (facts versus values, science versus experience), they are not a binary dichotomy as they are both always present in social reality. Indeed, all applied instrumental reason carries implicit values, and values always require instrumentalism to enact them. This implies 'The context-freedom and purity of rationality is shown to be as mythical as the worldviews refuted by the Enlightenment. Rationality enters the world socially' (Feenberg, 2017, p.114). Furthermore, 'The modern ideal of knowledge is subsumption under formal rules, but instrumental rationality can provide no criteria for the appropriate choice of this rule' (Feenberg, 2017, p.130). Ben Goetzel talks of 'the digital saviour' (2020) claiming the first superintelligent AI may facilitate the transcendence of ethical issues, nullifying the need to upgrade humans' compassion or empathy, because it will fix all problems. This is a fantasy of outsourcing ethics to instrumentalism and fails to recognise the important duality of human reason. Human values are incommensurable, perspectival, contextually bound, and have no final answer for a superintelligence to 'solve'.

Instrumentalism cannot function as an effective value system and yet it is the authoritative form of rationality. When Feenberg states his concern about the 'threat to human agency posed by the technosystem' (2017, p.38) he is highlighting that humans are insufficiently empowered to resist instrumentalising rationality. In line with Lukács' notion of reification, the technosystem, 'imposes a rational culture that privileges technical manipulation over all other relations to reality. It narrows human understanding and lives to conform with the requirements of the economic system' (Feenberg, 2017, p.42). Furthermore,

> The rationality of capitalism is both social and instrumental in the sense that it is inseparable from biased institutional decisions even as it aims at technical control. It is formalized in technical disciplines that describe functional relations and in some cases codify institutional practice. Modernity is characterized by the hegemony of this type of rationality. It replaces religious and traditional worldviews in organizing major social institutions (Feenberg, 2017, p.113).

While Feenberg recognises the need to make greater space for human values in our social construction, he also understands the identification of apt values is by no means simply achieved:

> Philosophers have long criticized a form of life based on the pursuit of ever more powerful means without regard for any higher purpose. They have sought alternatives to the domination of instrumental rationality, either through spiritual

> renewal or a new concept of reason. But in the past higher purposes have always been validated by worldviews based on myths effectively refuted by the Enlightenment. Modernity is about the liberation of reason from such worldviews. However, the consequences call into question the belief in progress that inspired the Enlightenment (2017, p.113).

Values when universalised are inherently problematic, thus the importance of pluralism itself. Values need to allow space for other values to emerge, even though this will require tolerance for contradictions, such is the messy reality of the human social world and the deeper ecology in which it is enmeshed. The technosystem manifests a value of instrumental progress above all else. In the process, everything including humans are objectified, formalised, quantified and instrumentalised. Human values cannot be universally agreed and are always contextually bound. However, a first step is to recognise the instrumental underpinnings of capitalist aims, the delusion in its purported ethical neutrality, and how this exacerbates those instrumentalising tendencies of technological development. The potential for humans to inculcate alternative views of what technogenesis should constitute is compromised by the ubiquitous instrumentalism of modernity. Transhumanism can be viewed as an ideology that advocates that instrumentalism itself will necessarily yield positive outcomes. In the context of the techno-human condition under advanced capitalist conditions, a simplistic advocation of technological development can suggest little else.

Reification, Subjectivity, and Instrumentalism in Competitive Systemic Relations

Highly competitive social environments rarely lend themselves to pluralistic ways of being. They demand efficient behaviour as determined by the requirements of socio-economic and related forms of competition. As Lukács (1971 [1923]) elucidated with his conception of reification, the relationship to oneself becomes ‘thing-like’: we are objectified by our subject position in given circumstances. Within certain economic and social competitive structures, the choice to reject technological enhancement could potentially render someone socially and economically moribund (perhaps evolutionarily so). Everyone (who has access) is effectively forced to participate to keep up. Although the concept of transcendence is perhaps suggestive of some kind of liberation, the necessity here is suggestive rather of an imprisoning imperative on action. We literally have to transcend in order to conform (and survive). This may serve only to make us more efficient at carrying out the activities demanded of us by the

powerful systemic logics that we serve: conforming to various manifestations of transcendence in perpetuity. The trajectory may be towards an entirely non-human, though very efficient, technological entity derived from humanity that does not necessarily serve a purpose that a contemporary human would value in any way. Instrumentalism and perceived utility become the architects of uplift.

For Byung-Chul Han (2017) neoliberalism has already psychologically prepared us to passively conform to the systemic imperatives of this mutant form of capitalism which adapts workers into entrepreneurs. He argues that,

> Today, we do not deem ourselves subjugated subjects, but rather projects: always refashioning and reinventing ourselves…this projection amounts to a form of compulsion and constraint – indeed, to a more efficient kind of subjectivation and subjugation…The I is now subjecting itself to internal limitations and self-constraints, which are taking the form of compulsive achievement and optimisation. We are living in a particular phase of history: freedom itself is bringing forth compulsion and constraint (2017, p.1).

Perpetual self-optimisation in the neoliberal context, constitutes an 'auto-exploitation' where 'power relations are interiorized…and then interpreted as freedom' (2017, p.28). The psyche is the target motoring this internalised auto-exploitation. Through positive manipulation of emotion, subjects conform at a pre-reflexive level: an 'engineering of freedom and exploitation' (Han, 2017, p.28). Han claims 'It is not concern for the good life that drives self-optimization. Rather, self-optimization follows from systemic constraints – from the logic of quantifying success on the market' (2017, P.29), reiterating Feenberg's concern for experiential values being subjugated by the imperatives of capital. It is a process whereby the imperatives of capital parasitically occupy conceptions of selfhood on a pre-conscious basis. A parsing of relations acting upon cognition at multiple systemic levels including the instrumentalising reason of capitalist logics and its entrenched formal biases can begin to capture a notional subjectivity. Thus,

> we no longer work in order to satisfy our own needs. Instead, we work for Capital…[which] represents a new kind of transcendence…entails a new form of subjectivation. We are being expelled from the sphere of lived imminence – where life relates to life instead of subjecting itself to external ends (Han, 2017, p.7).

For Han then, the subtle, 'snake-like' psychological co-opting of 'technologies of the self' (after Foucault (1988)), precipitates a conformity to capitalist relations without self-awareness. A velvet revolution has taken place in the structuring of subjectivity. Cognitive decisions were never the domain of free-floating rational agents, but now the instrumental rationality that directs cognition takes root primarily in Feenberg's technosystem. As Bob Doede suggests, 'whose designs will our successor posthuman artifacts likely bear?...in our vastly consumerist, media-saturated capitalist economy, market forces will have their way' (2009, p.42). The neoliberal subject is thus primed for enhancement by capitalist conformity.

The focus on the individual enables transhumanists to distinguish their project from coercive state-sponsored eugenics programmes (Sarewitz, 2011; Levin, 2021). However, as each individual is responsible for their own enhancement choices, there is an implicit preference for decontextualised self-interest, rather than holistic conceptions of what the enhancement of humanity should mean overall. Sarewitz refers to 'the scale-up' problem: we cannot know the impact of an enhanced trait on an individual, nor the impact of an enhanced individual on society:

> if the goal of human enhancement is better humans, and better humanity, then there's a serious scale-up problem to the individual-rights perspective. For one thing, people are not simple summations…of individual traits…Second, humanity—the aggregation of humans—is not a simple summation of a bunch of humans, and even less of a bunch of human traits…the human enhancement program cannot be about individuals alone because the enhancements of traits and abilities are benefits that are supposed to allow us to act more effectively as whole people, in a world of other people, where social, cultural, and institutional structures help to determine what counts as effective (Sarewitz, 2011, p.201).

Sarewitz (2011) goes on to argue that the most enhanced people today are likely to be US military personnel, but few would want to change places with them in combat. Context matters. Furthermore, many enhancements, such as superior memories, may lead to better performance in certain contexts such as exams, but such benefits are negated by everyone else also investing in better memories, 'as when everyone stands on their toes in a crowd to get a better view' (Sarewitz, 2011, p.203). The fundamental nature of competition means narrowly defined, instrumental ends are privileged over more conceptually holistic, ethically construed and relationally responsible versions of enhancement.

Biotechnology and Neuroscience in Advanced Capitalism

Advanced capitalism also plays a decisive role in science's applications and implications, leaving its mark on neuroscience and molecular biology. Cooper (2008) convincingly analyses the symbiotic relationship between the biotech industry and neoliberal capitalism wherein life itself becomes surplus value. She explains, 'neoliberalism installs speculation at the very core of production' (2008, p.10). The hyperbolic expectations of a future 'where notions of biological generation are being…pushed to the limit' (2008, p.10) thus provide a great deal of sustenance for a system that is premised on continuous growth. Profoundly potent exponential progress promises to pay for neoliberalism's debt-based model by conjuring a fantastical future. 'Neoliberalism and the biotech industry share a common ambition to overcome the ecological and economic limits to growth associated with the end of industrial production, through a speculative reinvention of the future' (Cooper, 2008, p.11). Transhumanism can be seen as a grand narrative of the transcendent power of science and technology guided by human reason vanquishing the limitations of nature. Neoliberal capitalism feasts on such narratives as 'the operative emotions of neoliberalism are neither interest nor rational expectations, but rather the essentially speculative but nonetheless productive movements of collective belief, faith, and apprehension' (Cooper, 2008, p.10). Cooper develops the notion of 'delirium' as a reading of 'the biotechnological project of reinventing life beyond the limit' (Cooper, 2008, p.12). This 'delirium' is absolutely evident in transhumanist thought. Its source may be eschatological yearning rather than fantasy economics, but it serves the ideology of neoliberalism and its mythos of perpetual growth even faced with the impending disasters of the Anthropocene. Since before the neoliberal era, 'science and technology presented themselves as broad highways of opportunity, as reflected in Vannevar Bush's (1945) metaphor of science's "endless frontier"' (Jasanoff, 2019, p.27). While Cooper's analysis pays testament to real possibilities of biological science, the role of neoliberal capitalism results in 'forms of violence, obligation, and debt servitude that seem to be crystallizing around the emerging bioeconomy' (Cooper, 2008, p.14). Thus, the promises of the transhumanist grand narrative in fact undergird and extend the bio-capital convergence of free markets and cheap life.

The mystery of our own conscious minds potentially constitutes an uncomfortable reminder of the limitations of science, stressing the importance of humility and highlighting the problematic nature of its overreach into contestations of existential meaning. As Harari states, 'Scientists don't know how a collection of electronic brain signals creates subjective experiences…It is the greatest lacuna in our understanding of life' (2016, p.110). It is unsurprising then, that the inexplicable nature of sentience should be a site that many scientists are determined to reduce to a simple, intelligible, decontextualised, material entity, an object for study: the brain. Albeit with true human exceptionalism it is often conceived of as the most complex object in the known universe. The process is well underway: 'as Crick provocatively put it, locating the seat of free will in the anterior cingulate sulcus, a frontal region of the brain's cortex activated when a person is trying to solve complex problems, "You are nothing but a bunch of neurons"' (Rose & Rose, 2016, p18). For this version of neuroscience, our conscious experiences, our identities are chimeras – nothing more in reality than a physical interaction of tiny material entities.

The demystification of the mind is also big business and high stakes. Numerous private and public initiatives into unlocking the secrets of the brain have sprung up in recent years. The most significant of these are the US's $4.5 billion BRAIN project, Japan's Brain/MINDS, the China Brain Project and the EU's $1.2 billion Human Brain Project. Henry Markram, initiator and coordinator of the latter project, states that, 'the human brain is the world's most sophisticated information processing machine' (in Rose & Rose, 2016, p.45). This statement reveals a further implication of this ruthless reductionism. Not only does the individual disintegrate under the pressure of definition by constituent parts, but the purpose of the individual becomes reconstituted too. Humans become 'information processors' and 'machines'. It is no surprise then, that the focus of the Human Brain Project is effectively to make the mind manifest in computer form, as this is the metaphor by which we best currently understand the mind:

> The project's goal, therefore, was to build an information computing technology infrastructure for neuroscience and brain related research in medicine and computing, catalyzing a global collaborative effort to understand the human brain and ultimately emulate its computational capabilities. That is, the intention is to invent new forms of more brain-like - so called neuromorphic - computing, and to create a computer model of the entire human brain (Rose & Rose, 2016, p.45).

Thus, the materialisation of the mind posited by neuroscience versus the separation and privileging of information over material forms posited by cybernetics seamlessly conjoin.

There is a revealing dual and contradictory pull within contemporary neuroscience. On the one hand, it is embedded within the logics of advanced capitalism, and it is thus often dependent upon a neoliberal ideological underpinning to ensure its funding and the practical application of its findings in shaping social policy. For neuroscience, the result is a focus on individual minds, decontextualised from the bodies and the social worlds they inhabit. Hence neuroscience offers up the cold neutrality of science to potentially both 'diagnose' and 'fix' imbalances in those who do not function effectively in its hyper competitive and consumptive social setting. This reductionism also chimes with the ideal neoliberal subject believing in their own perfectibility through consumerism; that is to say, an instrumental approach to the self. The social context is discounted as the cause of mental problems if we can see and alter the material manifestation of the problems themselves as neuroscience ultimately promises to do:

> Neuroscience's preoccupation with the workings of the individual brain, even when the owner of that brain is engaged in intensely social interaction…is thus in accord with this focus on the individual, each 'neuro-self' responsible for their own well-being, sustained through the promises of personalised medical care (Rose & Rose, 2016, p.10).

Thus, there is no need to 'mitigate the inequality and deprivation that are an integral part of an intensely marketised economy' (Rose & Rose, 2016, p.155) as science promises to fix such ills, not by addressing their political and ideological causes, but by techno-scientific intervention at a granular and individual level.

The contradictory pull takes us beyond analysis of the decontextualised, non-social, individual. In defeating the mystery of the mind through its ultimate materialisation, the individual is no longer an individual at all, but rather is reduced 'to collections of neurons (nerve cells) and synapses (the junctions between them)' (Rose & Rose, 2016, p.10):

> The task of [neuroscience] is thus to elucidate the genetics, biochemistry and physiology of the brain processes and, in doing so, to make the mind, and the person it inhabits, merely a 'user illusion', fooling people into thinking that they

> are making decisions whereas it is really the brain that is doing it (Rose & Rose, 2016, p.19).

This schism between the fetishised, atomised individual that is integral to the modern ideological incarnation of capitalism (and transhumanism) and the deconstruction of the notion of the 'liberal' individual that science tends towards with its reductive conceptualisation of the mind thus indicates a fundamental disconnect. It should be noted that neuroscience is not alone in deconstructing the sense of identity or self, which is a key foundation of liberal ideologies. Likewise, behavioural psychology, through a range of practical experiments (most notably with split-brain patients) identifies an 'experiencing self' and a 'narrating self' – the latter constantly manipulating our lived experience into explicable and coherent stories that allow us to function, feeling and presenting the spectre of a consistent identity. The body too, is traitor to the concept of the 'in-dividual': 'my body is made up of approximately 37 trillion cells, and each day both my mind and body go through countless permutations and transformations' (Harari, 2016, pp.290-1). Indeed, our bodies are shared with numerous other species. Our gut microbiome informs our personality traits (Johnson, 2020). The body then, like the mind is a complex system, porous, and constantly interacting with other complex systems surrounding it and nested within it. The ultimate demarcation of that system as an entity becomes arbitrary when viewed from these systemic perspectives. Much of the process of science undermining the cogency of hygenic individual selfhood that arises under advanced capitalist conditions are forms of individuation that neglect or undermine complexity. Driven by the urge for instrumentalism they aim at tractability and control, thus heuristically simplifying reality and rendering it pliable to the interests of capital. The human and its individuated constituent parts are objectified and despite the undermining of the liberal subject this entails, relationality and deep complexity are intrinsically denied.

Transhumanist Framing of Reason, Cognition and Emotion

At its core the abstraction of the Wiener-Shannon cybernetic conceptualisation of information renders the theory apt only for detached contexts of limited complexity where a mathematical basis of analysis functions well. However, as Kay explains, 'critical difficulties...crop up when Shannon's analysis of communication extends...to biological domains where

information cannot be readily measured, and where the materiality of the channel, context, and semantics do matter' (Kay, 2000, p.100). Heredity, for example, cannot be effectively understood as an information system. This undermines the metaphors of 'organisms as words and texts and the meaning of the genetic code as the key to the Book of Life' (Kay, 2000, p.100). Epigenetics too undermines notions of the gene as the primary information bearing agent (Keller, 1995; Levin, 2021) and emphasises the importance of context (or environment in biological parlance) and materiality. The importance of materiality and context speaks to the embeddedness of biological entities in a complex relationality where quantification, formalism and neat delineation result in important losses of meaning. Levin argues, 'Transhumanists' allegiance to an informational vision is pivotal: without it, they would have to jettison their contention that human biology was fundamentally manipulable and, thereby, their promise of humanity's self-transcendence…they would cease to be transhumanists' (2021, p.215). Whilst the contestation that biology is not fundamentally manipulable is perhaps too generalised or too strong, claims that science can 'read the book of life' are hyperbolic and transhumanist pretentions of re-writing it should be problematised by the complexity that is ignored in its discourse.

The transhumanist conceptualisation of individual minds equally fails to contend with the conceptual leakiness of such a frame and the complexity inherent to minds. Levin identifies the start of the problem with transhumanists' conflation of reason and cognition. She explains, 'transhumanists' prizing of rationality is a mismatch with their handling of cognition, in two main ways: (1) "cognition" is defined in terms of information, and (2) cognitive functioning is presumed to operate, and hence be improvable, in a self-contained, or "modular," way' (2021, p.25). For transhumanists, reason is the prime good, as it is the salvific and essentialised aspect of humanity that promises to deliver an enhanced posthumanity, which itself is most usually characterised by its superior reason. Thus, 'transhumanists deem it irrational to support anything short of a maximal heightening of rational/cognitive ability' (Levin, 2021, p.42). The problem is they segment reason/cognition into an abstracted concept of information processing that can be theoretically upgraded like computer processing power. Human reason is not an abstract form of information processing sullied by irrational features such as emotion and noncognitive operations. Human reason is comprised of irreducibly integrated cognitive and noncognitive operations (Zohny, 2015) and

emotion cannot be separated out from rational or cognitive functions. Indeed, it is 'neuroscientifically uninformed' (Zohny, 2015, p.260) to claim otherwise.

The abstracted reason that transhumanists cherish is in their view threatened by emotion. Characterised thus, emotion only plays a polluting role in the functioning of rationality: it is best removed so that reason can be left to its own pure, decontextualised, information-based realm. For transhumanists, emotion may play a role in their aims, but usually it is limited to a non-functional one. It is a kind of throbbing, glowing, abstract pleasure-machine offering 'gradients of hedonic bliss' (Pearce, 1995). But emotion cannot be trusted to inform decision-making processes as it is not rational. The 'affective turn' in philosophy goes beyond emotion by emphasising how 'our consciousness is shaped by our (inter-) corporeal natures' (Protevi, 2018, p.324). It brings the body to attention: 'bodies have thus moved from a blank slate to living beings, from clay to be moulded to creatures feeling their way through ever-changing worlds' (Protevi, 2018, p.323). The cybernetic legacy of the primacy of information over materiality leaves transhumanists deaf to the implications of such a turn. Levin states 'transhumanists present negative affect as harmful per se: not only undesired but undesirable…posthumans would lack the capacity for negative affect altogether. Such a picture presumes that rational and nonrational faculties not only can but should be detached' (2021, p.24). This reflects transhumanists' failure to understand the complexity of the human mind with affect playing important cognitive roles in reasoning that cannot be separated out from other cognitive functions (Levin, 2021). It is also indicative of the engineering mindset, which tries to segment, modulate, quantify and define and tends to deal only with a Newtonian conception of systems, limited in their complexity. There is a fractal failure in transhumanist thought that evinces an unwillingness to engage in the deep epistemological complexity of reality: a determination to will the world into a 'restricted' complexity instead of a 'general' one. This is profoundly important, not just because it suggests much of what transhumanists promise is fantastical, but it reveals an attitude which is potentially dangerously narrow and anti-scientific.

Conceptions of what would constitute 'enhancement' are fundamentally muddied by a recognition of embeddedness in a complex ecology and the epistemic limitations to human

reason this implies. Enhancement for individuals reveals little about the implications for society as a whole, or more deeply, a world ecology. Transhumanists tend to avoid contestations of what constitutes enhancement by focussing on quantifiable factors (such as age or IQ), decontextualised from wider social implications. Furthermore, by espousing a liberal or libertarian stance of individual self-determination (More, 2013; Sandberg, 2013), interpretation of enhancement is the responsibility of each person. Such a position facilitates a refusal to contemplate power structures, inequalities, social injustices and other relational feedback.

The alternative transhumanist view is to assume an objective utilitarian, reason-based stance which can function as a kind of super-arbiter of what 'enhancement' really is. This takes the form of a superintelligent GAI or a 'god-machine' (Persson & Savulescu, 2012). Such a view functions by delaying commitment to specific values and assumes them to be neutrally discoverable through the process of instrumental progress given time. It biases notions of progress towards the instrumentalist forms inherent to our contemporary world and so functions to perpetuate the status quo rather than addressing the manifold injustices of our times. However, the hope of determining objective, transcendent supra-perspectival ethics is spurious. Ethics are situated, perspectival constructions with no transcendent basis or view from nowhere. Ethical implications emerge with every instrumental action, and so to deny they have a transcendent basis is not a concession to relativism.

Individuation and the Post-liberal Subject

The cybernetic vision of deconstructing the liberal human subject into its constituent parts threatens its continued plausibility as a singular cogent entity. Hayles identifies this as the transition from the ideas of liberal humanism to the 'posthuman condition' which emerges 'when computation rather than possessive individualism is taken as the ground of being, a move that allows the posthuman to be seamlessly articulated with intelligent machines' (1999, p.34). Hayles contests that such destruction of the liberal human was ever the intention of those who played a vital role in the conceptual liberation of information from matter: 'cybernetics was a means to extend liberal humanism, not subvert it. The point was less to show that man was a machine than to demonstrate that a machine could function like a man'

(1999, p.7). Despite this, Harari points out the hypocrisy of many scientific realists who are also committed to liberal humanism:

> Richard Dawkins, Steven Pinker and the other champions of the new scientific world view refuse to abandon liberalism. After dedicating hundreds of erudite pages to deconstructing the self and the freedom of will, they perform breathtaking intellectual somersaults that miraculously land them back in the eighteenth century, as if all the amazing discoveries of evolutionary biology and brain science have absolutely no bearing on the ethical and philosophical ideas of Locke, Rousseau and Thomas Jefferson (Harari, 2016, p.305).

This contradiction between mainstream cultural ideology, and the relentless propulsion of scientific understanding and technological advances appears to be on a collision course. The epistemology that underpins the cultural narratives of cybernetics plays a role in forming our material reality. As Hayles recognises,

> When I say virtuality is a cultural perception, I do not mean that it is merely a psychological phenomenon. It is instantiated in an array of powerful technologies. The perception of virtuality facilitates the development of virtual technologies, and the technologies reinforce the perception. The feedback loops that run between technologies and perceptions, artefacts and ideas, have important implications for how historical change occurs (1999, p.14).

As such, the paradigmatic interpretation of the mind as a bodiless information processor may bring about the creation of technologies that reflect this ideological standpoint. Harari states, 'once the heretical scientific insights are translated into everyday technology, routine activities and economic structures, it will become increasingly difficult to sustain this double game' (2016, pp.305-6), that is, the conception of the liberally conceived individual and the contradictory neuroscientific notion of the mind as merely neurons and synapses. In Lanier's efforts to humanise the information economy he argued: 'Digital information is really just people in disguise' (2014, p.15). The problem is that in cybernetic thinking the sentence can easily be flipped: people are really just digital information in disguise.

Hayles is not advocating this cybernetic vision, on the contrary, she attempts to undermine it through unveiling the contingencies that led to its manifestation. Hayles' concern is not just the notion that humans are essentially bodiless algorithms, but the implications of this assumption made manifest in real world technologies. Her concerns are not based on the

challenge to liberal humanism. She states, 'I do not mourn the passing of a concept so deeply intertwined with projects of domination and oppression' (1999, p.5). The problem is the biopolitical implications of the technological manifestations of cybernetic thinking:

> Today's corporations and governments pay homage to my individuality, and promise to provide medicine, education and entertainment customised to my unique needs and wishes. But in order to do so, corporations and governments first need to break me up into biochemical systems, monitor these subsystems with ubiquitous sensors and decipher their workings with powerful algorithms. In the process, the individual will transpire to be nothing but a religious fantasy. Reality will be a mesh of biochemical and electronic algorithms, without clear borders, and without individual hubs (Harari, 2016, pp.345-6).

Cybernetic thinking thus becomes a 'material-discursive practice' (Barad, 2007, p.141) by which biopolitical and commercially motivated interventions can be made ever more deeply and invisibly. As Barad states, 'Discourse is not what is said; it is that which constrains and enables what can be said. Discursive practices define what counts as meaningful statements' (Barad, 2007, p.146). As Foucault would contest, this process does not constitute 'progress' but only change. This material-discursive practice comes embedded with assumptions, vested interests and biases, and produces new classifications and calculations which facilitate new conceptualisations of deviancy and normality, engendering new forms of discrimination and rationalisation.

The Prescriptive Potency of Critical Posthumanism

The descriptive powers of critical posthumanism to theorise and conceptualise the breakdown of boundaries and dualisms are not always matched by its prescriptive potency. As Jenina Loh notes,

> Openness and vagueness…is part of the agenda of critical posthumanism, as it reveals its general anti-dogmatism and rejection of ideological thinking. The more concrete, detailed, and formulated an ethical theory is, the more it tends to ossify, which results in an inflexible distinction between right and wrong (2022, p.20).

Despite this vagueness, Loh rightly acknowledges that a 'society designed according to critical posthumanist inclusive ethical principles would without any doubt look very different from contemporary "western" societies' (2022, p.20). However, a difficulty critical

posthumanism faces is that the contemporary state of prevailing Western power structures where discriminations, hierarchies, inequalities and injustices are manifold is the world we live in. These discriminations are not overcome by the posthuman condition understood as the collapsing of ontological boundaries because 'the mobile, fragmented, posthuman subject…is…a symptom of postmodern conditions' (Sharon, 2014, pp.161-2). In other words, posthumanism describes this process but it must still distinguish between the liberatory potentialities this condition proffers, and the simple fact of its becoming which in some aspects exacerbates existent injustices.

The critical posthumanist critique of the project of immortalism may be directed at the transhumanist (and neoliberal) obsession with extending the self. This obsession creates an impulse to exceed ontological limitations and to deny epistemological ones, the compulsion to colonise and dominate and to propel the self into an abstract, post-embodied immortality. As Del Val states, it is 'the disembodied Parmenidean dream of an immobile being that wants to paralyse the movement of becoming, fostering a quantitative "enhancement" of existing and dominant capacities rather than a qualitative transformation towards greater plurality' (2020, n.p.). The very technological developments required to enable this process constantly undermine the cogency of the 'self' that transhumanists seek to extend.

The critical posthumanist celebration of hybridity and plurality as ends themselves can be brought into question by the fact that advanced capitalism is an 'anti-foundationalist and anti-essentialist discourse, of which notions like creativity, mobility, diversity and mixture are the very conditions of possibility' (Sharon, 2014, p.160). Critical posthumanism thus requires more extensive ethical potency. Such an ethical stance cannot claim to come from a transcendent, supra-human position. While posthumanism aims at 'accessing nonhuman perspectives [which] means taking into consideration the existence of other species' (Ferrando, 2019, p.152) it must also be 'aware of its epistemic limitations (as theorised by and for humans)' (Ferrando, 2019, p.2). Anthropos can be decentered, but not escaped. Critical posthumanism fruitfully draws on feminist epistemologies, understanding the self as situated and co-constituted in relationality. Situated knowledges recognise the limited scope of their own perspective, fostering humility, but the demand to unpick the deeply instrumentalist underpinning of modernity requires more than the humble work of individual

responsibility and living more lightly. Two thinkers that offer very useful critical posthumanist accounts of agency and ethicality are Barad and Hayles. In chapter 7 a more thorough ethical position will be developed, but here Barad's agential realism and Hayles' complex cognitive ecology will be drawn upon to help establish successful conceptions of posthuman agency and ethicality.

Barad's Agential Realism

For Barad 'the primary ontological units are not "things" but phenomena - dynamic topological reconfigurings/ entanglements/ relationalities/ (re)articulations of the world' (2007, p.141). She also emphasises the inseparability of materiality and discursive practices (nature-cultures). Thus, 'the primary semantic units are not "words" but material-discursive practices through which (ontic and semantic) boundaries are constituted' (2007, p.141). Phenonema are ever in flux, as material discursive practices dynamically reconfigure reality, emphasising the inseparability of epistemology and ontology. Everything is relational and processual. The dynamism of this unfolding is fundamentally agential. Thus, agency is not something humans or other phenomena have, rather the 'universe is agential intra-activity in its becoming' (Barad, 2007, p.141). That is to say agency is an 'enactment', it is a doing, not a having. Agency is about playing a role in the dynamic unfolding of becoming. As Barad, explains,

> The neologism "intra-action" signifies the mutual constitution of entangled agencies. That is, in contrast to the usual "interaction," which assumes that there are separate individual agencies that precede their interaction, the notion of intra-action recognizes that distinct agencies do not precede, but rather emerge through, their intra-action (2007, p.34).

Barad suggests this understanding constitutes the emergence of 'a lively new ontology'. The lively intra-connection of everything chimes with the conceptualisation of general complexity. The embeddedness of humans within this dynamic unfolding, does not render them inert, or unaccountable for their role in new becomings.

Humans are not *solely* responsible for their actions as they themselves 'do not exist prior to their "involvement" in naturalcultural practices' (2007, p.171). But this does not mean that

human activity is not imbued with ethicality. Indeed, our being and activities are the very stuff of ethicality as ethics cannot be separated from the dynamic onto-epistemological unfolding.

> With each intra-action, the manifold of entangled relations is reconfigured. And so consequentiality, responsibility, and accountability take on entirely new valences. There are no singular causes. And there are no individual agents of change. Responsibility is not ours alone. And yet our responsibility is greater than it would be if it were ours alone. Responsibility entails an ongoing responsiveness to the entanglements of self and other, here and there, now and then (Barad, 2007, pp.393-4).

Responsiveness is at the heart of Barad's ethics. This involves understanding ourselves as relational entities, part of the generative flow of becoming, not isolated units of selfhood manifesting a consciousness separated from the dynamic unfolding of being. But this responsiveness also demands an alertness to a processual context. Our context defines what is possible at any given time: 'intra-actions iteratively reconfigure what is possible and what is impossible - possibilities do not sit still. One way to mark this is to say that intra-actions are constraining but not determining' (Barad, 2007, p.177). Our situatedness within a context also means we cannot escape ethics, we cannot do nothing. Ethical questions around technological and scientific projects cannot be ignored, nor is the answer a rigid rejection on account of not daring to disturb the universe. Barad points out,

> Disturbance is not the issue, and "dare" is a perverse provocation. There is no such exterior position where the contemplation of this possibility makes any sense. We are of the universe-there is no inside, no outside. There is only intra-acting from within and as part of the world in its becoming (2007, p.396).

Our embeddedness in the universe and its intra-relational expansiveness does not suggest harmony and unity as a natural state. If that was so ethics would be an irrelevance as what is, is simply what should be. Thus 'Technoscientific practices are about making different worldly entanglements, and ethics is about accounting for our part of the entangled webs we weave' (Barad, 2007, p.385). Given that we are part of this proceeding, there is no choice but to be responsive to the processual dynamism that confronts us.

Intra-relational ontology is not a denial of separation. As Barad argues, 'Difference…matters - indeed, it is what matters…Matter is produced and productive, generated and generative…

Mattering is differentiating' (2007, pp.136-7). Material discursive practices change the constitution of matter – they make a difference in the world and help to constitute what difference is. Therefore, material discursive practices constantly make 'cuts', that is enact differentiations, reconfiguring phenomena, playing a role in what comes to matter: 'accountability and responsibility must be thought in terms of what matters and what is excluded from mattering' (Barad, 2007, p.394). However, these cuts that we make never produce clear binary dichotomies. Barad invokes the concept of 'diffraction' which undermines the presumed 'separability of subject and object, nature and culture, fact and value, human and nonhuman, organic and inorganic, epistemology and ontology, materiality and discursivity' and furthermore 'marks the limits of the determinacy and permanency of boundaries' (Barad, 2007, p.381). This notion also illuminates the impossibility of assigning clear causes and effects due to the multiplicity of intra-acting elements, the changeability of phenomena and emphasis on relations over relata. Thus, being ethical is an ongoing enactment, 'being alive to the possibilities of becoming… tak[ing] responsibility for the role that we play in the world's differential becoming' (Barad, 2007, p.396) and being willing to 'meet the universe half way' in this process.

Hayles' Complex Cognitive Ecology within the Dynamic Heterarchy

Barad's intra-active, account of agency and entanglement maybe unintuitive to humans as consciousness, by its singular perspectival nature, biases an onto-epistemology towards an overly independent sense of self, often accompanied by an inflated sense of importance. As Antonio Demasio states, 'consciousness…constrains the world of the imagination to be first and foremost about the individual, about an individual organism, about the self in the broad sense of the term' (2000, p.300). The erroneous transhumanist framing of the individual separate from relations, a free-willed, independent rational agent, is exacerbated by its equally individuating notion of human reason as an abstracted force. An overblown faith in the potency of human reason as a cognizing capacity underpins the transhumanist emphasis on human choice uncontaminated by contextual relations. A more holistic view of cognition is required which credits the relational, situated nature of and limitations to human cognition to contest the hyperbolic construction of human cognition within transhumanist thinking.

Hayles (2017) undertakes important work in offering a way of conceptualising cognition and agency that is neither blunted by a flat ontology that struggles to account for power differentials, nor threatens to fall back into the exceptionalist paradigm of the primacy of conscious human reason. By emphasising their capacity for decision-making and interpretation of meaning, she argues cognising agents can be distinguished from underlying material processes. The problem with conceptualising enhancement from the perspective of liberally conceived individual humans, and of glorifying human rationality and agency is brought into sharp relief by Hayles' notion of a 'complex cognitive ecology'.

Hayles (2017) identifies cognition as an important factor in analysing agency as the 'crucial distinguishing characteristics of cognition…are choice and decision, and thus possibilities for interpretation and meaning' (2017, p.28). Nevertheless, by focusing primarily on non-conscious cognition, Hayles denies consciousness the privileged role as the sole rational agent in control of all decision-making. The growing import and influence of technical cognition is one reason for her focus, but also the underpinning of all conscious thought by vital forms of biological non-conscious cognition is pertinent. This latter point aims at undermining human exceptionalism by highlighting the extent to which consciousness is always dependent on non-conscious processes. Hayles highlights 'recent discoveries in neuroscience confirming the existence of nonconscious cognitive processes inaccessible to conscious introspection but nevertheless essential for consciousness to function' (2017, p.2). In the humanist paradigm consciousness is identified with higher order forms of reason that are drawn upon to justify human exceptionalism. However, it is not the entire or even major part of the processes that enables complex cognition: 'enhancing and supporting it are the ways in which the embodied subject is embedded and immersed in environments that function as distributed cognitive systems…human subjects are no longer contained—or even defined—by the boundaries of their skins' (Hayles, 2017, P.2). Thus, the importance of acknowledging the role of non-conscious cognition in forming human agency has profoundly important philosophical implications:

> assumptions taken for granted in traditional Western cultures are undermined and even negated when the primacy of higher consciousness becomes questionable…its identification with rational actor economic theory, its entwinement with the development of sophisticated technologies, and the perceived superiority it bestows on humans as the most cognitively advanced species on the planet (and beyond) (Hayles, 2017, p.87).

It is these assumptions that underpin transhumanism and they are especially salient to the conception of morphological freedom and the advanced capitalist paradigm through the dependence upon an understanding of self-determining, individual rational agents.

Furthermore, Hayles' aims are extremely productive in supplying a situated and differentiated account of agency through the notions of cognitive assemblages: 'fluctuating collectivities of humans, nonhumans, and computational media through which information, interpretations, and meanings circulate' (2022, p.2) which are embedded in a wider 'planetary cognitive ecology' (2017, p.3). The applicability and complementarity of this cognitive assemblage approach to complexity thinking is evident:

> A cognitive assemblage approach considers these properties from a systemic perspective as an arrangement of systems, subsystems, and individual actors through which information flows, effecting transformations through the interpretive activities of cognizers operating upon the flows. A cognitive assemblage operates at multiple levels and sites, transforming and mutating as conditions and contexts change (Hayles, 2017, p.118).

This opens up the possibility for a greater appreciation of environmental factors being deeply impactful on decision-making processes. For example, Hayles states 'the notion of a cognitive assemblage may be extended to include not only other technical devices but also overtly political concerns such as racism, gender discrimination, urban infrastructural design, and institutional politics' (2017, p.185). Whilst remaining open to the pluralistic intra-connectedness of constituting forces (embedding its thinking firmly within a general complexity paradigm) it also acknowledges difference between actors with an emphasis placed on cognition as an especially pertinent agential capacity.

In sketching a notion of the system of cognition, Hayles proposes a 'tripartite framework' or pyramid. Consciousness and unconsciousness sit together at the top of this pyramid, functioning as 'modes of awareness' (2017, p.27). Underneath that is non-conscious cognition, which is 'inherently inaccessible to consciousness although its outputs may be forwarded to consciousness through reverberating circuits' (2017, p.27). The lowest tier, which is notably also the broadest, comprises of material processes which are non-cognitive but nevertheless mediate cognizing activity. They are distinguishable from the other two tiers

because they do not constitute ‘choice and decision, and thus possibilities for interpretation and meaning’ (2017, p.28). Hayles is keen to point out that whilst a pyramid may imply hierarchy, privileging ‘modes of awareness’, these actually constitute the smallest section of cognition. Also of vital importance is that the distinctions only exist ‘for analytical clarity, in reality complex recursive loops operate throughout the system to connect the layers to each other and connect different parts of each layer within itself’ (2017, p.29). As all these layers interact with and affect all other layers, they should be constituted not as a linear hierarchy at all but as a ‘dynamic heterarchy’. This notion is very useful as a conceptualisation of all systems in a complexity framework. Systems intra-relate and have nested, porous intra-connections with other systems. Hierarchical conceptions tend to obscure these intra-connections and the recursive nature of feedback between elements within a system.

Non-Conscious Cognition in Techno-Human Assemblages

Accounts that advocate radical technological development sometimes characterise technology as a kind of self. This is exemplified by Kevin Kelly’s *What Technology Wants* (2011). Kurzweil also represents a similar sentiment with a teleological account of technological evolutionary determinism. Both see the increasing ubiquity and power of technology as an inherent property, something technology itself desires. This is a deeply anthropic conceptualisation and is based on a failure to recognise technological development as bound up with human activity. The complex agential intra-connections are denied and replaced with an unfolding sense of self akin to human consciousness. Whilst the sense of volition afforded technology by these accounts is spurious, Hayles rightly recognises ‘a kernel of insight here…technologies develop within complex ecologies, and their trajectories follow paths that optimize their advantages within their ecological niches’ (2017, p.33). Concepts such as Heidegger’s ‘gestell’ or enframing of technology can begin to be unpacked by deeper reflection upon the nature of these complex ecologies. Technology becomes a way of revealing (and by extension enclosing) exactly because its development occurs within an ecological niche that is highly attuned for instrumental progress. It is not imbued with a magical free will as Kelly perceives it, or the teleological determinism of Kurzweil, but rather it is a complex and contingent ecological unfolding, embedded in the systemic logics of advanced capitalism.

Such is our embeddedness not only in nature but in a deeply technical ecology that modern humans are entirely dependent on technical systems and the collapse of these would result in systemic chaos and a massive dwindling of the human species (Hayles, 2017). By understanding the complex systemic interconnection of transport systems, water and sanitation facilities, electric grids, banking systems and agricultural and medical production all of which themselves depend on computational systems undertaking cognitive tasks as a dependency for most human cognition (conscious and non-conscious) the fallacy of the liberal human becomes increasingly evident (Hayles, 2017). The arbitrariness of identifying the conscious aspect of human reason as not only the centre but the totality of agential functioning is clear. The idea that human consciousness is capable of some kind of independent self-definition and actualisation, unencumbered by its intra-connection with multiple other agential entities, cognizing and otherwise, becomes manifestly untenable.

The co-constitution and processual becoming of the human and the increasingly complex technical infrastructures and entanglements underline the techno-human *condition* as a state of processual embeddedness not a 'hygienic' (Graham, 2002), separate transcendence. As Hayles recognises:

> Humans and technical systems are engaged in complex symbiotic relationships, in which each symbiont brings characteristic advantages and limitations to the relationship. The more such symbiosis advances, the more difficult it will be for either symbiont to flourish without the other (2017, p.216).

A notable aspect of this condition is that potent non-conscious systems are often able to read and predict humans in a way that enables them to influence or bypass conscious cognition – a point that was explored in the previous chapter. Hayles (2017) suggests that technical cognizers may evolve on a different path to homo sapiens and may not require consciousness as an emergent property as it is already present within the techno-human assemblage. Indeed, the difference in the way non-conscious and conscious cognizance functions points towards a variety of challenges for conscious agency. Non-conscious cognition tends to function much faster than conscious cognition, and this can be exploited, and profitably so in a capitalist context:

> With the advent of affective capitalism and computational media that exploit the missing half-second to hijack human affective responses before consciousness has a chance to evaluate them and respond…nonconscious cognition can be held hostage by the designs of neoliberal capital (Hayles, 2017, p.191).

Some of the implications of this were explored with the concept of the complex media ecology in the previous chapter. Technical non-conscious cognition provides multiple opportunities for competitive advantages that exploit limitations of conscious cognition.

Narrowly defined ends can often lead to the shifting of activity from the human to the technical realm because of these competitive advantages. Hayles (2017) provides an insightful analysis of High-Frequency Trading (HFT). Notable amongst the instrumental benefits of the computational paradigm over human cognition is speed. Hayles explains, 'HFT has introduced a temporal gap between human and technical cognition that creates a realm of autonomy for technical agency' (2017, p.142). The ultrafast machine ecology of HFTs has led to an increasing number of ultrafast black swan events. This is attributed to the limited strategies of algorithms having to compete at sufficient speed for the purposes of chasing profits. Algorithms attempting to outperform each other produce swarm-like behaviours: 'their interactions resemble the kinds of moves and counter-moves typical of propaganda (psyops) warfare: feints, dodges, misinformation, and camouflage' (Hayles, 2017, p.163). The impacts are manifold: 'The predominance of duelling algorithms has created a machine-machine ecology…creating regions of technical autonomy that can and do lead to catastrophic failures' (Hayles, 2017, pp.142-3). Thus, a machine ontology can create a fragile ecology as it can be characterised by excessively narrow goals. In this case the already pathological narrowness of the profit motive is exacerbated. Hayles rightly sees HFTs as constituting a new form of vampiric capitalism that is speculative in nature and contributes nothing to the real economy. It is the supposed 'enhancement' that machines offer in this realm that makes them integral to the assemblage, and yet, this does not 'scale-up' as the outcomes seem only to bring downsides for most of humanity, exemplifying the problem with instrumentalism.

Without an assemblage-based analysis, such emergent dynamics may be missed and with it the potentially profound implications of this unfolding. By understanding the agential capacities of technical cognizers such as algorithms, ethical evaluation calls for the analysis

of the multiple levels within an assemblage where information is interpreted and choices occur, rather than assuming all interpretation and choices are made by the conscious minds of individual human actors. This unfolding is, however, self-perpetuating. The more technological progress is made, the more dependent human social systems and therefore human individuals become on their functioning. That is, the deeper bind that the techno-human condition represents. Technical systems employing forms of non-conscious cognition become increasingly ubiquitous in society as their potency extends. Hayles states such systems are 'all around us and operating largely under the radar of the general public, including expert medical systems, automated trading algorithms, sensing and actuating traffic networks, and surveillance technologies of all kinds, to mention only a few' (2017, p.39). The decision to design and implement systems such as these enhance our capacities, and increase our dependencies, but as Hayles argues, 'We need to recognize that when we design, implement, and extend technical cognitive systems, we are partially designing ourselves as well as affecting the planetary cognitive ecology' (2017, p.141). What we do to ourselves we do not do in isolation – we are inextricably linked to a global complex ecology, which demands deep ethical consideration. A nuanced understanding of the various agencies, and mediating influences at work in this complex ecology becomes vital work (albeit with the recognition that any such understanding can only ever be partial given the inherent complexity).

Whilst technical non-conscious cognizers are becoming increasingly powerful and influential in the social world, it is also vital to note how these cognizers differ from human thinking: 'On the technical side are speed, computational intensity, and rapid data processing; on the human side are emotion, an encompassing world horizon, and empathic abilities to understand other minds…emotion and empathy…can make important contributions' (Hayles, 2017, p.139-40). This recognition highlights the importance of ethical reflection and responsiveness to these processes, whilst simultaneously emphasising the potency of non-conscious cognition and the role of other mediating factors in cognition. This demands greater humility rather than ascribing control to individual human actors, or humanity at large.

The accounts of Barad and Hayles draw attention to the situatedness of the techno-human condition in a specific yet dynamic context. The first part of this chapter focussed on the ways in which the competitive dynamics of our context help to structure subjectivity and project a reifying instrumentalising rationality. Whilst the focus was on the competitive dynamics within markets it is worth noting that this is not the only area where technological progress is occurring. Rapid instrumental progress in warfare capabilities is also intrinsic to the logics of the technosystem and raises further significant ethical implications. As Chris Hables-Gray explains:

> Science and technology in the 21st Century are mainly shaped by market (profit) and military priorities. The sooner new discoveries and inventions can be utilised, the greater their advantage, so incredible resources are poured into those new areas of research that promise maximum returns financially and in military utility (Hables-Gray, 2012, p.33).

It is instructive to consider how the logics of competition underpinning markets and militaries shape decision-making within the technosystem at large. It is also notable that the technologies upon which transhumanists tend to identify as proffering hope for significant enhancement potentiality first manifest themselves in the contexts of war and profit-making. This point is made succinctly by Goetzel when he considers the current state of AI: it is used for spying, selling, killing and gambling (2019).

Warfare

Warfare emphasises our embeddedness in contingent, fragile systems in which the introduction of radically powerful, widely available technologies cannot be separated from their potential uses for destructive ends. It is misguided to wax lyrical about automated robots without simultaneous deep reflection of automated killing robots. Furthermore, warfare is historically one of the most potent drivers of innovation and social change – it has thus always been an integral aspect of technogenesis. As Allenby & Sarewitz state:

> The intimate relation between technological evolution and military activity appears to be central to the techno human condition. From the Trojan horse…to World War II tanks, from the nuclear annihilation of Hiroshima and Nagasaki to the shock and awe of Iraq, one version of human history is a technological telling in which weaponry and military victory march in lockstep (2011, p.127).

Coenen (2021) argues this intimate connection between technological development and militarisation has also always been evident in the aim of enhancing human performance.

The introduction of AI into combat represents the emergence of new dynamics, constituting a third revolution in warfare following gunpowder and nuclear weapons (Walsh, 2017; Lee, 2021). One consequence of AI in the battlefield emphasises the darker side of the posthuman condition as people may be killed based on metadata:

> one's metadata can be compared against a pre-existing pattern, a "signature" in the parlance of the US intelligence community. And if that metadata fits within the "signature" of a 'terrorist' template, one might find oneself at the receiving end of a predator drone strike…This data-based attack…requires no "target identification" but rather an identification of "groups of men who bear certain signatures, or defining characteristics associated with terrorist activity, but whose identities aren't known" (Cheney-Lippold, 2017, p.39).

The language of a 'signature strike' emphasises the ontological shift in perspective which not only constitutes objectification ('target' after all implies an object), but also the heuristic indifference that is implied by the process of datafication. People are not merely objects, but shadows of objects: fuzzy statistical probabilities. The messy, contestable, conceptual construction of a 'terrorist' based on someone's real life beliefs and activities is substituted for data markers which converge with those deemed typical of terrorists: 'Such logic…isn't interested in biographical profiles and back stories, it does not deal in desires or motivations…it is post-narratival' (Andrejevic, 2015, p.41). This has serious consequences. For example wedding parties in Pakistan have been targeted by US drone strikes as congregations of mobile phones outside of city centres have been deemed to resemble terrorist activity (Cheney-Lippold, 2017).

Here the form of objectification of humans in the context of war can be seen to take on a new shape as a result of data-driven technologies:

> Absent a legal requirement to target a single, identifiable individual, the ontological status of target is technologically rooted. Rather than being a more adept or accurate processing feature, the US's "terrorist" is mainly a datafied object of simple, strategic convenience. It's a functionalist category appropriate to the growing data-based logic of the NSA (Cheney-Lippold, 2017, p.45).

Phil Zimmerman emphasises the instrumentalist framing of complex problems such as terrorism, when he states that the issue 'is mathematics, scientists, engineers – they'll find ways to turn these problems into engineering problems, because if you turn them into engineering problems then you can solve them…The NSA has an incredible capability of turning things into engineering problems' (in Cheney-Lippold, 2017, p.45). The result of this instrumentalizing mindset is humans become probabilistically determined, technical constructions, underlining the contingency of selfhood within new relations of the techno-human condition: 'Death by algorithm represents a violation of a person's inherent right to life, dignity, and due process' (Bolton in Tucker, 2014, n.p.). Nevertheless, autonomous weapons are likely to constitute a growing threat in the future, undermining human rights law, international peace and security.

If autonomous weapons are widely produced and cheaply available, then being identified as an enemy of a nation state may not be necessary to being targeted by an algorithm and an autonomous weapon. Multiple smaller, non-state actors may have access to such machines of death.

> Killer robots will lower the barrier to war. By further distancing us from the battlefield they'll turn war into a very real videogame. Autonomous weapons will destabilise the current geopolitical order…a few individuals can control a large military force…Our planet will become a more dangerous place (Walsh, 2017, pp.172-3).

Daniel Deudney refers to the prospect of 'omniviolence' (in Torres, 2019) such is the potential for proliferating AI slaughterbots, along with other bio, nano and cyber weapons, to cause devastation at scale. Torres (2019) claims the 'k/k ratio', which signifies the number of killers to killed, could fall radically as a result of this process. Lowering the cost of admission to the battlefield can avoid democratic accountability: 'with autonomous drones, you don't need the consent of citizens to use force—you just need money. And there might be no knowing who's behind that money either' (Odin in Hayles, 2017, p.139). Transhumanists are not entirely oblivious to these possibilities but in the fashion of techno-utopian solutionism, they turn to technologies for the answer. Bostrom sees the remedy as a high-tech panopticon wherein, 'Comprehensive surveillance and global governance would thus offer protection against a wide spectrum of civilizational vulnerabilities' (2019, p.467). His instrumentalist,

engineering mindset is deaf to the irony when he advocates a world where ‘everyone is fitted with a “freedom tag”’ (2019, p.465). Pluralism is again narrowly constrained by total visibility and conformity with whichever ideology governs the panopticon.

Given the potential of autonomous weapons to become destabilising in their plenitude and devastating effect, it is unsurprising that there has been wide-ranging demand that development of this technology is curtailed. In a letter signed by numerous high-profile figures, its signatories state, ‘The key question for humanity today is whether to start a global AI arms race or to prevent it from starting. If any major military power pushes ahead with AI weapon development, a global armaments race is virtually inevitable’ (in Walsh, 2017, p.174). The instrumental power yielded means those who do not have access could be strategically incapacitated. Furthermore, the benefits that can be acquired through the competitive advantage pushes development further. Reymann & Benedikter argue,

> The fear of being left behind accompanies every single decision for or against the use of new technology. This is a logic that quickly leads to an arms race in every area of life, among individuals as well as among states. This certainly also applies in the field of military whose inner logic always gives the compulsion to strive for technological superiority. A strong military interest in the potential of human enhancement in connection with (semi-) autonomous weapon systems is therefore almost self-evident (2021, p.128).

This is a high risk, high reward game, and competitive logics tend to result in a race to the bottom in terms of risk. The risks can also exacerbate divisions between competing actors, such as nation states, leading to mistrust and deepening the competitive divide. Identifying the trajectory of globally competitive nation states in the context of the development of superintelligence Victor Vinge points out that ‘it’s essentially like an avalanche…it’s the ultimate weapon’ (cited in Garreau, p.75). His concern is that superintelligence is an incredibly risky entity to develop and requires significant caution rather than the high risk / high reward competitive context which does not allow for the requisite care. His point of departure is not autonomous weapons per se, but the development of AI generally. It is instructive therefore that he views AIs final purpose as a weapon - an inevitable consequence perhaps of a competitive rather than collaborative global fitness landscape.

AI is not the only technological development touted as offering the potential to enhance human capacities but also exacerbating the devastating impacts of warfare. Gray draws attention to this:

> At the start of the 21st century technologies of mass killing have become more powerful and more widely dispersed. Not only nuclear weapons but also chemical and biological weapons are steadily becoming cheaper and more easily usable, while genetic engineering is sure to be used to develop methods of genocide that destroy human life selectively on a large-scale. In a time when the spread of knowledge makes these technologies ever more accessible death rates could be very high, even among those whose longevity has been artificially enhanced (2011, p.210).

Gray's final prognosis of the implications of the quest for immortal life highlights a crucial challenge to radical enhancement technologies, that is, they have other applications:

> The end-result of scientific enquiry is to return humankind to its own in tractable existence…Instead of enabling death to be overcome, it produces ever more powerful technologies of mass destruction. None of this is the fault of science…The growth of knowledge enlarges what humans can do. It cannot retrieve them from being what they are (Gray, 2011, p.235).

His notion that humans are, by nature, normatively deficient represents a dubious essentialism. Nevertheless, his point highlights the divide between instrumental and normative progress. Our instrumental progress means techno-human systems imply ever more potent capabilities. Whether that be the power to destroy nature or each other, in the long run it is difficult to conceive of a competitive, stable system that can contain and withstand our technogenetic trajectories.

Conclusion

The concept of 'transcendent conformity' developed in this chapter is intended as an expression and critique of our current acquiescence to instrumentalism, and indeed of transcendence as a proposed commendation of instrumentalism. Our embeddedness within a complex dynamic heterarchy of which the techno-human condition is a significant part demands a recognition that we can never 'transcend'. This is not the rejection of the idea that humans can and may transform themselves – they have always sought to do so. Rather, I have

argued that such transformation is a process, a becoming, but always bound within the complex, relational constraints of our context. Failure to recognise either the complexity of the context or the necessity of the embeddedness is erroneous. However, the 'conformity' is not intended here to represent a dystopic or defeatist acceptance of the limitations of intra-relation. Nor is it an expression of technological determinism - viewing the techno-human condition as a bind from which we cannot escape, and which programmes our every decision. The conformity here is a contingent critique: it is designed to emphasise our situatedness in a state of instrumentalist modernity, and to illuminate the possibility of co-evolving a different context which may offer more promising futures. In a sense, it chimes with Braidotti's reimagining of the posthumanist subject:

> [W]e need to devise new social, ethical and discursive schemes of subject formation to match the profound transformations we are undergoing. That means that we need to learn to think differently about ourselves. I take the posthuman predicament as an opportunity to empower the pursuit of alternative schemes of thought, knowledge and self-representation. The posthuman condition urges us to think critically and creatively about who and what we are actually in the process of becoming (2013, p.12).

However, whereas Ferrando (2019) considers posthumanism as a 'philosophy of mediation', my conception of 'transcendent conformity' is intended to be a more stringent critique and does not call for mediation, but rather for resistance and change.

'Transcendent conformity' as a concept is itself intended to imply process and intra-relation as the two words imbue new shades of meaning on each other. The proposed 'transcendence' of transhumanism is a conformity to capitalist relations. The concept of the individual which lies at the heart of it (and the related self-definition implicit in 'morphological freedom' and consumer capitalism); the endless 'progress' which it promises; the unquestioned presumption of 'value' created through the dynamism and inventiveness of the market (which faces the same scale up problem as individualist notions of 'enhancement') – all represent mythic aspects of capitalist pretension. That is to say, the proposed 'transcendence' is a conformity of mindset to a specific cultural condition that is fundamentally instrumentalising in its approach. Furthermore the 'conformity' in turn requires of the individual that they keep up with this transcendence – the soft persuasion of advertising, the harsher inducement of the conditions of precarity, social expulsions, the widening wealth gaps and the threat of 'the

Gods and the useless' (Harari, 2017, n.p.) scenario. 'Conformity' too points at the air of authoritarianism in this position, and the fact that implicit within the proposed transcendence are the conditions for totalitarianism, reductionism and the impulse for control, ideas explored further in the next chapter. Thus, the term 'transcendent conformity' is not intended to delimit, define and remain stationary, but rather speak to the evolving conditions of technogenesis in an instrumentalist landscape. The words are intended to reflect, refract and echo each other offering new meanings. They can do so effectively as they are almost oxymoronic – one clutching at a sense of escape and freedom, the other confining and containing the impulse, drawing attention to its inherent contradiction.

The recognition that we cannot transcend but merely co-evolve, and we should not conform, but instead resist, also points towards the tension inherent to our notion of agency. We have already emphasised that human *being* is constituted by its relationality and as such there is no self-creation or self-determination, but only co-creation and co-evolution. However, awareness of our context, will likely change the decisions we take, and as such we can perceive differing agential possibilities related to differing levels of awareness. Michel Puech explains that a 'lack of awareness implies…the absence of self-construction: living as an object in commercial and societal networks, not as a self" (2016, p.173). Immersed as we are in complex cognitive assemblages which often construct our complicity and are premised on our ignorance even working to construct it psycho-politically (Han, 2017), the instrumentalism makes objects of us and undermines agency. A more thorough and evolving awareness of the techno-human condition in which we are all embedded will not free us from the pervasive instrumentalism that defines modernity, but it begins to offer more potential for choices that resist, and imaginings that change. Lewis argues:

> To guard against the determining aspects of the technological medium, we need education in order to bring about awareness of these effects. Developing this awareness is invaluable, allowing us greater agency, without which we risk living as beings determined by the technologies in our lives (2020, p.48).

A key aspect of such education would be an understanding of the limits of knowledge and self-knowledge in the context of differentiated complexity, generating humility. Such aims are not about providing us with *more* agency, but rather by reconstituting our understanding of ourselves and our context, we would be able to *act* differently. Moving beyond conformity

is thus about reconfiguring what is possible and making us more alive to the potentialities of 'differential becoming' within the dynamic heterarchy of being. This too can be perceived as an 'enhancement' as it constitutes expanding possibilities, though it approaches the question of enhancement from a very different angle to that envisaged by transhumanists. The next chapter raises concerns about the current trajectory of transhumanist aspirations in an advanced capitalist context if such potentialities of differential becoming fail to emerge and challenge this path.

Chapter 6: Systemic Dehumanisation

Introduction

This chapter considers the transhumanist value of 'inclusivity' and argues that transhumanism is unlikely to be inclusive in the context of advanced capitalism. Much of the evidence for this contestation has already been laid out as inherent to the logics of capitalism, as explored in chapter 3, and further analysed in the context of the competitive logics of the technosystem in chapter 5. Of particular importance are the notion of exclusions and concentrations that are increasingly manifest, and relatedly the increasing inequalities that have been identified within the advanced capitalist paradigm. The inherent class conflict is pertinent as is the potential for this conflict to deepen in the context of significant automation unemployment, or the furthering of what Varoufakis identified as the beginnings of techno-feudalism. The reconceptualisation of humanity in reductive, materialist or virtual terms explored in chapter 5, where humans are considered 'information processors' or 'nothing but a bunch neurons', is aided by the reifying logic of capitalism which objectifies humans and may render them expendable. This threat is deepened by the commodifying logics of surveillance capitalism analysed in chapter 4 where humans are conceived of as information objects, disaggregated into dividual entities and bought and sold as data products.

With these processes thus established, this chapter opens with an analysis of the ideas of Julian Savulescu, Steve Fuller and Nick Bostrom, prominent transhumanist thinkers with very different justifications for and visions of human enhancement. Savulescu employs a distinctly secular view of humanity, which focuses on human moral failings and the existential dangers these cause as a justification for upgrade. His work has an expressly biologically determinist bent, underplaying the complex logics of the social world and their impacts on individual and collective morality and the development and dissemination of technology. Savulescu argues moral upgrades should be compulsory and also bolstered by an extensive surveillance architecture to guarantee moral behaviour. Fuller rejects the plausibility of a secular underpinning to transhumanist aspirations, and views humans not as wretched moral failures doomed to extinction, but as nascent Gods destined for

transcendence. Fuller displays much greater awareness of the prevailing social conditions in determining the development and outcomes of transhumanist technologies, even suggesting altering our current social world to maximise efficiency in progressing transcendent aspirations. Whilst Savulescu asserts that coercive human enhancement can deliver an egalitarian future, Fuller embraces extreme social outcomes and inequities as a tool on the journey to omnipotence. The 'Longtermist' philosophy identified with Bostrom is then analysed for its calculating Utilitarianism and its resulting moral indifference to human catastrophes as long as they pose no existential risk to humanity.

A final factor that will be considered is the colonial and religious pretensions within some transhumanist discourse. Drawing on all of these transhumanist visions, it is argued here that the stark inequalities and excess populations that may exist outside of the techno-economic bubble of progress could result in a genocidal logic. This logic is exacerbated and supported by a reconceptualisation of humanity in reductive, materialist or virtual terms, and by misanthropic conceptions of an undifferentiated humanity bearing a blighted biological moral nature. Furthermore, aspects of technological progress such as advanced weapons and increasingly intrusive technologies with surveillance capacities, coupled with the idea that civil liberties pose a threat within highly technologically developed societies, add to the incipient genocidal logics. This potentiality may be developing within technocapitalism and latent within transhumanist aims in the context in which they are emerging.

Compulsory Moral Enhancement – Julian Savulescu

Humankind can be viewed as a creature desperately in need of salvation from the myriad dangers that pose an existential threat at the beginning of the 21st Century. Technology, especially of the sort that intervenes in our very nature, is increasingly looked towards as that salvation. Marvin Minsky argues that,

> we are unlikely to last very long – on either cosmic or human scales of time. In the next hundred or thousand years, we are liable to destroy ourselves, yet we alone are responsible not only for our species' survival but for the continuation of intelligence on this planet and quite possibly in the universe (cited in Garreau, 2005, p.123).

Julian Savulescu (2009) also cites species survival as a primary justification for human enhancement, arguing that we face a 'Bermuda Triangle of Extinction': radical technological power, liberal democracy and human moral nature, the triumvirate which threatens a potential cocktail of destruction. He argues, 'It is a matter of such urgency to improve humanity morally to the point that it can responsibly handle the powerful resources of modern technology that we should seek whatever means there are to effect this' (Persson & Savulescu, 2013, p.130). Savulescu's recognition of the importance of moral progress is not a call for deep ethical evaluation and systemic analysis, but to alter the bug-ridden code of human nature using technology. For him radical technological power is an inevitability so its moral content is beyond question. The solution must lie with adapting individual humans to their new techno-centric environment.

Conceptions of 'human nature' are highly contentious, but it is in this area that Savulescu (2009) believes we have the greatest capacity to alter the alarming future he foresees. Savulescu argues that we have evolved as a species to exist in a very different context from our own (a localised Pleistocene hunter-gatherer community versus a globalised world of advancing technological power). Our moral natures are now at odds with the modern socio-technical world – we are empathetic, but only to a very limited degree unbefitting of our global reach; we are near-sighted, we tend to co-operate only in smaller groups when our efforts are observed and we are distrustful of strangers and naturally xenophobic (Savulescu, 2009). Furthermore, our inclination for short term thinking explains our slow reactions to climate change and 'kin altruism' or 'the contract of mutual indifference' can be seen as an explanation for the continuing existence of extreme poverty (Savulescu, 2009). For Savulescu the causes of all these problems can be found within our biological wiring, rather than our social structures. He claims, 'It is important to recognise that embracing biological enhancements does not imply biological causation. There is nothing intrinsically wrong with employing biological solutions to social problems' (2012, p.92). However, a lack of awareness of the roots of social problems may well result in biological solutions that exacerbate rather than ameliorate such issues.

Social and biological reality are intricately connected and co-evolve. Whilst the failings of humankind to deal with global problems are increasingly manifest, deep social as well as

biological understandings are required. Understanding moral dispositions as deriving from an all-determining biological composition typifies essentialised notions of human being. Savulescu's insistence on divorcing biological and social systems in his analysis underplays the complexity and the inter-related nature of these complementary systems. Systemic logics, including formal biases within technocapitalist relations that determine vested interests and cultural norms, play a significant role in how moral dispositions form and create impacts.

Whilst it is easy to imagine that certain mental enhancements aiding aspects of intelligence might be desirable to people, the idea that 'moral' enhancements would appeal is more dubious. Being more empathetic or altruistic may put people at a distinct disadvantage in the context of a competitive capitalist society. Many of the altruistic attributes that Savulescu wishes more people would exhibit would render them less attuned to a fitness landscape where a mantra is 'greed is good'. That social systems contain implicit moral content emphasises the contestability of the claim human moral nature is bad *per se*. Rather, it is extremely pliable and varied. Responsibility for the dissemination of moral enhancements would likely reside in existent power structures which may well bear much of the responsibility for moral failings in the first place. Thorough interrogation of the tendencies that exist within our political and economic frameworks are needed as these logics will inform the development, design, accessibility and utilisation of technologies that Savulescu cites as offering strong possibilities for altering our failing moral nature. It is very concerning then, that Persson & Savulescu argue moral enhancements 'should be obligatory, like education or fluoride in the water, since those who should take them are least likely to be inclined to use them. That is, safe, effective moral enhancement would be compulsory' (Persson & Savulescu, 2008, p.174). They are clear in their contention, contra the tenets of morphological freedom, that such enhancements could and should be imposed against people's will if necessary. Whilst Savulescu claims utilitarianism is 'too demanding' (2014), he also argues 'There should be very good reasons for not adopting the utilitarian solution of maximising well-being' (Savulescu & Birks, 2012, p.7). Persson & Savulescu (2012) explicitly advocate shifting moral philosophy from a 'rights' to a benefit/harm discourse (which supposes such judgements are quantifiable, neutral and unerring).

Savulescu fails to understand that moral perspectives differ incommensurably. 'Moral enhancement' is tautologically employed to assume what is moral, and thus what constitutes its enhancement can be universally agreed rationally. There is no transcendent 'view from

nowhere' that can justify such authoritarian prescription. Persson & Savulescu propose an infallible 'God-machine' to arbitrate with perfect fairness. This falls victim to the erroneous transhumanist presumption that instrumentalism itself can solve moral problems. It cannot, it can only be perspectivally situated and in the context of new technologies would likely be judged through a filter of powerful vested interests. Although Savulescu speaks of promoting social justice, equality, and 'good' there is much to suggest that his view of morality is a socially conservative one. When considering moral dangers of radical technological enhancement, Savulescu tellingly focuses his attention on individual actors: 'in the next decades there's no reason why a backyard terrorist or fanatic or psychopath could not create a bio weapon that would at least destroy millions of lives' (Savulescu, 2009, n.p.). While such a reality is imaginable, the prominent position that terrorism plays in the public imagination facilitates the dehumanising treatment of migrants. Furthermore, it plays an important role in popularising certain policies that tend to cede civil liberties. Indeed, despite advocating 'fixing' human moral nature, Savulescu claims that the technologically enhanced threat from terrorists and other malign individuals requires the relinquishing of civil liberties including the right to privacy:

> we will need to relax our commitment to maximum protection of privacy, we're seeing an increase in the surveillance of individuals and that will be necessary if we are to avert the threats that those with anti-social personality disorder, fanaticism, represent through their access to radically enhanced technology (2009, n.p.).

Savulescu fails to consider the discourses which inform what constitutes 'anti-social personality disorder'. For example, public protest could fall into this category in the context of growing authoritarian tendencies in governments across the world. Again, Savulescu is blind to the influence of power in determining moral norms. Savulescu's argument also illustrates Shaw's concern that 'acquiescence to increased surveillance...is secured on the basis of the anxieties mobilised by the threat of terrorism, concerns about copyright theft and child protection issues' (2008, p.37). He advocates 'extensive surveillance by the state…setting aside what people in liberal democracies have come to regard as rights, in particular the right to privacy' (Persson & Savulescu 2012, p.125). The ideology behind such totalitarian aims bolsters surveillance capitalism's commercial logics explored in chapter 4.

Whilst Savulescu proposes to 'fix' social problems with technological solutions, he simultaneously endorses the loss of rights and privacy for individuals on account of the social

challenges technology will bring. This highlights how incommensurably contestable moral positions are, while also revealing a solutionist myopia. If moral enhancement were compulsory, along with pervasive surveillance apparatus and the God Machine, humans would be rendered incapable of any agency to conduct moral decisions. They would be 'psychologically or motivationally' (Persson & Savulescu, 2012, p.112) unable to do so and unaware of this limitation. The preferred moral outcomes are guaranteed by the technological agency. Such a condition remains invisible when viewed through the lens of morphological freedom as individuals are assumed to be exhibiting free will. As Levin complains, the 'utilitarian lens on preventing ultimate harm makes them willing to sacrifice what makes human existence worth conducting' (2021, p.124) and because of the 'willingness to sacrifice psychic complexity, moral cultivation, and freedom, their eliminative agenda is especially impoverishing' (2021, p.124). While Savulescu's ideas can be seen to contravene the more widely-espoused liberalism within transhumanist discourse, it is best understood not as an outlier but as indicating a central contradiction. The rational essentialism and the centrality of 'enhancement' reveal a tacit utilitarianism, a supposed reductive universality. It is this that drives the surety that instrumental progress must be desirable. This is in fundamental tension with the expression of individual liberty, and morphological freedom. Savulescu merely brings this contradiction to the fore with his view that individuals are part of an inadequate species teetering towards oblivion.

The Proactionary Imperative, Necronomics and The Republic of Humanity - Fuller

Fuller & Lipinska (2014) give humans a more elevated standing in their advocacy for transhumanist interventions, recognising them as 'aspiring deities' (2014, p.9). They acknowledge their own non-conformist Christian faiths play a vital role in underpinning their transhumanist fervour and warn that a rational analysis of history would render faith necessary to justify any transhumanist endeavours. They argue that if you believe in the cogency of human enhancement, 'yet you see yourself as somehow poised "against" or "beyond" theology, then you need to question the source of your confidence in humanity's

indefinite self promotion' (2014, p.8). In other words, a belief in God is necessary to justify the faith that transhumanist aims will not end in catastrophe.

At the heart of *The Proactionary Imperative* is the belief that we are obliged to pursue technoscientific progress relentlessly and endlessly to reach our god-like destiny or infinite power, effectively to serve God by becoming God. This conception of humanity's metaphysical condition lies at the heart of Fuller & Lipinska's justification for the 'proactionary imperative', an ideological extension of the 'proactionary principle' which they identify as 'the 18th century enlightenment idea of progress on overdrive' (2014, p.9). The implications of such a mantra are stark:

> replacing the natural with the artificial is so key to proactionary strategy…some proactionaries speak nowadays of 'black sky thinking' that would have us concede - at least as a serious possibility if not a likelihood - the long-term environmental degradation of the Earth and begin to focus our attention on space colonisation (2014, pp.99-100).

Fuller & Lipinska fail to consider that even if we are to take their long term, transcendent aims seriously, those aims are completely undermined by a laissez-faire attitude to social, economic and environmental risk. A sustainable environment is a necessary platform on which to build transcendent goals. Only blind faith and ideological dogma can cast these two objectives (a sustainable environment and transcendent goals) into a logical contradiction. Furthermore, it is not just the Earth itself that would be allowed to fall victim to Fuller & Lipinska's transhumanist super-experiment, but any person or thing that may represent grist for the mill in the transcendent journey.

The full extent of suffering Fuller & Lipinska would be willing to gamble in their 'cosmic casino' is revealed when we analyse what their project would mean for individual human beings: 'a proactionary world would not merely tolerate risk-taking but outright encourage it, as people are provided with legal incentives to speculate with their bio economic assets. Living riskily would amount to an entrepreneurship of the self' (2014, p.132). The horrors that are likely to be endured by this globalised market of human experimentation are conceived of as mere learning experiences as 'proactionaries… seek large long-term benefits for survivors of a revolutionary regime that would permit many harms along the way' (2014,

p.101). Progress on overdrive will thus require sacrifices. The economic fragility that humans may soon face would prove extremely useful to proactionary goals: in a society where vast swathes of the population are entirely reliant on the State for survival, market forces would determine that the less the State provides the more people are likely to risk for a lower reward. Hence, 'proactionaries would re-invent the welfare state as a vehicle for fostering securitised risk taking' (2014, p.42) and 'the proactionary state would operate like a venture capitalist writ large' (2014, p.42). Social justice and the promotion of equality are not a concern of the state here: 'To the proactionary, there is nothing intrinsically valuable in…"equality"…On the contrary, it looks like the enforcement of…a "fragile" approach to ecology that fails to recognise the creative power of destruction' (Fuller & Lipinska, 2014, pp.3-4). At the heart of this ideology is the removal of basic rights for 'Humanity 1.0', Fuller's (2010) term for modern, non-augmented human beings. Such rights are replaced with duties towards the future augmented transhuman entity: 'Humanity 2.0' (2010). The current manifestation of human beings must make sacrifices with the intent of increasing the likelihood of enabling this 'Humanity 2.0' to come into being.

The duties of modern day humans include that the very code of our being can and perhaps must be monetised: 'Conceptualise our genetic material as property that one is entitled, and perhaps even obliged, to dispose of as inherited capital' (Fuller & Lipinska, 2014, p.32) and 'personal autonomy should be seen as a politically licensed franchise whereby individuals understand their bodies as akin to plots of land in what might be called the "genetic commons"' (Fuller & Lipinska, 2014, pp.69-70). The neoliberal preoccupation with privatisation should thus extend to human beings according *The Proactionary Imperative*. Indeed, the life-time of debt that is the lived reality of most citizens in developed advanced capitalist nations, takes a further step as you are born into debt: 'Simply by virtue of being allowed to live, you are invested with Capital on which a return is expected' (2014, p.107). Fuller & Lipinska refer to this as a reinvention 'of self ownership in Humanity 2.0…[as an] abstract locus of agency responsible for the management and development of certain bio-economic assets' (2014, p.131). It is something of an understatement when they acknowledge 'Clearly employed here is a radicalisation of attitude toward the human' (2014, p.131). This after all amounts to the privatisation of the human being.

This is not logically too great a leap from current systemic logics: 'However specified, the ultimate goal in this bio-capital utopia is maximum productivity - making the most of one's inheritance' (Fuller & Lipinska, 2014, pp.70-71). Thus, the logic echoes the justification within advanced capitalism for its business ontology. Socially moribund masses are forced to serve the technoscientific super-project of Humanity 2.0 which utilises the ideology of market-fundamentalism in its quest for perpetual progress and maximum productivity. The only significant difference is that the stated aim of 'god-like' capabilities is overt, as opposed to the undefined end determined by an ever more voracious market logic, which is needed simply to serve capitalism's endless growth fetish. Fuller & Lipinska further advocate bringing about a war economy model, impressed as they are by 'unprecedented feats of innovation by virtue of having to respond to a comprehensive yet unpredictable external foe' (2014, p.106). Hence, they wish for a kind of permanent shock doctrine, disaster capitalism in extremis, whereby 'the prospect of ecological collapse, epidemics or even global financial meltdown [might] serve a similar function to focus minds in our own day' (2014, p.106). Such desire for 'creative destruction' augurs a further radicalisation of these proactionary ideas which Fuller develops in his *Nietzschean Meditations* (2019).

Critical posthumanists decry the construct of 'the human' in part due to its tendency to exclude not only non-human species, but humans who fail to adhere to underlying discriminatory suppositions about what humanness is. Fuller wishes to formalise these exclusionary practices with his notion of the 'Republic of Humanity'. Being human is expressly no guarantee of being welcome into his republic:

> membership in Homo sapiens is neither sufficient nor even necessary to qualify a being as 'human'… Transhumanism takes off at this point, opening the prospect that other beings – not only other animals but also complex machines – might come to occupy the status of 'human' in the future (2019, p.98).

Ominously, Fuller warns that any entity seeking citizenship would need to 'earn the status of "human" by passing certain criteria' (2019, p.104). The specifics are not outlined, but Fuller suggests, 'your capacity for self-assertion against a countervailing force – as good an empirical definition of autonomy as any – marks you as worthy of rights. You don't simply capitulate or adapt: You leave your mark' (2019, p.130). Fuller's reverence for power and will displayed here underpins his claim that Nietzsche is the transhumanists' philosopher, a

question more deftly explored in *Nietzsche and Transhumanism: Precursor or Enemy?* (Tuncel, 2017). Despite this, the framing of Fuller's concept of 'Human Citizenship 2.0' is presented as a liberal one: 'an immigration policy that is liberal with regard to ontology rather than geography. Thus, non-Homo sapiens may be allowed to migrate to the (conceptual) space of the "human"' (2017, p.102). As we shall see, it is equally important that humans and other entities can migrate out of that conceptual space too: citizenship is not permanent.

Behind Fuller's openness to extending the definition of human to include animals is his real concern that machines can qualify too. Hence, we must surmount 'our "organicist" prejudices…humans will overcome their *ontological narcissism*' (2017, pp.106-7). Following Moravec's notion of 'mind children', Fuller claims 'not to give automated machines some measure of respect, if not rights, is tantamount to disowning one's children' (2019, pp.105-6). For Fuller, humans and machines differ only in 'the crucible of creation: a womb versus a factory' (2019, p.106). This is because he essentialises humanity by its transcendent capacities: its potential to become divine. A hierarchical conceptualisation by which humanity lies between animals and gods underpins his thought. Humanity's purpose is to move up the hierarchy and machines enter the fray in between humanity and God as the great enablers for this journey. Thus, the idea that animals may gain citizenship is not based on an ethic of care or compassion but on the proviso that they are upgraded to enable them to enter a dialogue of equals with fellow citizens (2019). Machines, meanwhile, the most valuable form of capital in the technosystem, are afforded rights equal to those of any other citizen.

Affording our most potent machines rights, and expelling those least able to access and use such machines from the protection of citizenship, would radicalise the expulsions and concentrations of power and wealth already existent in the technosystem. Fuller though, has little interest in questions of power dynamics and social justice. All such considerations are outweighed by the instrumentalist focus on creating entities with God-like power. Thus, when Fuller contrasts '"posthumanist" in the case of animal rights activists [with] "transhumanist" in the case of machine rights activists, the former de-centring the "human" as a locus of value, the latter extending it' (2019, p.131), what is presumed by his notion of 'human' is an essentialised aspiring deity. 'Value' is simply that which seeks omnipotence: sentience, suffering, justice, all become irrelevant: instrumental power is all that counts. He

acknowledges that there is no 'intrinsic "value added" to being human. Whatever added value there is will have become a 'moveable feast' that always needs to be fought for tooth and nail, as machines also improve their capacity for intelligence' (2019, p.89). That Fuller's proposed criterion for citizenship, a 'capacity for self-assertion against a countervailing force', is a relative concept, not an absolute one, that always depends on context, only exacerbates the capriciousness of citizenship. A mouse may display assertion of will in its natural environs but may struggle to do so in certain laboratory conditions. Likewise, people whose motivations are rendered transparent through powerful algorithms and extensive surveillance may feel as if they are asserting their will but could be asserting the will of the algorithms' owners. Fuller's Republic of Humanity is a slippery concept which would enable great abuses of power.

The implications of expulsion from citizenship become clear when Fuller introduces his concept of necronomics: '"economics of death" or, more simply, "death policy"' (2019, p.163). Fuller pitches this as 'one of the undersold virtues of economic reasoning, namely, its ability to find value in anything' (2019, pp.163-4). Fuller is at times remarkably candid about his intention here, which is 'generating the most societal value from death making' (2019, p.165). Value for Fuller, it is worth re-emphasising, is simply progress towards total instrumental power. Therefore, murder is justified in all circumstances where this progress is aided: 'understanding the mindset of today's suicide bombers would not go amiss…ordinary acts of murder may even come to be routinely defended…if a physically fit but socially dysfunctional person refuses to make a graceful departure from the land of the living' (2019, p.168). Indeed, Fuller sees mass-murder as potentially very beneficial in our evolution from humanity to gods: 'evolution favours mass extinctions, as these open up previously occupied ecological niches in ways that allow the surviving organisms to explore previously untapped phenotypes as they fill those niches with offspring' (2019, p.192). Fuller's genocidal ambitions are not entirely suspended until his republic is in place. He claims of transhumanist sceptics:

> they look like zombies to us… How are we to think about beings who think this way? Aren't they the living dead? Indeed… They are programmed for destruction – not genetically but intellectually. Someone of a more dramatic turn of mind would say that they are suicide bombers trying to manufacture a climate of terror in humanity's existential horizons. They roam the Earth as death-waiting-to-happen. This much is clear: If you're a transhumanist, ordinary people are zombies (2019, p.197).

Fuller asks, ‘So how does one deal with zombies, especially when they are the majority of the population?’ He can only think of two viable solutions: ‘You kill them, once and for all… You enable them to be fully alive’ (2019, p.199). Simply put, for Fuller only transhumanists have any right to life: and even then only temporarily and contingently so, whilst they are able to evince demonstrable value in progressing towards transcendent aims.

This may seem extreme, but Fuller unabashedly embraces the eugenic nature of the transhumanist ideology, which ‘owes its very existence to eugenics, whose spirit it continues to promote under the slightly more politically correct rubric of “human enhancement”’ (Fuller & Lipinska, 2014, p.64). And indeed, in a distant echo of Savulescu’s rejection of privacy in favour of security, Fuller & Lipinska acknowledge that ‘eugenics requires mass surveillance and experimentation, with the understanding that many in retrospect may turn out to have been used or sacrificed for science’ (2014, p.63). However, like a PR brochure for corporate responsibility in the age of mass human experimentation, they assure us:

> Yes, this is eugenics, but [not] the classical state authoritarian version… Rather, hedgenetics would be a kind of participatory eugenics, a democratically accountable, legally binding version of eugenics written into the heart of intellectual property law and the regulation of financial transactions (2014, p.128).

How Fuller & Lipinska ensure democratic accountability across the planet or what takes precedence when democracy threatens to limit instrumentalist power they do not say. Likewise, there is no mention of the implications of the significant social and economic inequities that would arise from such a state of precarity in terms of the democratic deficit caused by such skewed power relations. Genocide would only be a serious moral concern for proactionaries if it inhibits progress towards the desired transcendent aim – perhaps by reducing the number of people available for experimentation. It is worth reflecting once more on Savulescu’s simplistic notion of ‘moral upgrade’, and the contestability of the term morality. Such a ‘moral upgrade’ for Fuller would simply mean making humans more compliant and amenable to whatever facilitates the greatest efficiency in realising our transcendent trajectory.

Whilst Fuller's ideas may not be something most transhumanists would advocate in full, they are important nevertheless, as they represent a rational transhumanist ideology, building on existing market logics, and legal and political structures. Their grain runs more aligned to advanced capitalism than against it, only adding an external overriding moral impulse (infinite progress towards omnipotence), which directs all vested interests within the system. Whilst Fuller & Lipinska would argue that they dignify humanity with a superior, indeed divine purpose in the Universe, the implications for 'Humanity 1.0' (unaugmented modern-day humans) would be devastating and deeply dehumanising.

The reason for analysing the transhumanist ideas of Savulescu and Fuller is not just to show how individuals would be under significant personal threat in the social worlds proposed by both thinkers, but to establish how each, in very different ways, conceptually 'dehumanises'. For Savulescu, humans are evolutionary relics – morally stunted entities ill-fitting for the modern world. While it is hard, in many ways not to agree with him given the parlous state we find ourselves in, it should be noted that Savulescu puts the blame squarely within the moral core of each and every individual, all of whom need fixing. He offers little recognition of the social contingency of human moral failings. We are biologically, not systemically damned. We *all* offer such a threat to ourselves and each other that we cannot possibly be trusted and must give up all rights to privacy and agency: the fault is with us, not the technology that heightens our potential for destruction or the social systems that empower it, whilst shaping our morality. For Fuller, we are nascent gods – but this conception too renders us 'dehumanised' as our current manifestation is simply a disposable stepping-stone on the path to divinity. Humanity is an iteration – an early one at that. We are Humanity 1.0, ripe for brutal and persistent experimentation and overdue an upgrade.

Bostromism, Longtermism, X-Risk and the absurd implications of quantifying the imaginary

Longtermism is a sub-movement of the Effective Altruism community. It has a number of strands, although, perhaps the most notable and influential thinker involved is Bostrom the prominent transhumanist who founded the Future of Humanities Institute in Oxford

University. Phil Torres, an existential risk researcher refers to the collection of ideas at the heart of Longtermism as 'Bostromism', which he explains as

> a vision that…commands us to subjugate nature, maximize economic productivity, colonize space, build vast computer simulations, create astronomical numbers of artificial beings, and replace humanity with a superior race of radically "enhanced" posthumans. Its basic tenets imply that the worst atrocities in human history fade into moral nothingness when one takes the big-picture view of our cosmic "potential," that preemptive war can be acceptable, that mass invasive surveillance may be necessary to avoid omnicide, and that we should give to the rich instead of the poor (2021, p.2).

Bostromism is a combination of transhumanism and utilitarianism and melds the two to make claims about the overriding importance of existential risk. What is particularly revealing about this philosophy is its tendency to spuriously quantify abstract and complex notions such as value (broadly equivalent to happiness) and existential risk in a way that can be used to justify atrocities and inequities in the modern world, highlighting the potentially pathological implications of taking a quantifying, engineering mindset into realms of radical uncertainty. It also conceptualises humans as instrumental containers for abstract value, and as such, other vessels are potentially equally useful at carrying such value. This abstracted and instrumentalist notion of the human entirely underplays our embodied and embedded being. Finally, Bostrom's utilitarianism relies upon a transcendental standpoint (the point of view of the Universe (Torres, 2021)) that claims neutrality and objectivity, thereby avoiding the contextual, perspectival nature of ethical reason.

In his article, *Astronomical Waste: The Opportunity Cost of Delayed Technological Development,* Bostrom claims that $10^{\wedge 29}$ potential human lives are wasted every second that we are not colonizing the Virgo Supercluster with computer generated minds of human equivalence. Despite the article's emphasis that every second lost is so incredibly expensive from a utilitarian standpoint, he claims that 'the lesson for utilitarians is not that we ought to maximize the pace of technological development, but rather that we ought to maximize its *safety*' (2003, n.p.). This is where *existential risk* becomes the foremost consideration for ensuring we do not waste our 'cosmic endowment' by failing to reach 'technological maturity' (2012). Bostrom's notion of technological maturity is based on hugely contentious transhumanist assumptions, such as the ability to transfer sentience to machines. But these groundless assumptions allow him to calculate that 'the expected value of reducing existential

risk by a mere *one billionth of one billionth of one percentage point* is worth a hundred billion times as much as a billion human lives' (2012, n.p.).

Bostrom is not alone in his thinking. Whilst the figures may be different (unsurprising given the calculations are so incredibly arbitrary) his colleague Hilary Greaves states 'a change that … increases the chance of imminent extinction by 0.00001%, is roughly welfare equivalent to the intrinsic badness of an event that wipes out 10% of the population throughout the next century' (cited in Torres, 2021, p.20). Torres suggests such thinking constitutes an 'information hazard' and cites Thomas Nagel's analysis of utilitarianism in the context of war where he asks, 'How many charred babies is too many when the stakes are this high?' (2021, p.22). The anchoring device of Utopian Transhumanist fantasies (the '*Ultimate Moral Interest of the Universe itself'* (Torres, 2021, p.23)) enables real world catastrophes to be couched as 'mere ripples' in comparison. Climate catastrophe, genocides, wars, all are minor episodes as long as some survive and are able to pass on the baton of our technological expertise. Implicit in this is those who hold the baton of technological expertise are much more 'valuable' than those who do not (radicalising the bios/zoe divide and placing the vast majority in the role of homo sacer (Agamben, 1998) as described in chapter 2).

Disturbingly, especially in the context of the acute concentrations and expulsions discussed in chapter 3, the Longtermist utilitarian philosophy that Bostrom has inspired can be used to perversely justify the transfer of wealth and resources from the poor to the rich. As Andreas Mogensen argues, 'utilitarianism seems to imply that any obligation to help people who are currently badly off is trumped by obligations to undertake actions targeted at improving the value of the long-term future' (2020). Torres sums up the line of thought effectively when he states,

> If what matters is the total amount of pleasure across space and time from the universe's disembodied perspective, then the fact that some 15,000 children die each day from hunger-related illnesses pales in comparison to the astronomical quantities of value that would be lost if an existential catastrophe were to occur (2021, p.28).

Torres rightly identifies that such thinking surely legitimizes 'the ongoing dominance of the Global North in a world still recovering from the devastating effects of Western colonialism,

imperialism, political meddling, exploitation…In a phrase, [Longtermists] support white supremacist ideology' (2021, p.28). Furthermore, the lives of those outside of the techno-human bubble of progress that promises to help deliver Bostrom's imagined future are not, in the big scheme of things, very relevant to these future prospects. Indeed, given the potential for disenfranchised groups or even individuals to commit omnicide in a world of radically accessible weapons, the lives of anyone who threatens progress may be deemed a legitimate threat and target. Even if they are only tangentially or algorithmically connected to such potentialities, given their infinitesimally small worth in comparison to the vast value of space colonising posthuman possibilities, little consideration can be paid towards their welfare.

Bizarrely, given the emphasis he places on minimizing existential risk, Bostrom claims that cessation of technological progress would constitute an existential catastrophe. He cites 'permanent stagnation' as one of four such outcomes: human extinction prior to technological maturity, flawed realisation and subsequent ruination being the other three. Despite this, he seems fully aware that technological development is the exact cause of our massively increasing existential risk. He states,

> The great bulk of existential risk in the foreseeable future is anthropogenic; that is, arising from human activity. In particular, most of the biggest existential risks seem to be linked to potential future technological breakthroughs that may radically expand our ability to manipulate the external world or our own biology. As our powers expand, so will the scale of their potential consequences—intended and unintended, positive and negative (2012, n.p.).

He further acknowledges that 'there were probably no significant existential risks in human history until the mid-twentieth century' (Bostrom, 2002, n.p.) and yet now he concedes that it would be a mistake to calculate the chances of us destroying ourselves before the end of the century at less than 20%. Of course, to even begin to attempt to calculate the chances of this requires significant hubris. There are simply too many unknown factors – perhaps Lord Martin Rees' (2004) estimate of 50-50 is less disingenuous on account of the fact it can be read as a kind of shrug.

The hubristic tendency towards epistemological certainty, the obsession with quantification, the reduction of the human being to an instrumentalist vessel of potential value, and the hesitancy to engage in serious ethical reflection by claiming an objective transcendental

stance on such matters are all endemic failings of much transhumanist thought. In Bostrom's obsession with existential risk they amalgamate into a troubling philosophy with dangerous consequences. Torres is justified in his concern about the influence of Bostrom's ideas and the practical steps being taken to place this kind of Longtermist thinking into positions of power. Toby Ord, another thinker on Existential Risk labels these times 'The Precipice' (2020), characterising the current moment as the vital pivot in human history that could see us tumble to extinction or propel ourselves on an awe-inspiring journey into the cosmos. Torres is rightly concerned this imposing sense of the deep import of the current moment along with the hyperbolic promise of 'Saturating our future light cone with intrinsic value by colonizing space, subjugating nature, maximizing economic productivity, simulating huge numbers of conscious beings' (Torres, 2021, p.37) renders Bostromist Longtermism 'a dangerous, millenialist ideology according to which the means justify the ends and the end is, in Bostrom's canonical formulation, nothing more or less than Utopia itself' (2021, p.37) (as noted, a totalitarian concept). Torres further recognises its secular rather than religious grounding but adds 'one could very plausibly describe it as a *quasi*-religion whose central object of worship is not "God" but *future value*' (2021, p.25). Quasi-religiosity is another familiar and unsettling refrain when analysing transhumanist imaginaries.

Religion and Colonialism

The cybernetic conceptualisation of bodiless information facilitates the hubristic epistemological certainty required to allow the transhumanist imagination to project techno-human reason into a future of absolute mastery. It underpins Kurzweil's nanobot swarm consciousnesses, Fuller's dream of becoming God, and Bostrom's of colonising our light cone with $10^{\wedge 29}$ superintelligent and blissfully happy posthuman entities. To believe in these futures requires certain metaphysical leaps of faith. Hayles brings us back to Earth from the cybernetic fantasy by rightly asserting,

> In the face of such a powerful dream, it can be a shock to remember that for information to exist, it must always be instantiated in a medium...The point is not only that abstracting information from a material base is an imaginary act but also, and more fundamentally, that conceiving of information as a thing separate from the medium instantiating it is a prior imaginary act that constructs a holistic phenomenon as an information/matter duality (1999, p.13).

These dreams are not science, they are religion. As if to emphasise the point, Meghan O'Gieblyn enlighteningly displays the similarity between Kurzweil's conception of history and certain interpretations of the Bible:

> Like the theologians at my Bible school, Kurzweil…had his own historical narrative. He divided all of evolution into successive epochs. We were living in the fifth epoch, when human intelligence begins to merge with technology. Soon we would reach the "Singularity", the point at which we would be transformed into what Kurzweil called "Spiritual Machines". We would transfer or "resurrect" our minds onto supercomputers, allowing us to live forever (2017, n.p.).

Here, religion is playing a different role than it does for Fuller & Lipinska. Whereas for them it is the justification for an irrational faith in progress, for Kurzweil it is almost a rhetorical device. Kurzweil is promising the spiritual (and material) benefits of religious salvation.

These most transcendent versions of transhumanism, where consciousness, or perhaps just intelligence, leaves the body and exists in some virtual manifestation, requires an updated version of the 'soul'. Thus, for Kurzweil, a person can be conceived of as a pattern of energy. This is certainly a divergence from the 'ruthless reductionism' of neuroscience:

> A pattern, transhumanists would insist, is not the same as a soul. But it's not difficult to see how it satisfies the same longing. At the very least, a pattern suggests that there is some essential core of our being that will survive and perhaps transcend the inevitable degradation of flesh (O'Gieblyn, 2017, n.p.).

The great irony about this technological salvation is that 'What makes the transhumanist movement so seductive is that it promises to restore, through science, the transcendent hopes that science itself has obliterated' (O'Gieblyn, 2017, n.p.). It cannot make these promises without slipping back into the religious myths from which science seeks to liberate us: '[transhumanist] theories about the future are a secular outgrowth of Christian eschatology' (O'Gieblyn, 2017, n.p.). Technology itself often becomes imbued with a kind of animism that renders it 'not only autonomous but also, in a sense alive, and perhaps a supernatural power' (Thorpe, 2016, p.98). Beth Singler draws attention to the eschatological language that litters AI discourse. She identifies,

> A god-like being of infinite knowing (the singularity); an escape of the flesh and this limited world (uploading our minds); a moment of transfiguration or 'end of days' (the singularity as a moment of rapture); prophets (even if they work for Google); demons and hell (even if it's an eternal computer simulation of suffering), and evangelists who wear smart suits (just like the religious ones do) (2017, n.p.).

Furthermore, she identifies an updated version of Pascal's Wager: Roko's Basilisk (2021). Roko, a user of the LessWrong internet forum posited that a future superintelligence (the Basilisk) would create a computer-generated eternal prison for the consciousnesses for all those that did not seek to bring about its existence. The 'Basilisk acts relentlessly to create the greatest good for the greatest number, and logically deduces that only its existence can ensure this outcome, it creates an incentive to bring itself into existence' (Singler, 2017, n.p.). Thus, AI threatens eternal damnation for non-believers, as well as the heavenly promise of immortality for its apostles.

Gray recognises that in Kurzweil's pseudo-religious promise of eternal life, there lies only annihilation as far the human individual is concerned: 'the individual mind is uploaded into a virtual universe. A speck of humanity becomes part of a cloud of consciousness or information. Whatever survives, the individual is extinguished. Death is not conquered but triumphs unnoticed' (Gray, 2011, p.218). Despite this, Kurzweil confidently declares that 'intelligence' will conquer the universe:

> The law of accelerating returns will continue until nanobiological intelligence comes close to 'saturating' the matter and energy in our vicinity of the Universe with our human-machine intelligence… Ultimately, the entire universe will become saturated with our intelligence. This is the destiny of the universe (Kurzweil, 2006, p.29).

This is very much colonialism, potentially quite literally, on drugs. Transhumanist pursuits are not just a threat to vast swathes of human individuals because its trajectories from a base of capitalist logics point towards unsustainable inequities and species diversion; it is an existential threat to the species as a whole, because the information with which Kurzweil wants to colonise the universe cannot be human intelligence in any meaningful sense.

Winwoode Reade's influence on transhumanist thought reveals its connection to notions of empire from its genesis (Coenen, 2014). Transhumanist ideas are also supported by millenarian-imbued religious myths promising eternal salvation: a disturbingly familiar story used to justify expansionist aims and domination. Hayles understands what Kurzweil's religious, colonial pretension entails:

> Information, like humanity cannot exist apart from the embodiment that brings it into being as a material entity in the world…Embodiment can be destroyed, but it cannot be replicated. Once the specific form constituting it is gone, no amount of massaging data will bring it back. This observation is as true of the planet as it is of an individual life-form. As we rush to explore the new vistas that cyberspace has made available for colonisation, let us remember the fragility of a material world that cannot be replaced (1999, p.49).

It is not just human extinction that these pretensions of universal colonisation augur, a 'black sky' thinking mentality sacrifices the whole of the natural world in its relentless pursuit.

Conclusion: Genocide, the incipient event

Eugenics is a charge that is often thrown at transhumanists, and it is even readily accepted by Fuller & Lipinska (2014). More commonly though, as Levin notes, transhumanists reject the claim 'that common ground exists between their views and prior eugenics [as]…it was state managed, while transhumanism features individual freedom of choice' (2021, p.171). Such a defence is already deeply enfeebled by the transhumanist failure to comprehend the breakdown of the sanctified and clearly delineated human individual. The process of reconceptualising the human in materially reductionist terms ('nothing but a bunch of neurons'), bodiless virtual terms ('information processors') and even as commodified capital, imply that a posthumanist framework is needed to re-think human agency under modern techno-human relations. Shaw articulates the stakes effectively:

> As life itself, understood as bio-genetic information, becomes commodified, it equally becomes manipulable and hackable. Understandings of what constitutes corporeality, consciousness and individuality have always been contested, but now they emerge as significant stakes in projected re-definitions of legal personhood and considerations of rights accorded to species other than human (2015, p.1).

This highlights the necessity for ethical consideration of the mutable, untethered human (or posthuman) condition. Transhumanism relies instead on simplistic, deterministic and teleological narratives of progress grounded in human rational exceptionalism and discrete individual agency. However, the utilitarian presumption of an objective superior rational view from nowhere contradicts the liberal framing of individual choice and agency. Morphological freedom is not sustainable alongside rationalist fundamentalist ideas that advocate panvasive surveillance. As such, the views espoused by Savulescu and Bostrom cannot be separated from prior eugenic pursuits on grounds of individual freedom of choice. Furthermore, existent notions of human rights may be undermined by challenges to personhood in this posthuman context. This is exacerbated by the proposed shift to benefit / harm calculations which pay no heed to the power relations that would underlie judgements about how benefit or harm is quantified and whose interests are considered.

A significant proportion of genocide scholarship constitutes an endeavour to define a 'universal essence' among the diverse instantiations of the crime. It attempts to root through commonalities and distinctive traits to reach an overarching conception of its particular nature and to determine the necessary conditions required to generate such a state. This train of thought often leads to over-simplified and stereotyped versions of what genocide looks like (Card, 2003; Wise, 2017). Particular focus is given to the role of despots in control of states. However, there is an increasing awareness of the complexity of genocide as a concept, and resultantly, broader and more nuanced reconceptualisations of its defining features. Louise Wise considers genocide from an 'ecological' perspective:

> as a contingent social (and material) construct that varies in form, dynamics, and manifestation across different historical and geographical contexts, instead of looking to uncover its 'universal form'…we should accommodate an understanding of genocide as a set of interacting processes, actors and relationships that evolves, or 'becomes,' over time, eschewing explanatory reliance on linear and simplistic, personality- driven notions of 'mad or bad' leaders…we need to move beyond the analytical confines of the state by facilitating perception of how episodes of genocide are situated within broader global contexts (2015, p.256).

She argues that it is 'imbricated with, and developing out of, a more expansive social and material environment…genocide does not "erupt", rather, it becomes over time, or at least the conditions of its emergence, or its potentiality, becomes over time' (2015, p.257). Ultimately through this ecological framework, she defines it as a 'complex system that produces

widespread social death' (2015, p.256). When genocide is conceptualised this way, it can be recognised as 'potentially incipient in the non-genocidal world' (Wise, 2015, p.257) and it becomes clear that many of the emergent forms of dehumanisation discussed here could come to represent genocidal potentialities.

Firstly, the increasingly extreme concentration of wealth in the hands of very few people is problematic. If such inequality is present in a world of radical technical potency the implications are stark. Furthermore, if such a world, or even a precursor to it, has a significantly lesser role for human labour, there could be unprecedented numbers of economically surplus people. Those who do not own the means of production will have no means of social mobility and may be entirely dependent on the good will of the wealthy. The gulf between rich and poor could be vastly widened by radically powerful technologies. When we consider the introduction of highly effective psycho-pharmaceuticals, genetic modification, nanotechnology, robotic prosthetics, brain to computer interfaces, superintelligent artificial intelligence and the development of life expansion, the inequities we are already seeing will surely be magnified if such a world is born out of the competitive nature of capitalism with its inherent collisions of interests. The already discredited idea of trickledown economics cannot even begin to apply when species divergence exists. Peter Frase's Four Futures imagines a scenario he labels 'Exterminism' (after E.P. Thompson) in which hierarchy and scarcity co-exist in a world of powerful technologies:

> A world where the ruling class no longer depends on the exploitation of working class labour is a world where the poor are merely a danger and an inconvenience. Policing and repressing them ultimately seems more trouble than can be justified. This is where the thrust "towards the extermination of multitudes" originates. Its ultimate endpoint is literally the extermination of the poor so that the rabble can finally be brushed aside once and for all leaving the rich to live in peace and quiet in their Elysium (2016, p.126).

What Sandel (2012) refers to as the 'Skyboxification' of life, namely the increasingly segregated social worlds of the elites in developed countries, is already with us. The falling share of the labour to capital ratio continues apace and shows no sign of abating as automation unemployment becomes increasingly evident. The logics of advanced capitalism decry social security and seek to privatise as much of the economy as possible. The treatment of ever larger numbers of surplus populations, most notably refugees, has become

increasingly dehumanising. Public discourse that encourages antagonism towards such groups has fanned the flames of a recent wave of populist politics in Europe and America. Meanwhile, the increasingly powerful technologies that enable this parlous and precarious state of affairs, and render their systemic logics ever more opaque, continue to develop at an exponential rate.

Fuller & Lupinska (2014) also raised the spectre of genocide, notwithstanding the genocidal implications in their own eugenicist vision for how transhumanism should be pursued. For them, it is the concept of 'ableism' that offers the threat – the idea that everyone would suffer from a permanent sense of disability. As Hauskeller puts it, 'The whole human condition is best understood as…a disability in need of fixing…We are, ultimately, always…defective… simply by virtue of being human' (2016, p.145). The concern is that those deemed less 'able' (that is, less enhanced) are considered less worthwhile, and less deserving of basic rights. This threat is exacerbated by other factors that undermine liberalism. For all its failings and its anthropocentric concessions, liberal thinking underpins much of the protections that are culturally and legally embedded within our political and legal frameworks. Human rights are not the natural state of affairs given human history, but actually a hard fought and profoundly important achievement (Arendt, 1973). Helen Fein (1993), in her analysis of the process of genocide speaks of the systematic removal of a population from a society's universe of moral obligation. The fragmenting of the liberal human subject is a necessary and worthy endeavour insofar as it contests manifold injustices and the hubris of transhumanist thought that can be traced to this conception of humanity. However, the reconceptualisation of the human is far from determined. Fuller's view of the human as 'Humanity 1.0' receives little 'moral obligation'.

A further concern emerges from Wise's recognition of a '"homology" between colonialism and genocide' (2015, p.260). The hyper-colonial pretensions of Kurzweil's aims for human-descendent intelligence and Fuller's for god-like universal dominance are unnerving given the interconnectedness Wise perceives. Like many colonial pursuits, religion plays an overt role in Fuller's ideology, his faith a justification for his willingness to run roughshod over any legislation deemed precautionary – that is to say with a focus on stability and sustainability. The religious elements of Kurzweil's vision are less overt, but its roots in Christian

eschatology and its reliance on metaphysical positions beyond the realm of science render it dependent on faith. The determinism of their views also points towards faith not rationality. For Moravec, modern humans don't matter because they are

> going to be left behind, like the second stage of a rocket. Unhappy lives, horrible deaths, and failed projects have been part of the history of life on Earth ever since there was life; what really matters in the long run is what's left over. Does it really matter to you today that the tyrannosaur line of that species failed? (cited in Thorpe, 2016, p.109).

He explicitly links this 'progress' to prior colonial pursuits (1990). To Moravec colonialism, genocide, ecological devastation are all just part of the natural history of progress: civilising forces in the grand march towards our intelligent designs colonising the universe. Cudworth & Hobden insightfully ask:

> Where… do these Western framings leave the concept of civilisation?... the development of such a discourse drew on a particular conception of what it meant to be human, in which being properly human demanded a separation from the rest of nature, constructed on the capability to control and exploit. The civilising mission of European colonialism was to both exert cultural superiority and subject 'barbaric' cultures to a form of uplift (2017, pp.123-4).

Moravec's worldview mirrors the 'civilising mission of European colonialism' to which Cudworth & Hobden refer. Again, the form of 'uplift' is present (in the guise of human enhancement); again, the barbarism is justified through a supposed cultural superiority (in the form of advanced technology).

A further indicator of genocidal potential is access to genocidal tools. As Savulescu identifies (as a justification for doing away with liberal democracy and replacing it with a panoptical authoritarianism), it is impossible to conceive of developing radically powerful technologies without developing radically powerful weapons. The possibility of 'omnicide' and the dangers of autonomous weapons as well as bio- and nano-tech weapons have been raised. Taken on its own, the sheer potential accessibility of weapons of such magnitude may represent a catastrophic danger. Coupled with the logics discussed above, the threat becomes all the more significant. A world of highly accessible weapons of mass destruction may also provide elite groups with a potential justification to take extreme measures to defend themselves.

The systemic dehumanising logics of advanced capitalism when applied to the incipient and emerging dynamics of radical technological possibilities, may not as yet be manifesting anything like ‘patterns of killings’ that would invoke genocidal fears. However, the point at which such an event may occur could, unlike all prior cases of genocide, result in an unstoppable and total process. The cocktail of deadly power, immeasurable opportunity, and inhuman pace of change mean that the conventional ‘early warning’ signs that Wise mentions would come far too late. It is vital then to recognise, despite the evident complexity of the process of realising transhumanist potentialities, the inherently genocidal latent tendencies that underpin much of the philosophy in the context in which it is emerging. The existential dangers of runaway computer intelligence and related fears are widely covered, but the inchoate genocidal propensities, much less so.

Chapter 7: Virtual Relational Anthropaporia: Towards an Ethics for the Future

Introduction

The previous three chapters have questioned the plausibility of transhumanism's self-determined values being attainable in the context of advanced capitalism. The notions of Data Totalitarianism, Transcendent Conformity and Systemic Dehumanisation explore different aspects of technogenetic development within advanced capitalist logics, aiming to demonstrate that the instrumentalism inherent to capitalism and advocated by transhumanists leaves no space for other values to flourish. This chapter seeks to sketch an outline of an ethical framework that may enable technogenesis to have less totalitarian, dehumanising and potentially genocidal outcomes. The chapter opens by contending that there is a vital duality to human reason. On the one hand, human reason can be applied to scientific and technical knowledge. In this domain genuine progress can be made. However, all scientific and technological practice is undertaken in the context of the social world and cannot be pure or detached from it. Thus, onto-epistemology cannot be extricated from ethics. However, there is no finality to the pursuit of ethical knowledge, no transcendent place from where 'truth' can be derived. Ethics are derived from experience and are perspectivally bound by living in a given context. It is in this domain that ethical reason emerges (though ethics are not exclusive to humanity). Whilst values and facts always exist coterminously, one can never consume the other in totality or exist entirely separately from the other. Both are fundamental aspects of our lifeworld.

The framework then builds on critical posthumanist discourse emphasising two aspects in particular: a relational ontology and its related call for compassion (the relational), and our interconnectedness with future (and past) states (the virtual). Adorno's philosophy will then be drawn upon to highlight what he sees as the central 'aporia' of Enlightenment: namely that reason always contains within it the potentiality for domination and barbarity. Adorno also develops an extremely useful 'negativistic ethics' that seeks to resist the 'inhuman'. By bringing together the 'aporia' and Anthropos, I intend to signal an open attitude to the human,

an acceptance of its mutable condition, and a rejection of humanist essentialism and universalisms. Furthermore, the rationality that may be applied in attempting to direct the trajectory of Anthropos should be problematised by Adorno's aporia and a rejection of the inhuman. Ultimately Virtual Relational Anthropaporia is an ethical formulation that attempts to speak to the unfolding of the technohuman condition building on the ethics of critical posthumanism and the thought of Adorno.

The Rational Critique of Reason and the Resurgence of Values

The technosystem, in line with transhumanist ideology, manifests a value of instrumental progress above all else. In the process, everything, including humans, are objectified: reified, formalised, quantified and instrumentalised. The transhumanist belief in the positive outcomes of human enhancement is based upon a faith in the human capability for the successful application of reason, a form of epistemological certainty.

A broad span of theoretical traditions have thoroughly undermined simplistic conceptualisations of reason. A range of these areas of theory have informed critical posthumanism including poststructuralism and postmodernism, science and technology studies (STS), cultural studies, literary theory, environmental and ecological theory, feminism, critical theory and postcolonial studies (Ranisch & Sorgner, 2014). All contend Enlightenment notions of linear progress underpinned by scientific, instrumental reason. Herbrechter (2013) identifies Nietzsche, while Neil Badmington (2000) suggests Marx and Freud as the main precursors to posthumanism in this regard. Each points to a different aspect of the fracturing of a conceptualisation of pure human reason. Nietzsche emphasizes the perspectival nature of truth, which 'galvanized "the great emancipatory movements of postmodernity...fuelled by the resurgent "others"' (Braidotti, 2013, p.37). Freud revealed the capricious nature of the human mind, and that its workings and desires determine that it can never be capable of adhering to a purely scientific rationality as it is comprised of its own complex curiosity. Marx demonstrated that rationality is constructed in the more-than-human world of social and economic relations. Capitalism bears its own reasoning force, containing formal biases, reifying, quantifying, formalising impulses and a thirst to bring as much into its orbit as possible.

Mathematics and science form the model for the type of instrumental rationality on which capitalism feasts, but the social world is messier than these formalised methodologies allow. This points toward a certain duality, namely, the strictly rational fact-based world and the world informed by experience and values. For Feenberg, this duality takes on various forms: cause and culture, fact and belief, lay and expert, technical rationality and democratic intervention, but he most often expresses it as science versus experience. The duality is central to the ontological, epistemological and ethical bases of human reason and the construction of the human life world. These pairings are not dialectic binaries, as they are perpetually intertwined when manifest in social reality. Nevertheless,

> science criticizes and transcends lived experience. It separates itself from our experience through rigorous critique. Its discoveries are not just an improved representation of nature similar in kind to the representations found in everyday life. The nature we encounter in our experience of the world is left behind as a cultural or psychological residue. The scientific idea of nature involves a systematic negation of experience; appearance and reality stand opposed (Feenberg, 2017, p.13).

Science often fundamentally contradicts experience, and its appeal to neutrality often results in its claims being privileged in the hierarchy of reason because it is seen as 'an absolute spectator on existence' (Feenberg, 2017, p.12). However, Feenberg rightly understands this as a serious error because 'Values...correspond to realities science may not yet understand, indeed may never understand, but which are surely real' (2017, p.14). Science cannot explain effectively much of what appears to matter to humans, and it certainly cannot be relied upon to determine exactly how humans should live. In part, this is because science,

> as a human pursuit, is always limited: knowing is made both possible and limited by time, place, body, culture, prejudices, and all other contingencies that operate in the search for truth...these limits show up in the flaws of technological designs, which may be biased to privilege the interests of a given social group or may contain unsuspected dangers for those who use them (Feenberg, 2017, p.5).

The damage that instrumental rationality has wrought evinces the danger inherent in venerating scientific facts and technological progress without deeper ethical reflection: 'Scientism, the claim that only science is true, meets its limits in the harm that accompanies "development" around the globe' (Feenberg, 2017, p.14). Facts can only tell us so much: they

can direct means, but not in themselves effectively determine moral ends. As Ian Angus explains,

> The waning belief in overall human progress...is rooted in the realization that technical ends (towards which a genuine progress of means does occur) cannot be rescued from conflict and mutual destruction by the same mode of thought that contributed to the accumulation of means (1984, p.13).

Because scientific and technological progress is palpable, it is self-justifying. However, technical progress does not ensure ethical progress, as was powerfully demonstrated by the two World Wars of the 20th century. The contemporary world has yet to fully come to terms with this central failing of Enlightenment rationality. As well as lacking the requisite grasp of human meaning, instrumental rationality becomes self-defeating when the ends to which it is applied involves the domination of nature, a theme integral to most posthumanist thought.

The critique of all-pervasive instrumental reason that underpins this thesis calls for the inclusion of explicitly ethical reason into systemic structures that contends with the challenges of techno-human and posthuman conditions. This means including values that are exogenous to pure scientific rationality: 'Values are the facts of the future. Values are not the opposite of facts, nor are they mere subjective desires with no basis in reality. Our world was shaped by the values that presided over its creation' (Feenberg, 2017, p.8). Facts and values, science and experience, instrumentalism and ethics, these realms of reason are intricately interlinked, they coproduce each other and both are present throughout the social world. Neither can be privileged in the final reckoning. This is not the rejection of science, but a recognition of its limitations as a determiner of not just what life is, but what it is for. However, it is much more difficult to achieve ethical progress as there is no 'truth' to discover. Ethics must be constructed and can have no transcendent basis, they are inherently 'fictive' (Sorgner, 2021). Thus, determining values is problematic and risks 'a return to some sort of disguised spiritualism, a renewed version of the split between (political) values and (technical) facts' (Feenberg, 2017, p.115). Pertinently, as we have seen, there are many versions of transhumanism that take on 'spiritualist' forms from Kurzweil's patterns to Fuller's God delusion, but almost always as a means to double down on instrumental rationality and 'progress'. In many cases the values are explicitly inhuman, for example Fuller & Lipinska's (2014) call for many harms on the route to Humanity 2.0. The

justification is the promise of the fantastical imagined end which inevitably transcends all human values through reaching absolute mastery of reality even transcending the entropic laws of physics on the path to Extropia. Rejecting the potential of an absoluteness of instrumentality to somehow transcend all value judgements still leaves us scrabbling around for an apt value system, and one that does not serve to propagate another hierarchical and barbaric 'humanist' ideal that by its nature exceptionalises, excludes and expels.

Posthuman Ethics: Relational Compassion

Transhumanists utilise the mutability of the human condition as the point of departure for its instrumentalist approach to 'enhancing' it. Critical posthumanists, meanwhile, recognise it is this very mutability, especially in the profoundly dangerous context of the modern techno-human condition, (technogenesis under advanced capitalist relations) that demands deep ethical reflection. As Graham states,

> What is at stake, supremely, in the debate about the implications of digital, genetic, cybernetic and biomedical technologies is precisely what (and who) will define authoritative notions of normative, exemplary, desirable humanity into the twenty-first century (2002, p.11).

Echoes of this sentiment can be found in Andy Miah's (2008) analysis too. For him, posthumanism is 'the study of the collapse of ontological boundaries…of how moral landscapes might be transformed by this occurrence' (2008, p.21) and 'posthumanism is a philosophical stance about what might be termed a perpetual becoming' (2008, p.23). It is this perpetual becoming that requires the ongoing re-definition of an 'ethics of bodies that matter' (Zylinska, 2004, p.523). The 'human' then in critical posthumanism and transhumanism lacks essentialism and stability – the 'post' and 'trans' prefixes clearly point to this. But whereas the 'post' demands a deep ethical consideration of the implications of the unmooring, the 'trans' tends to claim a clear and advantageous direction of travel. In a sense, critical posthumanism calls for ethical evaluation, whereas transhumanism calls for instrumental progress.

Loh (2021) characterises critical posthumanist ethics as ‘inclusive’ and thus in contradistinction to traditional Western thought. Whereas ‘exclusive’ ethics focus on a moral agent or ‘relata’, usually the liberally conceived human subject, inclusive ethics begins with the relations between relata (Loh, 2022). As Haraway explains, ‘Beings do not preexist their relatings’ (Haraway, 2003, p.6). Loh (2022) claims that all versions of inclusive ethics have a term for ‘relations’, that is, the ‘in-between’ of relata. Haraway’s notion of ‘kinship’ and Barad’s ‘entanglement’ are exemplars. Transhumanists’ tendency to avoid context and its conception of ‘morphological freedom’ identify the philosophy as exclusive: focused on individual agents rather than relations between them. As Loh notes, exclusive ethics need not deny relations, but in emphasising the moral agent, they simplify ethical reality and tend towards discriminatory practices as the ethical agent is assumed to have superior inherent value. Inclusive ethics need not deny the existence of relata, but sees them as defined first and foremost by their relations to everything else.

The existence of relata, much like a system in complexity theory, is an entity in flux, nested within and overlapping other systems, a superficial and transitory node. As Barad states, relata “do not preexist relations; rather, relata-within-phenomena emerge through specific intra-actions” (2007, p.140). For Haraway too, relations precede relata, thus a ‘relation is the smallest possible unit of analysis’ (2003, p.20). Haraway sees ethics as situated ‘response-ability’(2016, p.12). Whereas exclusionist ethics might talk of ‘responsibility’, Haraway’s reframing draws attention to context (or situatedness) thus we co-constitute the world, becoming-with our various relations in ‘kinship’ (2016). These relations are more-than-human. Thus, ethics is not reduced to the subject-object relationship implicit in exclusive ethics. Inclusive ethics have a tendency to see a vibrancy in these relations as ‘objects’ are no longer inert but constantly interacting with other matter, including humans.

The binary dichotomy of subject and object is one of an array of binary conceptualisations that facilitates the domination of nature and represents an ontological misrepresentation of reality. Human/non-human, nature/culture, self/other, mind/body, organic/technological are all false binary dichotomies steeped in humanist thought that critical posthumanists seek to disrupt and undermine. These ideas by no means originate within posthumanism nor are they exclusive to it. Indeed, as Braidotti & Hlavajova (2018) note, such thinking is a point of theoretical convergence between a number of writers engaged with process oriented,

materialist ontologies. They include Deleuze & Guattari, Derrida, Whitehead, Wittgenstein, Meillassoux, Latour and Haraway, all of whom are cited as influencing posthumanist ideas. Together they seek

> to overcome binaries and state that matter, the world and humans themselves are not dualistic entities structured according to dialectical principles of internal or external opposition, but rather materially embedded subjects-in-process circulating within webs of relation with forces, entities and encounters (Braidotti & Hlavajova, 2018, p.8).

From this ontological recognition, Braidotti evinces the ethical dimension of the ideas of critical posthumanist thinkers when she states they 'are bonded by the compassionate acknowledgement of their interdependence with multiple, human and non-human others' (2018, p.341). The ontological recognition of co-existence with multiple beings, leads to a foundational ethical stance of 'compassionate acknowledgement'. It is not claimed here that there can be a transcendental basis for this ethic. No amount of rationalising can instantiate this claim as a 'fact'. However, Barad links ontology, epistemology and ethics when she claims 'ethicality is part of the fabric of the world; the call to respond and be responsible is part of what is' (2007, p.182). Knowledge does not innocently reveal truth because it is an entanglement, an 'intra-action' with being and thus produces ethical outcomes. This conceptualisation interlinks ethicality and instrumentality, facts and values, science and experience. It is not that they are one and the same form of reason, but rather that science co-constitutes experience and vice-versa, all instrumentality has ethical implications, knowledges produce values and values mediate knowledge production. Ethics is thus a fundamental and unavoidable part of existence, even if there is no transcendent basis on which it can rest.

That humanity is imbricated in a wider context from which it cannot be separated is an important posthumanist principle. It is not just that it undermines the concept of the exceptional, 'purified', 'ontologically hygienic' human, clearly delineated from the rest of nature, but also because it indicates a wider complex ontological relationality, and ethical 'response-ability'. However, that humans are enmeshed in richly relational correlations with other systems, and that human systems are co-constitued by non-conscious cognitive functions and multiple material actors does not mean humans cannot play a role in affecting their social contexts or its proposed technical evolution. As Herbrechter points out

‘Postanthropocentric posthumanities are still about humans and humanities but only in so far as these are placed within a larger, ecological, picture’ (2018, p.96). Humans then still undertake important agential functions, though agency is a doing word, an ‘enactment’ (Barad, 2007) rather than something one possesses. As Hayles argues,

> the human designer has a special role to play not easily assigned to technical systems, for she, much more than the technical cognitive systems in which she is enmeshed, is able to envision and evaluate ethical and moral consequences in the context of human sociality and world horizons that are the distinctive contributions of human conscious and nonconscious cognitions. Consequently, we need a framework in which human cognition is recognized for its uniquely valuable potential, without insisting that human cognition is the whole of cognition or that it is unaffected by the technical cognizers that interpenetrate it (2017, p.136).

The role of the human is not one from the God-perspective, separate from and hierarchically positioned above the rest of nature. Nor can we simply rid ourselves of the powerful and complex technical, socio-cultural and economic systems in which we are embedded or their ethical implications. General complexity puts limits on our epistemological capacities and renders the impulse for control self-defeating. Humility is required in identifying our position as a co-constituter of social reality, embedded as we are in webs of intra-relation – a dynamic heterarchy.

The Totality of Instrumentalism and Totalitarianism of Ethics – Playing God and the Limitations of Compassion

The transhumanist whose ideas could be seen to correlate best with the relational compassion advocated by critical posthumanist thinkers is David Pearce. Instructively, super wellbeing is the prime focus of Pearce’s analysis. As a third-generation vegan, suffering, and not just that of humans but of all sentient beings, is the primary concern of his ‘Abolitionist’ philosophy. He argues for ‘compassionate ecosystem redesign’ whereby,

> A cruelty-free world can come about only via compassionate use of biotechnology: genetically re-engineering obligate carnivores and other predators; cross-species fertility control; neurochip implants; GPS surveillance and tracking; nanorobots in marine ecosystems; and a host of technical interventions beyond the pre-scientific imagination (Pearce, 2011, n.p.)

Pearce understands Nature as an utterly cruel and callous state of affairs. He cites Richard Dawkins claim that whilst composing 'this sentence, thousands of animals are being eaten alive; others are running for their lives, whimpering with fear; others are being slowly devoured from within by rasping parasites; thousands of all kinds are dying from starvation, thirst and disease' (in Pearce, 2010, n.p.). But whereas Dawkins acknowledges 'it must be so', Pearce advocates intervention.

Pearce goes some way to recognising the complexity of attaining desirable results from intervention when he states, 'if…we rescue wild elephants dying from hunger or thirst, the resultant population explosion would lead to habitat degradation, Malthusian catastrophe and thus even greater misery' (Pearce, 2010, n.p.). However, he claims the complexity is now becoming tractable with the requisite levels of technology on the horizon (a restricted complexity view). Pearce does not seem to appreciate that even if the technical complexity could somehow be negotiated, the ethical complexity cannot.

Pearce fantasises about the lion lying down with the lamb – a pastoral, heavenly scene. But the creatures he imagines would not really be lions or lambs, but rather mind-controlled automatons designed to look like lions and lambs. Which begs the question, who is designing these creatures? What is behind the anthropogenic nostalgia of such a vision? If there is a plurality of values in a context of such radical power then control and order may be difficult to attain. Such impulses for control inevitably narrow value spaces. Whether sentience can maintain contentment under such conditions of pure control is itself dubious. Pearce advocates the engineering of 'gradients of hedonic bliss' – that is, sentient beings that experience joy on unthinkable scales. This would surely come at the expense of self-awareness and agency. The degree of instrumental capability demands a totality of ethical evaluation, one clear and all-pervasive worldview to determine all value questions. This once more points to the way in which instrumental and ethical reason are entirely intertwined in the social world. The exponential increase in instrumental powers yields exponential demands on ethical decision-making. It negates plurality of vision in favour of totalitarianism – patterns that have been identified throughout this thesis. The notion of a 'singleton', 'a world order in which there is a single decision-making agency at the highest level' (Bostrom, 2006, p.48) constitutes this unitary entity in total control in transhumanist discourse. For Bostrom this is a likely outcome of technological progress and offers numerous advantages:

‘a future singleton might be perpetually stable. This could happen if surveillance, mind control, and other security technologies develop in such a way as to enable a singleton to effectively prevent the emergence of internal challenges’ (2006, p.54). Feminist epistemologies that influence critical posthumanist thought (Ferrando, 2019) that focus on ‘situated knowledges’ (Haraway, 1988) and multi-prespectival ethical stances, are overwhelmed in this fantasy of a single ethical viewpoint.

The potential for even relational compassion to lead to inhuman outcomes when a single viewpoint decides all can be highlighted by Pearce’s answer to a thought experiment. Offered a button that would destroy all sentient life immediately, Pearce (2019) claims he would press it in order to end suffering. It can be argued that such an action is inhuman, it is after all mass-murder on an unprecedented scale, and there is no voluntarism or agency here in any of the life forms that are permanently obliterated. Compassion can lead us to the conclusion that this is the right thing to do – but largely only when coupled with a quantifying mindset that calculates suffering to outweigh joy in sentient beings. This is where such radical technological capacities lead – a single totalitarian vision of what is right. Underpinning the decision to press such a button is a great deal of hubris, the sense that one single perspective should have the authority to speak for all of life. Compassion, when coupled with hubris and the related epistemological certainty integral to transhumanist thought, may not facilitate favourable outcomes. Even in a world of genuine relational compassion it is hard to imagine the tools that Pearce advocates yielding positive consequences. And in a world where relational compassion is utterly disregarded in favour of the interests of capital accumulation, it is entirely unimaginable.

The inhuman and totalitarian possibilities of the emergence of a radically potent singleton demands ethical contestation, which implies the need for human ethical reason to play a role in the processual unfolding of the techno-human condition. Of course, such a claim potentially puts humans back in the position of exceptionalist saviours (it is only us that can save us from ourselves! We are still special!). However, human reason in this context is defined by the acknowledgement of its limitations. It recognises that all human reason can only be theorised by humans *in conjunction* with increasingly potent tools and in the context of all their other relations. It recognises serious limitations to the human capacity to grapple

with complexity and thus rejects epistemological certainty and the idea that the future can be managed through instrumentalism and processes of risk and quantification. It rejects the hubris of centralising the human (and implicitly select groups of humans) rather than understanding the human as embedded and embodied within complex relations. It acknowledges the damage that can be wrought by extending instrumentalist capacities without parallel ethical commitments, such as pluralism and inclusiveness, which often collide with instrumentalist pursuits. It problematises its own reason, never seeking to universalise, always recognising the perspectival and situated nature of its evaluations. Thus, it is the employment of human ethical reason from a stance of humility and relational reckoning rather than hubris and domination or control.

Posthuman Ethics: The Virtual

Whilst critical posthumanism, with its underlying onto-episto-ethical stance of 'relational compassion', should, and usually does oppose the transhumanist ideology, Hayles recognises an important and valuable aspect of the discourse. That is, its understanding that,

> technology is involved in a spiralling dynamic of co-evolution with human development. This assumption, known as technogenesis, seems to me compelling and indeed virtually irrefutable, applying not only to contemporary humans but to Homo sapiens across the eons, shaping the species biologically, psychologically, socially and economically (2010, p.216).

A focus on compassionate relations, especially in the era of the Anthropocene may lead to the urge to turn away from our technogenetic co-evolution, repulsed by its devastating effects. However, Hayles quite rightly acknowledges that it demands deep reflection, and not denial or spurious rejection. Hayles too recognises that the dynamic is spiralling, echoing the oft-cited transhumanist claim of exponential growth. The transhumanist ideological commitment to the positive outcome of the co-evolution is dubious, and of course it inspires manifold fantastical and Utopian assertions, and sometimes ethically abhorrent positions. However, its core idea that technogenesis is speeding up, and that this process has profound implications, is both valid and vital.

An implication of the posthumanist understanding of our embeddedness within the dynamic heterarchy is that, just as we are bound in webs of intra-relation to all other entities, we are similarly linked to the past and the future. Barad states, 'the past and the future are enfolded participants in matter's iterative becoming' (2007, p.181). As 'subjects-in-process' we are always in intra-relation with what is to come. Braidotti uses the term 'the virtual' to refer to this posthumanist relation to the future. She explains,

> There is much to be gained by approaching the posthuman present along the parallel plateaus of the past and virtual, that is to say of what already is and what might become the case…approaching time as a multifaceted and multidirectional effect enables us to grasp what we are ceasing to be and what we are in the process of becoming. This double approach helps address the injustices and violence of our times and helps us organise to address them, while it also nurtures an inspiring perception of the actualisation of not yet accomplished virtual options (Braidotti, 2019, pp.64-5).

This opens up posthumanist ethics very explicitly to engaging with transhumanist aspirations, which it has indeed done (Hayles, 1999, 2011; Shaw, 2018; Ferrando, 2019). The virtual is not only about a posthumanist engagement with far futures, but also with 'deep time' which, as Herbechter explains, leads 'to a "geologization" of posthumanism, which provides an important antipode to the techno-utopian and techno-centered figure of the posthuman' (2022, pp.1-2). Such a perspective fosters post-anthropocentric thinking by foregrounding the fleeting nature of humanity's existence and bringing to mind 'preanthropy' – the universe before our existence and 'postanthropy' when we have long since disappeared (Herbrechter, 2022). It also enables an 'earthier focus': 'The proliferation of geostories, in the plural, highlights the fact that accounts of the anthropos in the Anthropocene are not consensual but conflictual' (Herbrechter, 2022, p.10). These also undermine the notion of the human as the eponymous hero of the Anthropocene, but rather, 'all kinds of materials – geologic, organic, and linguistic – get their say' (Herbrechter, 2022, p.11). Such geostories, draw attention to the hubris of 'black sky thinking' (Fuller & Lipinska, 2014), and call for sustainable strategies for an ongoing process, or 'to maintain our Earthling status in its various entanglements' (Bennett, 2012, p.245). Braidotti's (2019) quest to nurture 'not yet accomplished virtual options', and critical posthumanism's process-oriented underpinning exhibits an openness and a determination to continue seeking more compassionate systemic relations even as our embeddedness in contemporaneous instrumentalist systems ensures that the injustice and violence of our times persist for now.

The Virtue-al / Relational

Integral to the transhumanist imagination is the potential for increasing certain narrowly defined capacities of human individuals. Whereas transhumanists would define this as a definitively positive development and consider it an 'enhancement', critical posthumanists would take a more sanguine approach. Questions must be posed about the potential impact on all other relations within the dynamic heterarchy. Foregrounding the increased capacities as within the context of the individual alone loses sight of multiple relations and power structures that enable the process and may be affected by it. The 'scale-up problem' (Sarewitz, 2011) has emphasised that increasing the capacities of individuals offers no surety of the improved functioning of society. Whether transhumanist aims are focussed on individuals via morphological freedom or some spuriously univeralised notion of 'humanity', both fail to consider the relations to all other forms of being within the dynamic heterarchy. The notion of 'enhancement' becomes more contestable when the relational focus is applied. Increased instrumental capacities may simply imply greater levels of exploitation, extraction and dominance. Braidotti states, '"We-are-all-in-*this*-together" is the ethical formula par excellence and all the more so in a posthuman vital political economy of over-exposure and evanescence, exuberance and extinction' (Braidotti, 2019, p.168). If this is so, then the basis for enhancement must be understood as improving our capacity for compassionate relations. 'Ethical relations create possible worlds by mobilising resources that have been left untapped in the present, including our desires and imagination. They activate the virtual in the web or rhizome of interconnection with others' (Braidotti, 2019, p.166). Thus, the virtual is less about 'futurism' and more about future-rhizome (after Deleuze & Guattari). A similar sense of processual response-ability is present in Barard's claim that, 'The future is not the end point of a set of branching chain reactions; it is a cascade experiment' (2007, p.394). That is, it is less about projecting a hubristic, controlling and domineering sense of epistemological certainty into the future: the proclamation of fantastical possibilities as a justification for systemic violence; and more about an ongoing ethical engagement with the shifting sands of the dynamic heterarchy.

Levin's critique of transhumanist thought culminates in an advocation of Aristotle's virtue ethics which she contends contradicts the tenets of transhumanism. Whilst there are a variety of aspects of virtue ethics that are problematic especially when narrowly applied to

individuals, Levin (2021) identifies a focus on harmony and relationality that can be usefully applied to the Virtual-Relational conception of ethics. For Aristotle 'Everything is in harmony with reason' (in Levin, 2021) and as Levin explains,

> augmented rational ability is not a goal in its own right. Instead, our rational ability is meaningful and salutary only when actualized and instantiated in light of a rich, articulated notion of flourishing that is the ultimate telos, or "that for the sake of which" (hou heneka), of everything we humans do. Contra transhumanists, our rational capacity is untethered and potentially dangerous absent such a conception. Far from offering one, transhumanists treat its omission as a methodological strength (2021, p.71).

The notion of human flourishing (eudaimonia), here connected to a telos, carries a risk of perpetuating the exclusionary aspects of humanism. Jaime del Val potently frames humanism's human as 'a colonial, speciest, classist, sexist, racist, heteropatriarcal [sic], phallogocentric project of compulsory abledness' (2020, n.p.). Thus, the point of considering eudaimonia must not be to demand individual humans live up to a narrow notion of flourishing or else face expulsion from that fragile category of 'human'. Rather, applied reason, untethered from an ethical grounding, can only be instrumentalist, and thus increasingly destructive given its amoral stance.

Instrumentalism leads to a surfeit of unchecked power. Aristotle's Doctrine of the Mean holds that virtue lies in between the extremes of excess and deficiency. Levin argues,

> the moral mean is categorically different from the cut-and-dried arithmetical variety, ascertaining what conduct expresses that mean cannot be routinized but instead often requires fine-grained contextualization…[it] is a powerful, enduring illustration of the view that balance, or harmony, exists only in relationships where all salient dimensions are suitably aligned. In contrast, transhumanists would sever reason from other aspects of our mental functioning, lest they taint the superior factor (2021, p.72).

Thus, the telos of flourishing should not constitute an adherence to a universal collection of moral rules, but rather a contextually bound response to the unfolding of relations. Braidotti claims, 'Ethics is not just the application of moral protocols, norms and values, but rather the force that contributes to conditions of affirmative becoming' (2019, p.168). The critical posthumanist conceptualisation also calls for systemic analysis of complex cognitive ecologies (relational and inclusive analyses) rather than for the moral mean to be situated in liberally conceived human individuals. The techno-human condition, that ever deepening intra-relation of humans and technology, demands this is so. Reason, instrumental and ethical, is manifest throughout our relations and cannot be solely located in the human mind.

The virtual-relational ethic is a call for a situated, evolving attitude, but with a commitment to relational compassion as its guiding conception. As such, the values that transhumanism purports to embrace: pluralism, inclusivity and continuous questioning of knowledge are all positive values befitting a virtual-relational attitude. Yet, such values cannot be realised in the advanced capitalist context given its overriding instrumentalist logics. Instrumentalism can only lead to domination guided by the vain and spurious hope of totalising control. It is antithetical to ecological complexity and situated knowledges. Meanwhile, belief in ethical progress can have no transcendent grounding and is historically tainted by a legion of catastrophic endeavours. Nevertheless, without a commitment of an ethical stance toward technogenesis, there is no hope of progress.

Adorno's Aporia and Negativistic Ethics as a Basis For Progress

Progress is an intractable aspiration with a burdensome past. Reinhart Kosselleck (2002) argues that progress as a historical process is a distinctly modern notion linked to a changing conception of time. In particular, he cites Kant's understanding of the term as 'neatly and deftly [bringing] the manifold of scientific, technological, and industrial meanings of progress, and finally also those meanings involving social history and even the totality of history under one concept' (2002, p.229). Therefore, the dialectical, non-hierarchical notions of ethical and scientific rationality are unified. Furthermore, they are linked to a teleological account of history unfolding with an overarching trajectory of positive change in both the ethical and the technical sphere. Not only Kant, but Hegel and Marx can be seen to read history with such a teleological lens. However, such a view has rightly fallen out of favour from critical theory, difficult as it is to subscribe to in the face of the existential crisis of environmental degradation and other catastrophes that are related to our increasing technical capacities and current systemic structures.

Amy Allen states, 'For contemporary critical theory, progress is accordingly understood in contingent rather than necessary, disaggregated rather than total, and postmetaphysical rather than metaphysical terms' (2016, p.9). It is contingent insofar as it is not a determined natural certainty, and where it does occur it is a conditional, perhaps fortuitous and temporary event. Its disaggregated nature indicates that there are multiple manifestations of progress, for

example cultural, economic, technological and socio-political; progress in one area does not necessitate progress in others and indeed progress and regress can occur simultaneously. It is postmetaphysical in that 'the conception of the end toward which progress aims is understood in a deflationary, fallibilistic, and de-transcendentalized way' (Allen, 2016, p.9).

Transhumanist ideologies often fall foul of understanding progress in this way. There is often a distinctly teleological view that belies the contingency that should be recognised as inherent to the nature of progress. Acknowledgement of disaggregation is underplayed in order to focus on instrumental rationality and technical progress with a misguided assumption that ethical progress must follow, or that ethics are an irrational pursuit, that should be replaced by aims of instrumentalism. The displaced eschatological desires that transhumanists are prone to mitigate with a transcendental grand-narrative of humanity 'self-evolving' contains a metaphysical overtone, with echoes of the structure of Christian mythology. The metanarrative of progress as historical fact is a concept which Adorno claims is synonymous with an 'affirmative mentality' which 'is incapable of looking horror in the face and thereby perpetuates it' (2006, p.7). It is fundamentally imbued with an imperial, colonizing force: 'the language of progress and development is the language of oppression and domination' (Allen, 2016, p.3). Yet we require a notion of progress to have any hope of achieving it, and the notion must have a normative grounding, without which, as Feenberg has argued, instrumental rationality will always hold sway, meaning progress will remain synonymous with power, and thus oppression.

Adorno offers an important way of conceptualizing progress on which a normative basis for its definition can rest. Central to Adorno's concern is the realisation that any notion of progress is bound up with the potential for crimes being committed in its name, evident in the rise in fascism in Europe at the time of his writing (which also has unnerving echoes in the current conjuncture). This returns us to Adorno's conception of the central aporia or contradiction inherent to Enlightenment thinking: the entanglement of knowledge and power. Domination is a natural impact of rationality and rationalizing the resultant domination becomes an inherent part of Enlightenment thought. For Adorno, this is not just the case for the reified instrumental rationality of the technosystem. All knowledge including ethical reasoning contains the seeds and potential for barbarity. Horkheimer & Adorno are in no

doubt, that this is where Enlightenment thinking had led to in their lifetime: 'Enlightenment, understood in the widest sense as the advance of thought, has always aimed at liberating human beings from fear and installing them as masters. Yet the wholly enlightened earth is radiant with triumphant calamity' (Horkheimer & Adorno, 2002, p.1). This is because as Adorno states, reason, the organ of progress, 'does not contain two strata, one that dominates nature and one that conciliates it. Both strata share in all its aspects' (Adorno, 2006, p.157). Despite this he also recognises that without reason, there is no hope of progress. We are thus dependent on continuing our commitment to the path of Enlightenment:

> The aporia which faced us in our work thus proved to be the first matter we had to investigate: the self-destruction of enlightenment. We have no doubt—and herein lies our petitio principii—that freedom in society is inseparable from enlightenment thinking. We believe we have perceived with equal clarity, however, that the very concept of that thinking, no less than the concrete historical forms . . . with which it is intertwined, already contains the germ of the regression which is taking place everywhere today (Horkheimer & Adorno, 2002, p.xvi).

Adorno, alongside Horkheimer in *The Dialectic of Enlightenment*, therefore seek to 'prepare a positive concept of enlightenment which liberates it from its entanglement in blind domination' (2002, p.xviii). Central to this project is the recognition that progress is always bound up with regress and that both coexist simultaneously, highlighting the disaggregated nature of the term. What is required is that reason becomes self-aware by reflecting upon its own regressive moment. Therefore, as Adorno states in his *History and Freedom* lectures, Enlightenment must

> achieve through reflection on its own activity the consciousness that could lead it out of this web of delusion in a non-arbitrary manner…By using its own methods, philosophy would be enabled to understand the ways in which it is embroiled with forces that are in conflict with what it truly desires…[it] is faced with the challenge of transcending itself (2006, pp.169-70).

Reason then still has a very important function, but in order to achieve a 'doctrine of progress that has been brought to self-consciousness' (Adorno, 1981, p.153), at the heart of such thought must lie humility.

The perspectives that reason leads us to must problematise themselves, participate in active self-criticality and be radically open to alternative views. Allen states, 'Adorno and Foucault

encourage critical theorists to enter into intercultural dialogue with subaltern subjects without presuming that we already know what the outcome of that dialogue should be' (2016, p.202). For Adorno, the problem with this is that it leads to a difficult, even 'contradictory situation. We need to hold fast to moral norms, to self-criticism, to the question of right and wrong, and at the same time to a sense of the fallibility of the authority that has the confidence to undertake such self-criticism' (2000, p.169). An awareness of the fallibility of reason is thus an epistemological stance, but also a normative one. This is because respecting the other is integral to preventing reason from its calamitous potentiality. This is summarised by Adorno's 'heterodox and even heretical view…progress occurs where it comes to an end' (2006, p.153). Modesty, or perhaps more aptly humility, is vital to a just form of Enlightenment reason. Such a notion bolsters Feenberg's claim that 'The critique of hubris is the basis for an ethic and a politics of technology' (2017, p.1). The excessive self-certainty of hubris is built upon a lack of epistemological understanding, but hubristic aims also have ethical implications as both Adorno and Feenberg understand. Humility demands the uncovering of reason's genealogy and problemetisation of it (Allen, 2016). This chimes with Foucault's notion of 'freeing thought from what it silently thinks' (in Allen, 2016, p.205), or in Adorno's terms 'breaking the spell of what has come to be second nature for us' (in Allen, 2016, p.205). It is, however, a further aspect of Adorno's thought that is particularly useful as a normative guide to engaging with radical technologies with transhumanist potential.

Adorno's equivocation in determining a concrete ethical perspective is based on his recognition that any ethical position is contingent on its historical and social positioning. As he says, there is no 'standpoint removed by however tiny a distance from the circle of being' (1974, p.247). In other words, there is no inviolate level from which to view reality – a point transhumanists ignore repeatedly. Capitalism is particularly pernicious at providing the rationale for its own irrationality and as such the good cannot be glimpsed from within capitalist conditions, that is: 'Wrong life cannot be lived rightly' (Adorno, 1974, p.39). Additionally, were Adorno to advocate positive principles that are not context dependent they would not be sufficiently self-critical to answer the Enlightenment aporia central to his work. Most crucially of all, the certainty of such principles would contain within them inherent authoritarianism as they claim to be valid in all contexts and therefore deny the radical openness to other viewpoints required by Adorno's demand for modesty. Failure to supply such transcendent normative principles could leave him open to a charge of relativism.

However, Adorno understands that it is more appropriate to identify what is ethically wrong than to claim an objective foundation of normative values that transcend context. He explains,

> We may not know what absolute good is or the absolute norm, we may not even know what man is or the human or humanity—but what the inhuman is we know very well indeed. I would say that the place of moral philosophy today lies . . . in the concrete denunciation of the inhuman (2000, p.175).

Adorno's insight is built on what Fabian Freyenhagen calls 'a minimal and negativistic ethics' (2012, p.175) or what Brian O'Connor calls a 'negativistic theory of progress' (2005, p.186), that is 'the new categorical imperative' (1973, p.365) that there should be no repeat of Auschwitz. Adorno states:

> I believe that you should start by taking progress to mean this very simple thing: that it would be better if people had no cause to fear, if there were no impending catastrophe on the horizon—if you do this, it will not provide a timeless, absolute definition of progress, but it will give the idea a concrete form. For progress today really does mean simply the prevention and avoidance of total catastrophe (2006, p.143).

The prime target of this statement for Adorno is capitalism, the logics of which determine that 'nationalism, war, racism and even genocide are not accidental features of the modern world, but are engendered by the social and conceptual structures characteristic of it' (Freyenhagen, 2012, p.180). However, in the light of the potential implications of radical technologies arising in the context of advanced capitalism, which may give rise to genocidal outcomes as described in the previous chapter, this ethical imperative for the 'avoidance of total catastrophe' becomes all the more urgent and real.

Conclusion: Virtual Relational Anthropaporia

The notion of anthropaporia is intended to indicate three key ideas related to technogenesis. Firstly, it indicates an acceptance of the mutability of the human condition. Thus, this is not a bioconservative critique of transhumanism that depends upon and demands the protection of an essentialist human quality. 'Anthropos' here is an open prospect and is necessarily co-constituted by its manifold relations including technological ones. As an open prospect, it is not a universalist concept. Anthropos does not claim all 'humans' and expel all 'others'. It

understands there is no universal 'we', but only situated beings-in-process-and-relation. Secondly, the placing of the aporia alongside anthropos indicates that the trajectory and construction of any notion of anthropos is open to reasoned investigation and ethical critique. As per Adorno's claims, such reason must itself be subject to problematisation, an attempt to counteract the 'germ of regression' that exists in all acts of reason. Transhumanism, with its dogmatic and unnuanced insistence that enhancement technologies should be pursued and embraced, falls foul of this demand. Likewise, its conception of the human as a universal category containing an essentialised rationalism is misguided. Thirdly, the aporia recognises the inhuman as that which must be resisted. Building on Adorno's 'minimalist or negativistic ethics' it advocates a precautionary stance to technogenesis as a recognition of the capacity for inhuman acts to be undertaken in the name of enhancement and progress.

As Adorno recognizes, the Enlightenment project cannot be altogether abandoned. Absolutist critiques of humanism and Enlightenment rationality depend on definitions that limits their conceptualisation to their historical failings rather than their stated aims. One of the central tenets of humanism includes the affirmation of the dignity and worth of all people and 'a commitment to the search for truth and morality through human means in support of human interests' (cited in Wolfe, 2010, p.xi). An acknowledgement of our interdependence with non-human others should surely form part of human truth, morality and interests. Indeed, as conceived in the virtual-relational ethics advocated here, it is an integral underpinning to a conception of human flourishing. This does not contradict a humanist creed, though it can absolutely be found to oppose humanism as it has been most usually manifest. From this perspective, it could be said that posthumanism is a refining of humanist or Enlightenment values, indeed a demand for it to live up to its own principles more completely.

Furthermore, within posthumanism, there is a conception of the 'inhuman' which accords well with Adorno's minimalistic and negative ethics. The inhuman

> denounces the inhumane, unjust practices of our times. More specifically it stresses the violent and even murderous structure of contemporary geo- political and social relations, also known as 'necro-politics'. These include increasing economic polarization and the 'expulsion' of people from homes and homelands in an upsurge of global 'neo-colonial' power relations (Braidotti & Hlavajova, 2018, p.4).

Adorno may be considered a proto-posthumanist as convincingly argued by Hobden (2014). His insights, coupled with the explicit duality of ethical and instrumental reason, bolster posthumanism's countervailing narrative to advanced capitalist techno-triumphalism. Every

step of the development of radical technologies demands an equivalent ethical coevolution of our social world. The ethics cannot be based on universal claims but must recognise the entanglement of knowledge and power and thus the domination and barbarism that unchecked instrumental rationality implies. It must be focused therefore on redressing this process of domination that leads to inhuman outcomes. This should not be limited to the inhuman treatment of human 'others', but of nature at large emphasising a compassionate stance motivated by a recognition of intra-connectedness. Thus, anthropaporia as a notion builds on the ethical stance identified by the Virtual/Relational to complete the concept of Virtual Relational Anthropaporia. 'Human enhancement' should not be conceived of as the uplift of instrumental human capacities, but as a measure of our commitment towards and capacity for relational compassion. Thus, the meaning of 'human' is brought into question as well as the meaning of 'enhancement'. An ecological respect of multiplicity as opposed to a controlling unitary instrumental node (as per Bostrom's singleton) or path (as per More's extropia) is paramount.

Chapter 8: Conclusion

An Imminent Critique of Transhumanist Values in an Advanced Capitalist context

This thesis has sought to question the ethical implications of transhumanist aims coming into fruition in the context of advanced capitalism. It has been acknowledged that advanced capitalism is going through numerous crises and that there is no guarantee that transhumanist aims will be realised within this system. Furthermore, it has been acknowledged that transhumanism is not a clearly delineated set of aims but a broad church that can be generalised as a positive disposition to the re-engineering of the human condition through the application of technoscience. Many of the thinkers identified with the movement do not necessarily self-identify as transhumanists, and many who identify as transhumanists may well reject the thought of specific thinkers linked with the movement. Nevertheless, considering the co-constitution of transhumanism and advanced capitalism is highly productive. In part this is because advanced capitalist logics are so pervasive that they are often neglected (or implicitly assumed) in conceptualisations of our technogenetic development.

There are various ways of framing the transhumanist ideology from belief in radical progress, to the desire to expand rationalism into the cosmos. At its core though is the idea of 'human enhancement'. It is therefore fruitful to consider what transhumanism means by the terms 'human' and 'enhancement'. It has been established that the notion of the human in transhumanist discourse is largely descended from the Enlightenment and rational humanism. Indeed, it has been recognised as a philosophy of 'hyper-humanism'. As such, it puts human concerns and human aims at the centre of its outlook: it is fundamentally anthropocentric. Furthermore, it uncritically embraces the notion of a universalised human and thus carries over the discriminatory aspects of humanism whereby the human is associated with certain traits such as rationalism. Implicitly this creates a hierarchical notion of the human that expels or 'others' certain humans while further entitling privileged groups. Transhumanist faith in human reason constitutes a form of essentialism whereby the human is defined by its

singular capacity to employ rationality. This essentialism separates and venerates the human, underwriting its anthropocentric presumptions. It also makes of rationalism itself an almost deified quality. It is this quality which enables a faith in the tractability of existence to human knowledge and understanding. Such faith denies limitations inherent to the human condition as well as underpinning its certainty that human aims are realisable and will not be derailed by unintended consequences. This can be framed as epistemological certainty. Transhumanists' employment of a reductive information frame derived from cybernetics secures this conviction by conceiving of reality as a code which can be read and edited. Thus, the human in transhumanist discourse is a tractable information processing machine, separable from and superior to the rest of nature which surrounds it. It is special on account of its reason, but that reason through self-application can make the human not just special, but supreme.

This potential underpins the notion of and justification for enhancement. Whilst some transhumanists, such as Bostrom, Kurzweil and Fuller offer specific outlandish visions of posthuman lives, enhancement is usually framed as a matter of choice for each individual. As such transhumanists offer no cohesive notion of what enhancement is but rather view it through the lens of increased capacities in certain distinct, instrumental and measurable attributes that may be disseminated through market structures. Age, IQ, strength, dexterity and speed are obvious examples. Largely, 'enhancement' framed in this way is not only uncontested, but incontestable. Broken down into abstracted, decontextualised, individualised capacities and additionally proffered as something one can adopt or reject, transhumanist enhancement avoids rigorous, contextual, ethical interrogation. But depending on how the human is conceived, the question of what constitutes enhancement will change. If the human is conceived of as a latent God, then increased instrumental capacities are its prerogative. If it is conceived of as a consumer, again this is so (if it can afford them), and with the implicit assumption one is responsible for one's own capacities, an entrepreneurship of the self. But if the human is an animal embedded in complex relations with other species and nature at large, then 'enhancement' is contingent on the health and sustainability of its relations. If the human is conceived of as an environmental threat, then enhancement is surely that which limits its instrumental power or otherwise redirects its exploitative lifeways. Transhumanists' notion of the human bleeds into its conception of enhancement and thus advocates an entitled, instrumentalist, exploitative, colonial, unaccountable, unrepentant technogenetic trajectory.

It would be valid to ask to what extent transhumanism is simply a manifestation or outgrowth of advanced capitalist relations. The current techno-human condition is fundamentally defined by such relations, and undoubtedly much transhumanist discourse assumes capitalist logics. Much of it explicitly advocates these relations or their extension in the case of the free market libertarian roots of Extropianism. However, it should be noted there are some dissenting transhumanist voices. Technoprogressives often acknowledge that the development of radically potent technologies demands a recalibration of our social relations, especially if they are to be inclusive. Despite this, at the very least, transhumanism is a useful narrative for advanced capitalism. As advanced capitalism puts speculation at the core of production, transhumanism offers a story of epic future returns. Furthermore, as has been highlighted throughout the thesis, numerous characteristics of transhumanism echo the logics of advanced capitalism. Their manifold similarities seem to exacerbate the excesses of the other. The interpellation of the rational individual as the central protagonist of each is one factor. At the same time both systems objectify the individual, reconstituting the individual into various constituent parts, whether that be neurons and synapses, genetic code or behavioural data markers. The human thus becomes tractable to the aims of capital or science, and most usually the amalgamation of the two. Whilst transhumanism and advanced capitalism are curiously unspecific about ethical ends, both depend on notions of growth, increased efficiency and progress.

Perhaps most notable is their affinity for *instrumental* progress. Both envisage 'progress' as necessary and desirable, and conceptualise techno-scientific progress as an effective guarantor of overall progress. Whilst capitalists may endeavour to attribute certain fundamental values with capitalism (most usually, 'freedom'), it has been revealed to be generally disinterested in specific human values. Rather the assumption is that enabling and facilitating capital accumulation will bring about net benefits to humanity by increasing wealth. Values are effectively outsourced to the 'free' individuals of capitalist society and assumed to scale-up to a desirable totality. Transhumanism undertakes a similar calculation employing equivalent assumptions. Again, the individual (via morphological freedom) is responsible for the specific enhancements they select or consume, and this is assumed to scale-up once more to a desirable overall state. However, transhumanists have afforded themselves more scope to proffer specific values as fundamental to its aims, perhaps as their

project is speculative as opposed to a manifest reality of everyday existence. The thesis has not questioned nor critiqued these stated values themselves (inclusivity, plurality and the continuous questioning of knowledge), but rather probed whether such values are likely to emerge from our co-evolution with radical technological developments in the context of advanced capitalism. In so doing, it functions as an imminent critique of transhumanism and it has been argued that none of these values are realisable in this context and that advanced capitalist logics and transhumanist discourse inhibit their potential emergence due to the instrumentalism inherent to techno-capitalist relations.

The continuous questioning of knowledge is undermined by the instrumentalist relationship characteristic of modern technics. This instrumentalism constitutes a reifying ontology whereby the world inclusive of human beings becomes standing reserve: objects ready for exploitation. Transhumanists and capitalists delight in the potential of Big Data as a source of new knowledge. For transhumanists data promises to restrict complexity to a tractable level, thereby facilitating epistemological certainty and the promise of total control. It functions as a manifestation of the promises of cybernetics that through emphasising the import of information over embodiment, life could be understood as code. Capitalists too share the desire for control in the context of surveillance capitalism to predict and manipulate consumers for profit maximisation. This desire for control leads to an actualising project where data is not just heuristically extracted from the world for the purpose of developing new knowledge products, but the world is reconstituted in ways that make it more accessible to datafication. Both surveillance capitalism and transhumanist dataism are totalitarian projects that attempt to render everything quantifiable, predictable and manipulable. Thus, while turning rich intra-related complexity into instrumentalisable data points constitutes a heuristic interpretation of reality that involves an erasure of meaning (Hayles' Platonic forehand) it also encourages a further reconstruction of the world as more amenable to prediction and control.

This attempt at totality is futile as new forms of emergent complexity are unleashed by the technologies that enable surveillance capitalism which constitute a novel complex media ecology. This undermines pretentions of control as social uncertainty is catalysed by this new meta infrastructure of immense technical complexity, matched with novel techniques of

manipulation and all expressed through the complex patchwork of multiple actors vying for influence. Nevertheless, Data Totalitarianism conceptualises the way both transhumanism and capitalism push outwards towards totality. For capitalism this is primarily driven by the fundamental need for permanent growth. Frontiers are sought for new forms of cheap nature. Surveillance capitalism provides a new frontier of human behaviour abstracted through Big Data and potent algorithms into knowledge products. For transhumanism, the desire for control ultimately constitutes an urge to escape all limitations and this must include its relations with its environment as these relations constrain possibilities. Datafication promises the flattening of complex relations to tractable information, but totality is required for epistemological certainty.

With regards to pluralism, it has been argued that transhumanist discourse exaggerates the agency of both individual humans and that of an imagined, universalised humanity. By ignoring systemic relations and the complex ways in which humans share agency with other non-conscious cognizers and material actors, transhumanists fail to recognise how the logics of capitalism function to structure subjectivity, delimit human possibilities and direct technological developments. Transhumanists underplay the extent to which ongoing technogenesis is directed by the competitive and instrumentalist fitness landscape of advanced capitalist competition and competitive nation states. The concept of Transcendent Conformity indicates the demand to enhance oneself according to the systemic dynamics of capitalist competition. The conformity also applies to states which propel technological innovation in the field of warfare due to the context of the competitive arena of international politics.

Finally, inclusivity as a value is severely undermined by the expulsions and concentrations that are endemic to advanced capitalist relations. Radical technological development threatens to exacerbate these inequities to potentially extreme levels. The possibility of mass automation unemployment, combined with the powers potentiated by radical technological development could result in Harari's fated 'Gods and the useless' scenario. Transhumanist discourse tends to intensify the fragility of disenfranchised humans in a competitive fitness landscape. The hierarchical conceptualisation implicit in notions of enhancement characterises most humans as suboptimal and potentially worthless. While Fuller speaks of

necronomics (economics of death) and the expulsion of people from the 'republic of humanity', Savulescu advocates extensive surveillance and compulsory moral enhancement. Bostrum's utilitarian calculations render most humans utterly expendable as long as the project of space colonisation remains on course. Such conceptions coupled with the logics of inequality inherent to advanced capitalism and radicalised by technogenesis constitute a systemic dehumanisation: a complex unfolding that threatens to devalue human life to a state of desperate precarity. Combined with the potential ubiquity of radically potent weapons, this potentiates the spectre of genocide as an outcome of transhumanist developments.

Postanthropocentricism in the context of hyper-technocapitalism

It must be acknowledged that much of this thesis has been dedicated to concern for humans in the context of technogenetic developments under advanced capitalist logics. As such, it could be seen as an anthropocentric critique of transhumanism. It even invokes a new and contingent conception of 'anthropos', albeit problematised by its adjacent 'aporia'. Any invocation of anthropos as a demarcated and collectivist entity potentially risks creating new forms of essentialism and universalism that could animate new discriminations echoing those of the humanist past. Nevertheless, the theoretical grounding this thesis has drawn upon most often throughout is that of critical posthumanism, which also underpins my framework for a future oriented ethics. The argument thus risks the flaw Claire Colebrook identifies in Anthropocene discourse when she states,

> precisely when we ought to be confronted with "civilization" as a trajectory of wreckage, we become all too focused on surviving. Far from recognizing the ways in which desires, intentions and an epoch of humanism, enlightenment and globalism have destroyed their own conditions of emergence, the overwhelming response has been an insistence on hope for the future (whether by way of politics or geo-engineering) (2016, pp.114-5).

Colebrook's invocation of politics and geo-engineering reiterates the two forms of human reason – the instrumentalism of science and technology, and the ethical contestations of politics. It discredits both as forms of salvation or progress. However, in the face of the inhuman potentialities of technogenesis, not to invoke an alternative ethical stance or consider how we could reimagine the systemic relations of advanced capitalism would be a

capitulation to the process. Versions of Accelerationism (explored in chapter 3) offer a post-anthropocentric celebration of the dethroning of the human and its replacement with hyper-technocapitalist relations of modernity. This seems to be the de facto trajectory if we reject ethical and political interventions that aim to create hope for the future. It is claimed here that the inhuman spectre inherent in humanist, rational essentialist discourse, which is taken to extraordinary levels of hubris by transhumanists and bolstered by the radical ethical indifference of advanced capitalism, needs direct contestation.

The 'human' category has been a constant source of oppression by 'othering' those outside it. However, escaping anthropos in an advanced capitalist context may be problematic. Where humanity is subordinate to the interests of profit-driven, automated extraction, post-anthropocentricism of this kind has already gone too far. Categories can be exclusionary and thus oppressive, but they can also be necessary for resistance and survival. Whilst notions of 'human rights' can be problematised for implicitly denying rights to non-human beings, in the context of the genocidal potentialities of technogenesis, such rights may be vital. Post-anthropocentricism can be co-opted as a strategy for exclusion rather than an ethic of relational compassion. Fuller's post-organicist necropolitics is an exemplar of this. The post-centralizing aspect of posthumanism can exacerbate this problem by functioning as a flattening of meaning and values. For example, when posthumanism 'challenges biocentrism, sentiocentrism, vitalism, and the concept of life itself, blurring the boundaries between the animate and the inanimate, in a quantum approach to the physics of existence' (Ferrando, 2019, p.5) there is a risk that by undermining the integrity and importance of sentience, life and animism, it is hard to establish an ethical bedrock from which to counter inhuman aims. Universalizing, reifying forms of exceptionalism can come out of these 'centricisms', but a flattening of all values provides no ground for ethical contention.

Virtual Relational Anthropaporia thus draws upon critical posthumanist ethics whilst simultaneously appealing to the problematic project of Enlightenment. It recognises the necessity for drawing upon reason, and calls for a realignment of ethical reason to reign in the dominant force of instrumentalism that characterises modernity. This force becomes more potent through the amorphous fog of postdigital society. Virtual Relational Anthropaporia problematises the notion of the 'human', regarding humanity as open, relational, pluralistic

and does not aim to assert a universalised conception of what the human is. Nevertheless, it proposes a contingent version of humanity that is primarily directed by an ethic of relational compassion and seeks to bring about a fitness landscape that enables such an ethic to flourish. Such aims recognise our embeddedness in complex relations that belie any hope of tractability. Thus, humility and precaution counter the hubristic and proactionary stance of transhumanism. For an ethics to be relationally compassionate, it must be creative and active, it must be a force that can challenge oppression as well as naming it. Such a force must risk some of the weaknesses of the humanist paradigm, albeit by recognising, naming and problematising the dangers inherent to its own construction – the aporia at the core of all reason. Transhumanism is a useful material discursive practice insofar as it brings into view the extraordinary technogenetic possibilities on the near horizon. The powers it promises, however, are the very thing which demand of us a radical rethink of what it means to be human. The human inherent to transhumanist discourse is unfit to cohabit a world of such power, and the hyper-human it aspires to is more dreadfully ill-suited still. If the atom bomb is 'the dark watery reflection' (McBrien, 2016, p.124) of capitalism, then transhumanism is its narcissistic, egomaniacal outgrowth.

References

Acemoglu, D. & Restrepo, P., (2017) "Robots and Jobs, Evidence from US Labour Markets" in *National Bureau of Economic Research,* Available at: https://www.nber.org/papers/w23285 (Accessed 3 January, 2020)

Adorno, T.W., (2004 [1966]) *Negative Dialectics,* London: Routledge

Adorno, T.W., (2005 [1974]) *Minima Moralia: Reflections from Damaged Life*, London: Verso

Adorno, T.W., (1981) *Prisms,* Cambridge: MIT Press

Adorno, T.W., (2000) *Problems of Moral Philosophy,* Cambridge: Polity Press

Adorno, T.W., (2006) *History and Freedom: Lectures 1964-1965,* Cambridge: Polity

Agamben, G. (1998) *Homo Sacer*, California: Stanford University Press

Alexander, B., (2003) *Rapture,* New York: Basic Books

Albritton, R. Jessop, B. & Westra, R., (eds.) (2010) *Political Economy and Global Capitalism,* New York: Anthem

Alcaraz, A., (2019), *Cyborg Persons or Selves*, Szczecin: Wydziale Malarstwa

Allen, A., (2016) *The End of Progress,* New York: Columbia University Press

Allenby, B.R., (2017) "The Age of Weaponised Narrative" in *Issues in Science and Technology,* Summer 2017, pp.65-70

Allenby, B.R., (2019a) "Information Technology and the Fall of the American Republic", in 59 Jurimetrics J., pp.409-38

Allenby, B.R., (2019b) "5G, AI, and big data: We're building a new cognitive infrastructure and don't even know it" in *Bulletin of the Academic Sciences*, available at: https://thebulletin.org/2019/12/5g-ai-and-big-data-were-building-a-new-cognitive-infrastructure-and-dont-even-know-it/ (accessed 23rd April, 2022)

Allenby B.R., & Garreau, J., (eds.) (2017) *Weaponised Narrative: The New Battlespace*, Washington DC: Center of the Future of War

Allenby, B.R., & Sarewitz D., (2011) *The Techno-Human Condition*, Cambridge: MIT Press

Anderson (2008), “The End of Theory: The Data Deluge Makes the Scientific Method Obsolete” in *Wired*, available at: https://www.wired.com/2008/06/pb-theory/ (Accessed 20th August, 2020)

Amable, B., (2004) *The Diversity of Modern Capitalism,* New York: OUP

Andrejevic, M., (2015) “The Droning of Experience” in *The Fibreculture Journal: internet theory criticism research*, vol.2015, no.25, pp.202-216.

Angus, I. (1984) *Technique and Enlightenment: Limits of Instrumental Reason,* Lanham, MD: University Press of America

Arendt, H., (1973) *The Origins of Totalitarianism,* Wilmington: Mariner Books

Armellini, M., & Pike, T., (2017) *Should economists be more concerned about Artificial Intelligence?***,** Available at:

https://bankunderground.co.uk/2017/03/01/should-economists-be-more-concerned-about-artificial-intelligence/ (Accessed 13th May, 2018)

Arrighi, G., (1994) *The Long Twentieth Century: Money, Power, and the Origins of Our Times,* London: Verso

Bacon, F. (1996 [1626]) “New Atlantis” in Vickers, B., (ed.) *Francis Bacon: A Critical Edition of the Major Works*, Oxford: OUP

Badmington, N., (ed.) (2000) *Posthumanism*, Hampshire: Palgrave Macmillan

Barad, K., (2003) “Posthumanist Performativity: Towards an Understanding of How Matter Comes to Matter” in *Signs: Journal of Women in Culture and Society*, Vol.28, No.3, The University of Chicago, pp. 801-31

Barad, K., (2007) *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning,* Durham: Duke University Press

Bastani, A., (2019) *Fully Automated Luxury Communism*, London: Verso

Baudrillard, J., (1994) *Simulacra and Simulation*, Michigan: Michigan University Press

Behrent, M.C., (2013) “Foucault and Technology” in *History and Technology: An International Journal,* 09 May 2013, pp.54-104

Beller, J., (2012) “Wagers Within the Image: Rise of Visuality, Transformation of Labour, Aesthetic Regimes” in *Culture Machine 13*, available at http://www.culturemachine.net/index.php/cm/article/viewDownloadInterstitial/46 6/485.

Bennett, J., (2010) *Vibrant Matter: A Political Ecology of Things*, Durham: Duke University Press

Bennett, J., (2012) “Earthling Now and Forever” in Ellsworth, E., & Cruse, J., (eds.) *Making the Geologic Now,* New York: Punctum Books

Berg, A., Buffie, E., & Zanna, L., (2016) ‘Robots, Growth and Inequality’*,* in *Finance and Development,* September, 2016*,* pp.10-13 Available at: https://www.imf.org/external/pubs/ft/fandd/2016/09/pdf/berg.pdf

Bernal, J.D., (1969, [1929]) *The World, the Flesh & the Devil*, Bloomington: Indiana University Press

Best, S. & Kellner, D., (1991) *Postmodern Theory,* Hampshire: MacMillan

Best, S. & Kellner, D., (2001) *The Postmodern Adventure: Science, Technology and Cultural Studies at the Third Millennium,* New York: Guilford Press

Bernstein, A. (2019) *The Future of Immortality,* New Jersey: Princeton University Press

BMJ, (2017) “Effects of health and social care spending constraints on mortality in England: a time trend analysis”, available at: https://bmjopen. bmj. com/ content/7/11/e017722 (Accessed 24th April 2019)

Boden, M., (2006) *Mind As Machine: A History of Cognitive Science Vols I&2, Oxford: OUP*

Bowles, P., (2007) *Capitalism,* Harlow: Pearson

Bostrom, N., (2002) “Existential Risks” in *Journal of Evolution and Technology*, 9 (1)

Bostrom, N., (2003) “Astronomical Waste: The Opportunity Cost of Delayed Technological Development”, in *Utilitas,* 15 (3), pp.308-314

Bostrom, N., (2005) “A history of transhumanist thought”, *Journal of Evolution and Technology*, Vol. 14 No. 1, pp.1-25.

Bostrom, N., (2006) “What is a Singleton” in *Linguistic and Philosophical Investigations*, 5 (2), pp.48-54

Bostrom, N., (2008a) “Why I want to be Posthuman When I Grow Up” in Bert Gordijn, B., & Chadwick R., (eds.), *Medical Enhancement and Posthumanity*, pp.107-137

Bostrom, N., (2008b) “Letter from Utopia” in *Studies in Ethics, Law, and Technology* (2008): Vol. 2, No. 1: pp. 1-7

Bostrom, N., (2012) “Existential Risk as a Global Priority”, in *Global Policy,* 4 (1), pp.15-31

Bostrom, N., (2014) *Superintelligence*, Oxford: OUP

Bostrom, N., (2019) “The Vulnerable World Hypothesis” in *Global Policy*, Vol.10, Issue 4, pp.455-476

Bousquet, A., & Curtis, S., (2011) p.59 “Beyond models and metaphors: complexity theory, systems thinking and international relations” in *Cambridge Review of International Affairs*, 24 (1), pp.43-62

Boyd D., & Crawford, K., (2012) “Critical Questions for Big Data” in *Information, Communication & Society*, 15:5, pp.662-679

Box, G.E.P., (1976) (1976), “Science and Statistics” in *Journal of the American Statistical Association*, 71 (356): pp.791–799

Bour, S., “On Max More’s Extropianism” in Jorion, P., (ed.) (2022) *Humanism and Its Discontents*, Cham: Palgrave Macmillan

Braidotti, R., (2006) *Transpositions: On Nomadic Ethics*, Cambridge: Polity Press

Braidotti, R., (2013) *Posthuman*, Cambridge: Polity Press

Braidotti, R., (2018) “Posthuman Critical Theory” in Braidotti, R., & Hlavajova, M., (eds) (2018) *Posthuman Glossary,* London: Bloomsbury

Braidotti, R., (2019) *Posthuman Knowledge*, Cambridge: Polity Press

Braidotti, R., (2021) *Posthuman Feminism*, Cambridge: Polity Press

Braidotti, R., & Hlavajova, M., (eds) (2018) *Posthuman Glossary,* London: Bloomsbury

Brassier, R., (2014) “Prometheanism and its Critics” in in Mackay, R., & Avanessian, A., (eds.) *Accelerate*, Falmouth: Urbanomic

Brenner, R. (1998) ‘The Economics of Global Turbulence: A Special Report on the World Economy, 1950-98’ in *New Left Review,* 229

Bridle, J., (2018) *New Dark Age,* London: Verso

Brin, D., (1999) The *Transparent Society,* New York: Basic Books

Brynjolfsson, E. & McAffe, A. (2014) *The Second Machine Age*, New York: WW Norton & Co

Bunge, M., (1979), *Ontology II: A World of Systems*. Dordrecht: Reidel

Byrne, D., (1998) *Complexity Theory and the Social Sciences*, London: Routledge

Capra, F., (1996) *The Web of Life*, New York: Anchor

Capra, F. & Luisi, P.L. (2014) *The Systems View of Life: A Unifying Vision,* Cambridge: Cambridge University Press

Carr, N., (2015) *The Glass Cage,* London: The Bodley Head

Carrico, D., (2007) *Amor Mundi and Technoprogressive Advocacy*, available at: https://amormundi.blogspot.com/2007/11/amor-mundi-and-technoprogressive.html (Accessed 29th June, 2021)

Carrico, D., (2013) "Futurological Discourses and Posthuman Terrains" in *Existenz*, Volume 8, No 2, Fall 2013

Castells, M., (1999) The Information Age: Economy, Society and Culture; Vols. I, II & III, Oxford: Blackwell

Chace, Calum (2016) *The Economic Singularity,* London: 3Cs

Chandler, D. (2015) 'A World without Causation: Big Data and the Coming of Age of Posthumanism' in *Journal of International Studies*, May, 2015, pp.833-851

Cheney-Lippold, J. (2017), *We Are Data*, New York: New York University Press

Chiew F., (2015) 'The paradox of self-reference: Sociological reflections in agency and intervention in the Anthropocene' in *Animals in the Anthropocene: Critical Perspectives on Non-Human Futures,* edited by Human Animal Research Network Editorial Collective, 1-18. Sydney: Sydney University Press

Chivian, E., & Bernstein, A., (2008) *Sustaining Life*, Oxford: OUP

Climate Analytics (2015) *Global warming reaches 1°C above preindustrial, warmest in more than 11,000 years,* Available at: https://climateanalytics.org/briefings/global-warming-reaches-1c-above-preindustrial-warmest-in-more-than-11000-years/ (Accessed, 20th March 2019)

Clough, P.T., & Willse, C., (eds.) (2011) *Beyond Biopolitics*, London: Duke University Press

Coenen, C., (2014) "Transhumanism and its Genesis: The Shaping of Human Enhancement Discourse by Visions of the Future" in *Humana Mente Journal*, Vol.26, pp.35-58

Coenen, C., (2021) "Transcending Natural Limitations: The Military–Industrial Complex and the Transhumanist Temptation" in Hofkirchner, W., & Kreowski, H-J., *Transhumanism: The Proper Guide to a Posthuman Condition or a Dangerous Idea?* Cham: Springer

Colebrook, C., (2016) "What Is the Anthro-Political" in Cohen, Colebrook & Miller (eds.) *Twilight of the Anthropocene Idols,* London: Open Humanities Press

Condorcet, M.d., (1979 [1795]), *Sketch for a Historical Picture of the Progress of the Human Mind*, Westport: Greenwood Press

Cooper, M., (2008) *Life As Surplus*, Seattle: University of Washington Press

Connaughton , J., (2013) *The Payoff: Why Wall Street Always Wins*, Westport: Prospecta Press

Couldry, N. and Mejias, U., (2018) "Data colonialism: rethinking big data's relation to the contemporary subject" in *Television and New Media*.

Couldry, N. & Mejias, U. (2019), *The Costs of Connection: How Data is Colonizing Human Life and Appropriating It for Capitalism,* Palo Alto: Stanford University Press

Crouch, C., & Steeck, W., (1997) *Political Economy of Modern Capitalism,* London: Sage

Crouch, C. (2011), *The Strange Non-Death of Neoliberalism,* London: Polity

Crutzen, P. & Stoermer, E (2000) 'The Anthropocene' in *IGBT Newsletter* 41, p.17-18

Cudworth, E., & Hobden S., (2011) *Posthuman International Relations,* London: Zed Books

Cudworth, E. & Hobden, S., (2013) "Of Parts and Wholes: International Relations beyond the Human" in *Millenium Journal of International Studies*, 41 (3), pp.430-450

Cudworth, E. & Hobden, S., (2017) *The Emancipatory Project of Posthumanism,* Oxon: Routledge

Cukier, K. & Mayer-Schoenberger, V. (2013) "The Rise of Big Data: How It's Changing the Way We Think About the World" in *Foreign Affairs*, Vol.92, No.3, pp. 28-40

Damasio, A., (2000) *The Feeling of What Happens: Body and Emotion in the*

Making of Consciousness, New York: Mariner Books

Damasio, A., (2005 [1995]) *Descartes' Error: Emotion, Reason, and the Human Brain*, New York: Penguin

Damasio, A., (2012) *Self Comes to Mind: Constructing the Conscious Brain*, New York:

Vintage Books.

Darwin, C. (2009 [1859]), *The Origin of the Species*, London: Penguin

Deleuze, G., (1992) "Postscript on the Societies of Control" in *October*, vol. 59, pp. 3–7.

Deleuze, G and Guattari, E (2004a) *Anti-Oedipus*, trans. R. Hurley, M. Seem and H. R. Lane, London and New York: Continuum.

Deleuze, G and Guattari, E (2004b) *A Thousand Plateaus*, trans. Brian Massumi, London and New York: Continuum.

Del Val, J. (2018) *Algormithmic Government: The Problem is the Technology,* Available at: https://metabody.eu/algorithmic-government-the-problem-is-the-technology/ (Accessed 17 October, 2021)

Del Val, J., (2020), *Metahumanist Manifesto: its genealogy, evolution and relevance 10 years after*, available at: https://metabody.eu/wp-content/uploads/2020/07/METAHUMANIST-MANIFESTO-INTRODUCTION-Jaime-del-Val-1-1-1-final-web.pdf (Accessed 20th August, 2020)

Del Val, J., & Sorgner, S., (2010), *A Metahumanist Manifesto,* Available at: http://www.reverso.org/texts/DelVal-2010-Metahumanist-manifesto--Metabody-Journal.pdf

Diamandis, P., & Kotler, S., (2015) *Abundance: The Future Is Better Than You Think,* New York: Free Press

Doede, B. (2009) 'Transhumanism, Technology, and the Future: Posthumanity Emerging or Sub-Humanity Descending?', in *Appraisal*, 7 (3), pp.39-54

Dorling, D., (2014), *Inequality and the 1%,* London: Verso

Doudna, J.A., & Sternberg, S.H., (2017) *A Crack In Creation*, Boston: Houghton Mifflin Harcourt

Drexler, K. E., (1986: 1998) *Engines of Creation: The Coming Era of Nanotechnology,* New York: Doubleday

Drexler, K. E., (2013) *Radical Abundance: How a Revolution in Nanotechnology Will*

Change Civilization, New York: Pubic Affairs

Drexler, K.E., & Smalley, R., (1993) "Nanotechnology: Drexler and Smalley make the case for and against 'molecular assemblers" in *Chemical & Engineering News*, 81(48) pp.37-42

Dupuy, J-P., (2007) "Some Pitfalls in the Philosophical Foundations of Nanoethics" in *Journal of Medicine and Philosophy*, 32, pp.237-261

Dupuy, J-P., (2009) *On The Origins of Cognitive Science,* Cambridge: MIT University Press

Dupuy, J-P., (2010) "Cybernetics Is Antihumanism: Advanced Technologies and the Rebellion Against the Human Condition" in Hansell, G.R., & Grassie, W., (2010) *Transhumanism and Its Critics*, Philadelphia: Metanexus

Ellul, J., (1964) *The Technological Society,* New York: Vintage

Esfandiary F.M. (1970) *Optimism One,* New York: Norton

Esfandiary F.M. (1973) *Upwingers: A Futurist Manifesto,* New York: John Day Co.

Esfandiary F.M. (2000) *FM2030*, Available at: https://www.npr.org/2000/07/11/1076532/fm-2030

Federov, N., (1990) *What Was Man Created For?* Lausanne: L'Age d'Homme

Feenberg, A. (2017) *Technosystem,* Cambridge, MA: Harvard University Press

Fein, H., (1993) *Genocide: A Sociological Perspective,* London: Sage

Ferrando, F., (2013) *Posthumanism, Transhumanism, Antihumanism, Metahumanism, and New Materialisms* in 'Existenz', Volume 8, No 2, Fall 2013, available at: https://existenz.us/volumes/Vol.8-2Ferrando.pdf (Accessed 24th April, 2019)

Ferrando, F. (2019), *Philosophical Posthumanism*, London: Bloomsbury.

Feynman, R., (1959) "There Is Plenty of Room at the Bottom" in *Engineering and Science*, 23 (5). pp.22-36

Fisher, M., (2009) *Capitalist Realism,* New York: Zero Books

Foucault, M. (1982) 'The Subject and Power' in *Critical Inquiry*, Vol. 8, No. 4 (Summer, 1982), pp. 777-795

Foucault, M. (1988) "Technologies of the self" in Gutman, L.M.H., & Hutton P. (eds.)

Technologies of the Self, London: Tavistock

Foucault, M. (1990) The History of Sexuality, An Introduction, vol. 1. Harmondsworth: Penguin.

Foucault, M., (1995) *Discipline and Punish,* New York: Vintage

Foucault, M. (2002 [1966]) *The Order of Things: An Archaeology of the Human Science*, London: Routledge.

Foucault, M., (2003) *Society Must Be Defended. Lectures at the Collège de France 1975–1976*, New York: Picador

Foucault, M., (2007 [1978]) *Security, Territory, Population,* New York: Palgrave

Ford, M., (2015) *The Rise of the Robots - Technology and the Threat of Mass Unemployment,* London: Oneworld Publications

Frase, P., (2016) *Four Futures: Life After Capitalism,* London: Verso

Freitas, R.A., (1999) *Nanomedicine, Vol I,* Austin: Landes Biosciences

Freitas, R.A., (2003) *Nanomedicine, Vol II,* Austin: Landes Biosciences

Freitas, R.A., & Merkle, R., (2004) *Kinematic Self Replicating Machines,* Austin: Landes Bioscience

Frey, C.B. & Osbourne, M. (2013) *The Future of Employment: How susceptible are jobs to computerisation?* Available at: http://www.oxfordmartin.ox.ac.uk/publications/view/1314 (Accessed 31st March, 2015)

Freyenhagen, F., (2012) 'Adorno's Critique of Late Capitalism: Negative, Explanatory and Practical' in de Boer, K. & Sonderegger, R., (2012) *Conceptions of Critique in Modern and Contemporary Philosophy,* Basingstoke: Palgrave Macmillan

Fukuyama, F., (1992) *The End of Hstory and The Last Man,* New York: Free Press

Fukuyama, F., (2002) *Our Posthuman Future*, New York: Farrar, Straus and Giroux

Fukuyama, F., (2004) "Transhumanism: The World's Most Dangerous Idea" in *Foreign Policy* 144, pp.42-43.

Fuller, S. (2010) *Humanity 2.0 What It Means to be Human, Past, Present and Future,* Basingstoke: Palgrave Macmillan

Fuller, S. (2012) *Preparing for Life in Humanity 2.0,* Basingstoke: Palgrave Macmillan

Fuller, S. & Lipinska, V. (2014) *The Proactionary Imperative, A Foundation for*

Transhumanism, Basingstoke: Palgrave Macmillan

Fuller, S., (2019) *Nietzschean Meditations*, Basel: Schwabe

Gane, N., & Haraway, D. (2006): "When We Have Never Been Human, What Is to Be Done? Interview with Donna Haraway" in: *Theory, Culture & Society,* 23(7-8), pp.135-158.

Garreau, J. (2005) *Radical Evolution,* New York: Broadway Books

Gergen, K. J., (2009) *Relational being: Beyond self and community*, Oxford: Oxford University Press

Gilbert, J., (2015) *'Neoliberalism' and 'Capitalism' – what's the difference?,* available at: https://jeremygilbertwriting.wordpress.com/2015/07/14/neoliberalism-and-capitalism-whats-the-difference/ (accessed 15th June, 2020)

Goetzel, B., (2019), *Human Level AI* at Transvision 2019 Conference, available at: https://www.youtube.com/watch?v=IWgPKw1n1DQ (Accessed: 20th August 2020).

Golumbia, D.,(2009) *The Cultural Logic of Computation,* Cambridge: Harvard University Press

Good, I.J., (1965) "Speculations concerning the first ultraintelligent machine" in F. Alt & M. Ruminoff (eds.), *Advances in Computer Volume 6*, Academic Press

Graham, E.L. (2002): Representations of the Post/Human. New Brunswick: Rutgers University Press.

Gray, J., (2002), *False Dawn: The Delusions of Global Capitalism,* London: Granta Books London

Gray, J. (2011) *The Immortality Commission*, London: Granta Books

Griffiths, J.C., (1980) *Three Tomorrows: American, British and Soviet Science Fiction,* Totowa: MacMillan

Hables Gray, C., (2001) *Cyborg Citizen: Politics in the Posthuman Age*, New York: Routledge

Hables Gray, C., (2012) "Cyborging the Posthuman: Participatory Evolution" in Lippert-Rasmussen, K., Thomsen, M. R., Wamberg, J., (eds.) *The Posthuman Condition*, Aarhus: Aarhus University Press

Hagemeister, M., (1997) "Russian Cosmism in the 1920s and Today" in *The Occult in*

Russian and Soviet Culture, Rosenthal, B.G., (ed.) pp.185:203, Ithaca: Cornell University Press

Halberstam, J., & Livingstone I., (eds.) (1995) *Posthuman Bodies*, Indiana: Indiana University Press

Haldane, J.B.S., (1923) *Daedalus or Science and the Future: A Paper Read to the Heretics,* on February 4th, 1923. New York: E.P. Dutton & Company

Hall, P. A., & Soskice, D., (eds.) (2001) *Varieties of Capitalism,* New York: OUP

Han, B-C., (2017) *Psychopolitics,* London: Verso

Harari, Y. N., (2016) *Homo Deus,* London: Harvill Secker

Harari, Y. N., (2017) *The Rise of the Useless Class,* Available at: http://ideas.ted.com/the-rise-of-the-useless-class/ (Accessed 7th June, 2017)

Haraway, D.J., (1985) "A manifesto for cyborgs: Science, technology, and socialist feminism in the 1980s" in *Socialist Review*, *15*(2), 65-107.

Haraway, D.J., (1988) "Situated knowledges: The science question in feminism and the privilege of partial perspective" in *Feminist studies*, *14*(3), pp.575-599

Haraway, D.J., (2003) *The companion species Manifesto: Dogs, people, and significant otherness*, Chicago: Prickly Paradigm Press

Haraway, D.J., (2008) *When Species Meet*, Minnesota: University of Minnesota Press

Haraway, D.J., (2016) *Staying with the trouble*, Durham: Duke University Press.

Haraway, D.J, (2016a) *Manifestly Haraway, Minneapolis: University of Minnesota Press*

Harrison, P., & Wolyniak, J., (2015) "The History of Transhumanism" in *Notes and Queries,* Oxford: Oxford University Press, 62 (3), pp.465-467

Harvey, D., (1990) *The Condition of Postmodernity: An Enquiry into the Origins of Cultural Change,* Oxford: Basil Blackwell

Harvey, D., (2007) *A Brief History of Neoliberalism,* New York: Oxford University Press

Harvey, D., (2011) *The Enigma of Capital: And the Crises of Capitalism,* New York: Profile Books

Harvey, D. (2017) *Marx, Capital and the Madness of Economic Reason,* London: Profile Books

Hauskeller, M., (2014) “Utopia” in Ranisch, R., and Sorgner, S., (2014) *Post- and Transhumanism, An Introduction,* Frankfurt: Peter Lang

Hauskeller, M., (2016) *Mythologies of Transhumanism*, Cham: Palgrave Macmillan

Hayles, N.K., (1999) *How We Became Posthuman,* London: University of Chicago Press

Hayles N.K. (2010) “Wrestling With Transhumanism” in Hansell, G.R., & Grassie, W., *Transhumanism and Its Critics*, Philadelphia: Metanexus

Hayles, N.K., (2017) *Unthought. The Power of the Cognitive Unconscious*, Chicago: Chicago University Press.

Hayles, N.K., (2022) “Ethics for Cognitive Assemblages. Who’s in Charge Here?” in Herbrechter, S., et al. (eds.), *Palgrave Handbook of Critical Posthumanism*, Cham: Springer
Heidegger, M., (1977) *The Question Concerning Technology and Other Essays*, New York: Garland

Hendrick, D., (2009) *Complexity Theory and Conflict Transformation*, Bradford: University of Bradford

Herbrechter, S., (2013) *Posthumanism: A Critical Analysis*. London: Bloomsbury.

Herbrechter, S., (2018) “Critical Posthumanism” in Braidotti, R., & Hlavajova, M., (eds) (2018) *Posthuman Glossary,* London: Bloomsbury

Herbrechter, S., (2022) “Posthumanism and Deep Time” in Herbrechter, S., et al. (eds.), *Palgrave Handbook of Critical Posthumanism*, Cham: Springer

Hillis, D., (2016) *The Enlightenment is Dead, Long Live the Entanglement*, available at https://longnow.org/essays/enlightenment-dead-long-live-entanglement/ (Accessed 19th August 2020)

Hobden, S., (2014) *Being “a Good Animal”: Adorno, Posthumanism and International Relations* Available at: https://repository.uel.ac.uk/download/1fd6ad54528a3feb5e3aa8dec90a2ee6e31e44e975812c9af224b36fe61717e4/301996/Altvs403%2520Steven%2520Hobden%2520FINAL.pdf (Accessed 10th August 2019)

Horkheimer, M., & Adorno, T.W., (2002) *Dialectic of Enlightenment*, Stanford: Stanford University Press

Hughes, J. (2004), Citizen Cyborg, Cambridge, MA: Westview Press

Hughes, J. (2010): Contradictions from the Enlightenment Roots of Transhumanism. In: Journal of Medicine and Philosophy 35(6), pp.622-640.

Hughes, J. (2012) The politics of transhumanism and the techno-millennial imagination, 1626–2030, in *Journal of Religion and Science*, 47(4), pp.757-776

Hughes, J. (2014) "Politics" in Ranisch, R., and Sorgner, S., *Post- and Transhumanism, An Introduction,* Frankfurt: Peter Lang

Huxley, J., (1951) "Knowledge, Morality and Destiny" in *Psychiatry*, 14 (2), pp.129-140

Huxley, J.S., (1957) "Transhumanism." in *New Bottles for New Wine*, pp.13–17, London: Chatto and Windus

Idhe, D, (2009) *Postphenomenology and Technoscience,* Albany: SUNY Press

Idhe, D. (2010) "Of Which Human Are We Post?" in Hansell, G.R., & Grassie, W., (2010) *Transhumanism and Its Critics*, Philadelphia: Metanexus

IEET, (2007) *Origins and Theory of the World TranshumanistAssociation,* Available at: https://ieet.org/index.php/IEET2/more/bostrom20071226 (Accessed 10th August, 2019)

IOM (2022) *Rising Migrant Deaths Top 4,400 This Year: IOM Records More Than 45,000 Since 2014,* available at: https://www.iom.int/news/rising-migrant-deaths-top-4400-year-iom-records-more-45000-2014

IPCC, (2014) *IPCC Press Release*, available at: https://www.ipcc.ch/site/assets/uploads/2018/06/11022014_syr_copenhagen.pdf

IPCC, (2018) *Special Report: Global Warming of 1.5 ºC,* available at: https://www.ipcc.ch/sr15/

Jacobs, M., & Mazzucato, M., (2016) *Rethinking Capitalism,* Chichester: Wiley Blackwell

Jameson, F., (1991) Postmodernism*,* NC: Duke University Press

Jasanoff, S., (2019) *Can science Makes Sense of Life*, Cambridge: Polity

Johnson, K.V-A., (2020) "Gut microbiome composition and diversity are related to human personality traits" in *Human Microbiome Journal,* 15

Jorion, P., (ed.) (2022) *Humanism and Its Discontents*, Cham: Palgrave Macmillan

Kahneman, D., & Tversky, A., (2000) *Choices, Values, and Frames,* Cambridge: Cambridge University Press

Kant, I., (1997) *Practical Philosophy (The Cambridge Edition of the Works of Immanuel Kant),* Cambridge: Cambridge University Press

Kay, L.E., (1995) "Who Wrote the Book of Life? Information and the Transformation of Molecular Biology, 1945–55" in *Science in Context,* 8/4, pp.609–34

Kay, L.E., (2000) *Who Wrote the Book of Life? A History of the Genetic Code*, Stanford: Stanford University Press

Keller, E.F., (2002) *Making Sense of Life: Explaining Biological Development with Models, Metaphors, and Machines*, Cambridge: Harvard University Press.

Kellner, D., (1989) *Critical Theory, Marxism and Modernity,* John Hopkins University Press

Kelly, K. (1999) *New Rules for the New Economy*, London: Penguin

Kelly, K., (2011) *What Technology Wants,* London: Penguin

Klein, N., (2007) *The Shock Doctrine: The Rise of Disaster Capitalism,* London: Penguin

Klein, N., (2020) "How Big Tech Plans to Profit From the Pandemic" in *The Guardian*, Available at: https://www.theguardian.com/news/2020/may/13/naomi-klein-how-big-tech-plans-to-profit-from-coronavirus-pandemic (Accessed, 19th May, 2021)

Kosselleck, R., (2002) "'Progress' and 'Decline': An Appendix to the History of Two Concepts" in Presner, S.T., et al. (trans.) *The Practice of Conceptual History: Timing History, Spacing Concepts,* Stanford: Stanford University Press

Kovacs, M.G., (trans) (1989) *The Epic of Gilgamesh,* Stanford: Stanford University Press

Kurzweil, R., (2000) *The Age of Spiritual Machines: When Computers Exceed Human Intelligence,* London: Penguin

Kurzweil, R. (2006) *The Singularity Is Near,* London: Gerald Duckworth & Co Ltd

Kurzweil, R., (2010) *Transcend,* Pensylvania: Rodale Press

International Organization for Migration, (2017) *Global Migration Data Analysis Centre: Data Briefing Series,* Issue No. 8, March 2017, Available at: http://publications.iom.int/books/global-migration-data-analysis-centre-data-briefing-series-issue-no-8-march-2017 (Accessed 7th June, 2017)

La Mettrie, J.O.D, (1996), *Machine Man and Other Writings,* Cambridge: Cambridge University Press.

Lanchester, J., (2010) *Whoops! Why Everyone Owes Everyone and No One Can Pay,* London: Penguin

Land, N., (2011) *Fanged Noumena*, Cambridge: MIT Press

Land, N., (2012) *The Dark Enlightenment*, available at: http://www.thedarkenlightenment.com/the-dark-enlightenment-by-nick-land/

Land, N., (2014) "Circuitries" in Mackay, R., & Avanessian, A., (eds.) *Accelerate*, Falmouth: Urbanomic

Lanier, J., (2013) *Who Owns the Future*, London: Allen Lane

Latour, B., (1993) *We Have Never Been Modern*, Hemel Hempstead: Harvester Wheatsheaf

Lawrence, M., & Laybourn-Langton, L., (2021) *Planet on Fire,* London: Verso

Lazzarato, M., (2006) "From Biopower to Biopolitics"*,* in *Tailoring Biotechnologies,* Vol.2, Issue 2, Summer-Fall 2006, pp.11-20

LeDoux, (1998) *The Emotional Brain,* London: Simon and Schuster,

LeDoux (2002) *Synaptic Self: How Our Brains Become Who We Are,* New York: Viking

Lee, K-F, (2021) 'The Third Revolution in Warfare' in *The Atlantic,* available at: https://www.theatlantic.com/technology/archive/2021/09/i-weapons-are-third-revolution-warfare/620013/ (Accessed 15th March, 2022)

Levin, S.B., (2021) *Posthuman Bliss,* New York: Oxford University Press

Lewis, R.S., (2021) *Situating Media Literacy,* Cambridge: Open Book Publishers

Lewontin, R., (2000) *The Triple Helix: Gene, Organism, and Environment*. Cambridge: Harvard University Press

Loh, J., (2022) "Posthumanism and Ethics" in Herbrechter, S., et al. (eds.), *Palgrave Handbook of Critical Posthumanism*, Cham: Springer

Lukács, G., (1971 [1923]) *History and Class Consciousness,* London: Merlin

Lyotard, J-F., (1984 [1979]) *The Postmodern Condition,* Minneapolis: University of Minnesota Press

Mackay, R., & Avanessian, A., (eds.) (2014) *Accelerate*, Falmouth: Urbanomic

Nakamura, L. (2009) "The Socioalgorithmics of Race: in Magnet, S., & Gates, K., (eds.) *The*

New Media of Surveillence, Abingdon: Routledge

Maley, C.J., & G. Piccinini. (2015) "Neural Representation and Computation" in J. Clausen and N. Levy (eds.) *Handbook of Neuroethics,* pp.79–94, Dordrecht: Springer

Malm, A., (2016) *Fossil Capital: The Rise of Steam Power and the Roots of Global Warming,* London: Verso

Marcuse, H., (2007 [1964]) *One Dimentional Man*, King's Lynn: Routledge

Marx, K., (1977) *Capital,* New York: Vintage

Marx, K., (1844) "The Economic and Philosophic Manuscripts", reprinted in Giddens, A. & Held, D. (1982) *Classes, Power, and Conflict: Classical and Contemporary Debates*, California: University of California Press

Mason, P. (2015) *Postcapitalism,* London: Penguin

Maturana, H. R., & Varela, F. J., (1972) *Autopoiesis and Cognition: The Realization of the Living*, Dordrecht: Reidel

Mazzucatto, M., (2018) *The Value of Everything*, St. Ives: Allen Lane

Mbembe, J.-A., & Meintjes, L., (2003) "Necropolitics", in *Public Culture* 15, no. 1 (2003): 11-40

MacCormack, P., (2020) *The Ahumanist Manifesto*, London: Bloomsbury

McBrien, J, (2016) "Accumulating Extinction: Planetary Catastrophism in the Necrocene" in Moore, J. W., (ed.) (2016) *Anthropocene or Capitalocene?: Nature, History, and the Crisis of Capitalism,* Oakland: PM Press

McClellan, D., (ed.) (1977) *Karl Marx: Selected Writings*, Oxford: OUP

McCulloch, W.S., & Pitts, W., (1943) "A Logical Calculus of the Ideas Immanent in Nervous Activity" in *Bulletin of Mathematical Biophysics,* 5 (4): pp.115–33

Miah, A. (2008): A Critical History of Posthumanism. In: Gordijn, B./ Chadwick, R. (Eds.):Medical Enhancement and Posthumanity. New York: Springer, 71-94.

Mirowski, P., & Plehwe, D., (eds.) (2009) *The Road From Mont Pelerin: The Making of the Neoliberal Thought Collective,* London: Harvard University Press

Mitcham, C., (1994) *Thinking Through Technology,* Chicago: Chicago University Press

Mitleton-Kelly, E., (2003) *The Principles of Complexity and Enabling Infrastructures* available at: http://www.casa.ucl.ac.uk/ecid/EMK_The_Principles_of_Complexity.pdf (accessed 21 August, 2021)

Mogensen, A., (2020) "Moral Demands and the Far Future" in *Philosophy and Phenomenological Research,* 103 (3) pp.567-585

Monbiot, G. (2016) "Neoliberalism – The Ideology at the Root of all our Problems" in *The Guardian,* available at: https://www.theguardian.com/books/2016/apr/15/neoliberalism-ideology-problem-george-monbiot (Accessed 19th September, 2020)

Moravec, H., (1990) *Mind Children: The Future of Robots and Intelligent Machines*, Massachusetts: Harvard University Press

Moravec, H., (1999) *Robot: Mere Machine to Transcendent Mind,* Sydney: OUP

Morton, T., (2013) *Hyperobjects*, Minneapolis: University of Minnesota Press

Moore, J. W., (2015) *Capitalism in the Web of Life,* Verso: London

Moore, J. W., (ed.) (2016) *Anthropocene or Capitalocene?: Nature, History, and the Crisis of Capitalism,* Oakland: PM Press

Moore, G.E., (1965) "Cramming More Components onto Integrated Circuits", *Electronics,* 38 (8)

More, M., (1993) *The Extropian Principles,* available at: https://hpluspedia.org/wiki/Extropian_principles

More, M., (1994) *Pancritical Rationalism*, available at: https://web.archive.org/web/20001208123700/http://www.maxmore.com/pcr.htm

More, M., (1998) *The Extropian Principles,* available at: https://mrob.com/pub/religion/extro_prin.html

More, M., (2010) "True Transhumanism: A Reply to Don Idhe" in Hansell, G.R., & Grassie, W., *Transhumanism and Its Critics*, Philadelphia: Metanexus

More, M., (2013a) "The Philosophy of Transhumanism" in More, M., Vita-More, N. (eds.) (2013) *The Transhumanist Reader*, Chichester: Wiley-Blackwell

More, M., (2013b) "The Proactionary Principle: Optimizing Technological Outcomes" in More, M., Vita-More, N. (eds.) (2013) *The Transhumanist Reader*, Chichester: Wiley-

Blackwell

More, M., (2013c) “A Letter to Mother Nature” in More, M., Vita-More, N. (eds.) (2013) *The Transhumanist Reader*, Chichester: Wiley-Blackwell

More, M., Vita-More, N. (eds.) (2013) *The Transhumanist Reader*, Chichester: Wiley-Blackwell

Morin, E., (2007) “Restricted Complexity, General Complexity”, in Gershenson, C., et al (eds.) *Worldviews, Science and Us: Philosophy and Complexity*, pp.5–29, Singapore: World Scientific Publishing

Mumford, L., (1954) “Technics and the Future of Civilisation” in *In the Name of Sanity,* New York: Harcourt Brace

Mumford, L., (1967) *The Myth of the Machine, Vol. I, Technics and Human Development,* New York: Harcourt Brace

Mumford, L., (1970) *The Myth of the Machine, Vol. II, The Pentago of Power* New York: Harcourt Brace

Murphie, A., & Potts, J., (2003) *Culture and Technology,* Hampshire: Palgrave Macmillan

Nayar, P., (2009) *Rise of the ‘Posthumanities’: Exit Pursued by a Cyborg,* Working Paper

Negri, A., (2014) “Reflections on the Manifesto” in Mackay, R., & Avanessian, A., (eds.) *Accelerate*, Falmouth: Urbanomic

Noys, B., (2014) *Malign Velocities*, Winchester: Zero Books

O’Connell, M., (2017) *To Be a Machine*, Granta: London

O’Connell, M., (2018a) ‘Why Silicon Valley billionaires are prepping for the apocalypse in New Zealand’ in *The Guardian, Available at:* https://www.theguardian.com/news/2018/feb/15/why-silicon-valley-billionaires-are-prepping-for-the-apocalypse-in-new-zealand (Accessed 27th June, 2019)

O’Connell, M., (2018b), ‘Mark O’Connell: five books to understand transhumanism’ in *The Guardian, Available at: https://www.theguardian.com/books/2018/may/10/mark-oconnell-five-books-to-understand-transhumanism* (Accessed 27th June, 2019)

O’Connor, B., (2005)

O'Giebly, M., (2017) 'God In The Machine: My Strange Journey Into Transhumanism' in *The Guardian,* Available at: https://www.theguardian.com/technology/2017/apr/18/god-in-the-machine-my-strange-journey-into-transhumanism (Accessed 27th June, 2017)

O'Neil, C., (2016) *Weapons of Maths Destruction*, New York: Crown

Ord, T., (2020) *The Precipice,* London: Bloomsbury

Orwell, G. (1941) "Wells, Hitler and the World State" in *Horizon* IV(20), pp.133-139

Oxfam, (2018) *Reward Work Not Wealth*, available at: https://www.oxfam. org/ en/research/reward-work-not-wealth (Accessed 1st June, 2018).

Oxfam (2019) *5 Shocking facts about global poverty*, available at: https://www. oxfam. org/en/even-it/5-shocking-facts-about-extreme-global-inequality- and-how-even-it-davos (Accessed 24th April, 2019)

Oxfam (2021) *The Inequality Virus,* available at: https://www.oxfam.de/system/files/documents/the_inequality_virus_-_english_full_report_-_embargoed_00_01_gmt_25_january_2021.pdf (Accessed, 1st October, 2021)

Parisi & Goodman (2011) "Mnemonic Control" in Clough, P.T., & Willse, C., (eds.), *Beyond Biopolitics*, London: Duke University Press

Pasquale, F., (2015) *The Black Box Society,* Cambridge: Harvard University Press

Pearce, D., (1995) *The Hedonistic Imperative, available at: https://www.hedweb.com/hedonist.htm*

Pearce, D. (2007) *The Abolitionist Project,* available at: https://www.abolitionist.com

Pearce, D. (2010) *The End of Suffering, available at:* https://www.hedweb.com/transhumanism/humanity-plus.html

Pearce, D., (2011) *A World Without Suffering,* available at:

https://www.hedweb.com/animals/interview.html

Pearce, D., (2019) *The Imperative to Abolish Suffering,* available at:

https://www.hedweb.com/hedethic/sentience-interview.html

Persson, I., & Savulescu, J. (2008), *The Perils of Cognitive Enhancement and the Urgent Imperative to Enhance the Moral Character of Humanity,* Available at:

http://www.bep.ox.ac.uk/__data/assets/pdf_file/0003/9390/Finalsubmittedcorrected09april_08.pdf (Accessed 21st May, 2017)

Persson, I., & Savulescu, J., (2008) "The Perils of Cognitive Enhancement and the Urgent Imperative to Enhance the Moral Character of Humanity" in *Journal of Applied Philosophy,* 25 (3), pp.162–77

Persson, I., & Savulescu, J., (2012) *Unfit for the Future: The Need for Moral Enhancement* Oxford: Oxford University Press

Persson, I., & Savulescu, J., (2013) "Getting Moral Enhancement Right: The Desirability of Moral Bioenhancement" in *Bioethics* 27 (3), pp.124–31.

Pickering, A., (1995) *The Mangle of Practice: Time, Agency, and Science*, Chicago: University of Chicago.

Piketty, T., (2014) *Capital in the Twenty-First Century*, Cambridge: Harvard University Press

Pomerantsev, P., (2017) *This is Not Propaganda*, London: Faber & Faber

Porter, T., (1995) *Trust In Numbers*, Princeton: Princeton University Press

Protevi, J., (2019) "Political Affect" in Braidotti, R., & Hlavajova, M., (eds) (2018) *Posthuman Glossary,* London: Bloomsbury

Puech, M., (2016) *The Ethics of Ordinary Technology,* New York: Routledge

Rachman, G., (2022) *The Age of the Strongman,* London: Penguin

Rand, A., (1992 [1957]) *Atlas Shrugged*, New Jersey: Penguin

Ranisch, R., and Sorgner, S., (2014) *Post- and Transhumanism, An Introduction,* Frankfurt: Peter Lang

Raworth, K., (2017) *Doughnut Economics,* Vermont: Chelsea Green

Reade, W., (2004 [1872]) The *Martyrdom of Man*, Hawaii: University Press of the Pacific

Rees, M., (2004) *Our Final Century*, London: William Heinemann

Reymann, A., & Benedikter, R., (2021) "War in Times of 'Beyond Man': Reflections on a 'Grand' Contemporary Topic" in Hofkirchner, W., & Kreowski, H-J., *Transhumanism: The Proper Guide to a Posthuman Condition or a Dangerous Idea?* Cham: Springer

Rockström, J. et al. (2009) A safe operating space for humanity. *Nature* 461, pp.472–475

Roden, D. (2014) *Posthuman Life: Philosophy at the Edge of the Human,* Oxon: Routledge

Rose, H., & Rose, S., (2016) *Can Neuroscience Change Our Minds*, Cambridge: Polity

Rosenberger, R., & Verbeek, P-P., (eds.) (2015) *Postphenomenological investigations: Essays on Human-Technology Relations*, London: Lexington Books

Ross, D., (2020) *The Philosophy of Transhumanism*, Bingley: Emerald

Rouvroy, A., (2012) "The end(s) of critique: Data-behaviourism vs. due-process" in M. Hildebrant, M. & De Vries, K. (Eds.), (2013) *Privacy, due process and the computational turn: Philosophers of law meet philosophers of technology*, Oxford: Routledge

Rutherford, A. (2022) *Control: The Dark History and Troubling Present of Eugenics,* London: Weidenfeld & Nicolson

Sachs, J., (2021) "The Pandora Paper trail with Jeffrey Sachs" in *Intelligence Squared* [podcast], available at https://podcasts.apple.com/gb/podcast/the-pandora-paper-trail-with-jeffrey-sachs/id708371900?i=1000537982999 (Accessed: 29th November, 2021)

Sandberg, A., (2013) "Morphological Freedom – Why We Not Just Want it, but Need It" in More, M., Vita-More, N. (eds.) (2013) *The Transhumanist Reader*, Chichester: Wiley-Blackwell

Sandel, M., (2009) *The Case Against Perfection,* Cambridge, MA: Belknap Press

Sandel, M., (2012) *What Money Can't Buy: The Moral Limits of Markets,* London: Penguin

Sarewitz, D., (2011) "Can Technology Make You Better?" in *Argumentos de Razón Técnica*, no.14, pp.193-209

Sassen, S. (2008) *Territory, Authority, Rights* New York: Princeton University Press

Sassen, S. (2014) *Expulsions: Brutality and Complexity in the Global Economy: Brutality and Complexity in the Global Economy,* Cambridge: Harvard University Press

Savulescu, J. & Bostrom, N., (2010) *Human Enhancement,* Oxford: OUP

Savulescu, J., (2009) *Genetically enhance humanity or face extinction,* Available at: https://www.youtube.com/watch?v=PkW3rEQ0ab8 (Accessed 21st March, 2017)

Savulescu, J., (2012) 'Enhancing Equality' in Lippert-Rasmussen, K., Thomsen, M. R., Wamberg, J., (eds.) (2012) *The Posthuman Condition,* Aarhus: Aarhus University Press

Savulescu, J. (2014) *Why I Am Not a Utilitarian*, Available at: http://blog.

practicalethics.ox.ac.uk/2014/11/why-i-am-not-a-utilitarian/

Savulescu, J., & Birks. D., (2012) *Bioethics: Utilitarianism*, Chichester: John Wiley and Sons

Sawicki, J., (2003) "Heidegger and Foucault: Escaping technological nihilism" in Milchman, A., and Rosenberg, A., (eds.) *Foucault and Heidegger: Critical Encounters*, pp. 55–73. Minneapolis: University of Minnesota Press

Scahill, J., & Greenwold G., (2014) "The NSA's Secret Role in the U.S. Assassination Program" in *The Intercept,* available at: https://theintercept.com/2014/02/10/the-nsas-secret-role/ (Accessed 21st August, 2021)

Schick, N., (2020) *Deep Fakes and the Infocolypse,* London: Monoray

Sharon, T., (2014) *Human Nature in an Age of Biotechnology: The Case for Mediated Posthumanism*, Dordrecht: Springer

Shaw, D.B., (2008) *Technoloculture*, King's Lynn: Berg

Shaw, D.B., (2015) *Post-Human? And Who Are We Anyway,* University of East London

Shaw, D.B., (2018) *Posthuman Urbanism*, London: Rowman & Litttlefield

Singler, B., (2017) "fAIth" in *Aeon Essays,* available at: https://aeon.co/essays/why-is-the-language-of-transhumanists-and-religion-so-similar (Accessed, 19th August 2021)

Skinner, B.F., (1938) *The Behaviour of Organisms*, New York: Appleton, Century, Crofts

Skinner, B.F., (1965) *Science and Human Behaviour,* New York: The Free Press

Skinner, B.F., (2002:1971) *Beyond Freedom & Dignity,* Indianopolis: Hackett

Skinner, B.F., (2005:1948) *Walden Two,* Indianopolis: Hackett

Sorgner, S., (2021) *We Have Always Been Cyborgs,* Bristol: Bristol University Press

Srnicek, N. and Williams, A., (2014) "Accelerate: Manifesto for an Accelerationist Project" in Mackay, R., & Avanessian, A., (eds.) *Accelerate*, Falmouth: Urbanomic

Srnicek, N. and Williams, A., (2015) *Inventing the Future: Postcapitalism and a World Without Work,* London: Verso

Srnicek, N., (2017) *Platform Capitalism,* London: Verso

Standing, G., (2011) *The Precariat*, London: Bloomsbury

Stengers, I., (2015) *In Catastrophic Times: Resisting the Coming Barbarism,* London: Open

Humanities Press

Stiglitz, (2010) *Freefall,* London: Penguin

Stiglitz, J.E., (2016) "Inequality and Economic Growth" in Jacobs, M., & Mazzucato, M., *Rethinking Capitalism,* Chichester: Wiley Blackwell

Stolyarov II, G., (2019) "The United States Transhumanist Part and the Politics of Abundance" in Lee, N., (ed.) *The Transhumanist Handbook,* Cham: Springer

Strange, S. (1997) "The Future of Global Capitalism; Or, Will Divergence Persist Forever?" in Crouch, C., & Streeck, W., (eds.) *Political Economy of Modern Capitalism*, London: Sage

Streeck, W., (2014) *Buying Time,* London: Verso

Streeck, W., (2016) *How Will Capitalism End,* London: Verso

Suarez-Villa, L., (2001) 'The Rise of Technocapitalism' in *Science Studies,* Vol. 14, No. 2, pp.4-20

Šumonja M. (2020) "Neoliberalism is not dead – On political implications of Covid-19", in *Capital & Class*, 45 (2) pp.215-227

Susskind, R., (2015) *The Future of the Professions: How Technology Will Transform the Work of Human Experts*, Oxford: OUP

Tax Justice Network (2021) *How Much Money is in Tax Havens,* available at https://taxjustice.net/faq/how-much-money-is-in-tax-havens/

Tett, G., (2010) *Fool's Gold,* London: Little Brown

Thatcher, J, O'Sullivan, D., Mahmoudi, D., (2017) "Data Colonialism Through Accumulation by Dispossession: New Metaphors for Daily Data". *Environment and Planning: Society and Space* 34, no. 6, pp.990-1006.

Thorpe, C., (2016) *Necroculture*, New York: Palgrave McMillan

Tirosh-Samuelson, H., & Mossman, K. L., (eds.) (2005) Beyond Humanism: Trans- and Posthumanism, Frankfurt: Peter Lang.

Torres, P., (2019) *Omniviolence Is Coming and the World Isn't Ready,* available at https://nautil.us/omniviolence-is-coming-and-the-world-isnt-ready-8552/ (Accessed, 7th March 2021)

Torres, P., (2021) *Were the Great Tragedies of History "Mere Ripples"? The Case Against Longtermism*, available at: https://c8df8822-f112-4676-8332-ad89713358e3.filesusr.com/ugd/d9aaad_89094654cf0945738f5633b5d46653fd.pdf (Accessed 21 October, 2021)

Tucker, P., (2014) "Inside the Navy's Secret Swarm Robot Experiment" in Defense One (October 5), available at: https://www.defenseone.com/technology/2014/10/inside-navys-secret-swarm-robot-experiment/95813/ Accessed 10th December, 2019

Turing, A., (1950) "Computing Machinery and Intelligence" in *Mind,* 59, pp.433-460

Turkle, S,. (2011) *Alone Together,* New York: Basic Books

Ulanowicz, R.E., (2007) "Ecology: A Dialogue between the Quick and the Dead" in *Reframing Complexity: Perspectives from North and South*, Fritjof Capra et al. (eds.) Mansfield MA: ISCE

Varoufakis, Y., (2017) *Adults in the Room*, London: Penguin

Varoufakis, Y., (2021) "Techno-Feudalism is Taking Over" in *Project Syndicate*, available at: https://www.project-syndicate.org/commentary/techno-feudalism-replacing-market-capitalism-by-yanis-varoufakis-2021-06 (Accessed 29th November, 2021)

Vinge, V., (1993) "The Coming Technological Singularity" in *Whole Earth Review,* Winter Issue, (81), pp.88-95

Vint, S., (2014) *Science Fiction: A Guide for the Perplexed*, London: Bloomsbury

Vita-More, N. (2019) "History of Transhumanism" in Lee, N., (ed.) *The Transhumanist Handbook,* Cham: Springer

Walby, S., (2003) *Modernities/Globalisation/Inequities,* Available at: http://www.lancaster.ac.uk/fass/resources/sociology-online-papers/papers/walby-modernitiesglobalisationcomplexities.pdf (Accessed 25th November, 2017)

Walby, S., (2009) *Globalization & Inequalities,* London: Sage

Wallerstein, I. (2001) *World-Systems Analysis: An Introduction,* North Carolina: Duke University Press

Walsh, T., (2017), *Android Dreams*, London: Hurst & Company

Waters, B., (2011) "Whose Salvation? Which Eschatology? Transhumanism and Christianity

as Contending Salvific Religions" in Cole-Turner W.R., (ed.) *Transhumanism and Transcendence: Christian Hope in an Age of Technological Enhancement*, pp.163–75, DC: Georgetown University Press.

Watson, J.B (1913) 'Psychology as the Behaviourist Views it' in *Psychological Review*, *20, pp.158-177*

Weinberg, R. A. (1989). Intelligence and IQ: Landmark issues and great debates. *American Psychologist*, 44(2), 98-104

Wells, H.G., (1902) "The Discovery of the Future" in *Nature* 65(1684), pp.326-331

Westley F.S. et al, (2002) "Why systems of people and nature are not just social and ecological systems" in Gunderson L.H., & Holling C.S., (eds.) *Panarchy: Understanding Transformations in Human and Natural Systems,* pp.103-120, Washington DC: Island Press

Wiener, N., (1961) *Cybernetics: Or Control and Communication in the Animal and the Machine*, 2nd ed. New York: MIT Press and Wiley

Wise, L., (2015) *Social Death in Sudan: Towards an Ecology of A Genocide,* King's College London, University of London

Wolfe, C. (2010): *What is Posthumanism?* Minneapolis: University of Minnesota Press.

Wolff, R.P., (1963) *Kant's Theory of Mental Activity: A Commentary on the Transcendental Analytic of the "Critique of Pure Reason",* Cambridge: Harvard University Press.

Young, G., (1979) *Nikolai. F. Federov, an Introduction,* Belmont: Nordland

Yudkowsky, E., (2006) *Artificial Intelligence as a Positive and Negative Factor in Global Risk* Available at: http://intelligence.org/files/AIPosNegFactor.pdf (Accessed 20th December 2017)

Zohny, H., (2015), "The Myth of Cognitive Enhancement Drugs" in *Neuroethics* 8/3: pp.257–69.

Zuboff, S. (2017), *Surveillance Capitalism*, London: Profile

Zylinska, J., (2004) "The Universal Acts", in *Cultural Studies*, 18 (4), pp.523-537