A History of Transhumanism

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Submitted November 2018

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42504422

Statement of Originality

This work has not previously been submitted for a degree or diploma in any university. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made in the thesis itself.

Signed:

Elise Bohan_____ Date: ____30/11/2018_____

Acknowledgements

To David Christian, thanks so much for volunteering to supervise a Ph.D. candidate who started out with the vague idea that they wanted to explore Big History, transhumanism and the future of humanity. After some twists and turns I think it's turned out rather well. To Neil Levy, thanks for the comments on the final draft.

For the rest, I'll simply tip my hat to the many lucky hands I've been dealt in this great cosmic game of chance. The ones that come in the form of people, you know who you are. Thanks for being excellent humans!

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Humanity looks to me like a magnificent beginning but not the last word.

—FREEMAN DYSON

Abstract

This thesis presents the first book-length history of transhumanism. I trace the roots of proto-transhumanist thinking back to the Scientific Revolution and explore major examples of proto-transhumanist thought up to the late twentieth century. I then chronicle the origin and evolution of the first modern transhumanist movements and ideas. Finally, I demonstrate that transhumanist ideas and technologies are now fundamental features of the modern world and argue that we should take them very seriously, as they have the potential to profoundly influence how the human future unfolds.

Introduction

> *[W]e are now witnessing the end of an order of life and ways of being human… We are literally changing our minds, the ways we think, live, and relate to each other and the world, and in doing so we are changing what it means to be human.*
>
> — Judith Bessant, *The Great Transformation* (2018)

We are living in a unique historical moment, one of profound importance for all human beings. It is a time of rapid technological change marked by the rise of ever more advanced algorithms and machines. At the dawn of the twenty-first century, the first human genome had only just been sequenced and Google was yet to become an official verb. Smart phones had not been invented and neither had the selfie, or Instagram. Tech-giants of the analogue age, like Kodak, were still in business. Meanwhile, social media was an embryo, and Facebook was a dorm project spreading quietly across US college campuses.

Since the turn of the century, accelerating technological change has continued to revolutionise how we communicate, do business, learn, date, and think about the future. Many of the changes we've experienced in the last two decades have been so seamlessly absorbed in modern societies that we barely notice them. Smartphones and wearables feel like a natural extension of our bodies and minds. How did we get by without them? We barely remember.

In the twenty-first century, modern information technologies are enhancing our biological capabilities and integrating us ever more with smart technologies. The proliferation of these technologies, including the rise of advanced humanoid robots and artificial intelligence, is prompting us to redraw the boundaries of humanness and personhood to a novel degree, extending them beyond the humanist framework of the purely *biological* person. These technological developments, and shifts in human values and definitions, are directly advancing the core aims of transhumanism.

What is transhumanism?

Transhumanim emerged as a distinct philosophy and movement with clearly defined aims in 1990.[1] It is often described as a modern philosophy, a social movement and a field of study that focuses heavily on the promise and peril of an affiliated set of technologies and disciplines: nanotechnology, biotechnology, information technology and cognitive science (NBIC).[2] The leading transhumanist philosopher, Nick Bostrom, succinctly defines transhumanism as:

> The intellectual and cultural movement that affirms the possibility and desirability of fundamentally improving the human condition through applied reason, especially by developing and making widely available technologies to eliminate aging and to greatly enhance human intellectual, physical, and psychological capacities.[3]

Transhumanists pursue a bolder vision of wellbeing than their humanist antecedents, aiming to be "better than well."[4] Transhumanist visions of a good life include an array of possible futures that are not necessarily biological, or even recognisably human. The key feature of transhumanist philosophy that distinguishes it from humanism is the embrace of *posthuman* evolution—a state so far beyond present day humanity that it requires a new term to define it.

There is an ongoing debate over who coined the word transhumanism and who first used the word in its modern sense. As there are a number of errors in existing scholarly publications that touch on the etymology of transhumanism, I have compiled a separate

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[1] Although Max More and Tom W. Bell co-founded the first official transhumanist magazine, *Extropy*, in 1988, which was tied to the first official transhumanist movement, extropianism, I date the official emergence of transhumanism as a philosophy and movement to 1990 because this is the year that first philosophical documents outlining core transhumanist tenets were produced.

[2] A similar three-pronged definition can be found in: Max More and Natasha Vita-More, "Part I, Roots and Core Themes," in *The Transhumanist Reader*, ed. Max More and Natasha Vita-More (Oxford: Wiley-Blackwell, 2013), kindle.

[3] Nick Bostrom, "The Transhumanist FAQ: A General Introduction, Version 2.1," *World Transhumanist Association* (2003), 4, https://nickbostrom.com/views/transhumanist.pdf.

[4] *Humanity+*, "Humanity+ – What We Do," accessed July 7, 2018, http://humanityplus.org/.

section on this subject, which can be found in the back matter of this text (see Appendix A). This is important reference material and it belongs in a scholarly history of transhumanism, however I have not included it in the main body of the argument as it would be a distracting sidebar at this juncture. For now, it is more important to outline who transhumanists are and what they believe.

Transhumanists care more about the pursuit of longer, healthier lives, better decision making, and attaining greater mastery over nature, than they do about preserving humanity-as-we-know-it. They readily entertain the possibility that new experiences and value systems could have more to offer than our normative values, capabilities and lifeways. As Bostrom writes:

> Transhumanists view human nature as a work-in-progress, a half-baked beginning that we can learn to remold in desirable ways. Current humanity need not be the endpoint of evolution. Transhumanists hope that by responsible use of science, technology, and other rational means we shall eventually manage to become posthuman, beings with vastly greater capacities than present human beings have.[5]

The desire to engender posthuman states also distinguishes transhumanist ambitions from humanist desires to use scientific and cultural advancements, in the form of spectacles, surgery, or better nutrition and education, to incrementally improve the human condition. These pursuits are certainly endorsed by transhumanists and can be considered stepping stones towards more radically trans, or posthuman futures. But for many humanists, and other advocates of what we now consider fairly modest and normative interventions, the endorsement of more radical modifications that could render a person posthuman does not follow from their support for surgery or spectacle wearing. Hence we can say that transhumanism is an extension of scientific humanism, but not one that all humanists necessarily endorse.

[5] Nick Bostrom, "Transhumanist Values," *Journal of Philosophical Research* 30 (2005): 4, doi: 10.5840/jpr_2005_26.

The transhumanist Greg Burch explains the distinction between humanism and transhumanism in the following terms:

> …transhumanism goes beyond humanism, because it does not accept some immutable, fundamental 'human nature' as a given, but rather looks to continuing—and accelerating—the process of expanding and improving the very nature of human beings themselves… Transhumanists see the near future as a time in which our technological power of self-transformation will lead to a real transcendence of 'human nature' itself.[6]

Transhumanism has a long prehistory dating back to the Scientific Revolution. Transhumanist projects of human enhancement are arguably continuous with all past forms of technological innovation, and the many transcendental aspirations in human history that are apparent in pursuits like art, religion and alchemy. As the leading transhumanist James Hughes writes:

> Transhumanism has much in common with spiritual aspirations to transcend animal nature for deathlessness, superhuman abilities, and superior insight, though transhumanists pursue these goals through technology rather than (or at least not solely) through spiritual exercise.[7]

But, despite these continuities with earlier transcendental thinking, a distinctive feature of transhumanism is that the philosophy is firmly built upon the epistemological framework of a modern, scientific worldview. The philosophy of transhumanism has strong roots in the secular, materialist view of progress championed during the Enlightenment.[8] These scientific foundations clearly delineate the transhumanist pursuit of technological transcendence from pre-scientific analogues, like founding a religion, immortalising ones-self through art, or attempting to use gold to create an elixir of life.

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[6] Greg Burch, "An Introduction to Transhumanism," archived March 3, 2000, https://web.archive.org/web/20000303085528/http://users.aol.com:80/gburch3/thext.html.

[7] See: James Hughes, Nick Bostrom, and Jonathan D. Moreno, "Human vs. Posthuman," *The Hastings Center Report* 37, no. 5 (Sep-Oct 2007): 4, https://www.jstor.org/stable/4625770.

[8] The enlightenment roots of transhumanism are widely acknowledged in the transhumanist community. We will talk more about them in chapters one and two. See also: Bostrom, "The Transhumanist FAQ v. 2.1," 46; James Hughes, "Contradictions from the Enlightenment Roots of Transhumanism," *Journal of Medicine and Philosophy* 35, no. 6 (2010): 622-640, doi: 10.1093/jmp/jhq049.

Like all other ideas and movements, transhumanism is a product of its time. Transhumanist ambitions of radical life extension, brain uploading, intelligence augmentation, and space colonisation, could not be taken seriously as realistic projects before the invention of modern computers and rockets, the discovery of DNA, or the rapid increases in computing power and the declining cost of computation—all of which took place in the twentieth century and led us to the present period of networked computing, pervasive artificial intelligence, escalating automation, and ever more rapid technological change.

Why write a history of transhumanism?

In 2004, the American political scientist, Francis Fukuyama, lamented that "transhumanism of a sort is implicit in much of the research agenda of contemporary biomedicine." This worried Fukuyama, as he thought that the slippery slope of transhumanist enhancement was influencing the lifeways, choices and values of modern humans in novel ways and threatening to erode the essence of our humanity. Fukuyama was one of transhumanism's most prominent detractors in the early twenty-first century and dubbed it "the most dangerous idea in the world." He expressed grave concerns that "mood-altering drugs, substances to boost muscle mass or selectively erase memory, prenatal genetic screening, or gene therapy—can as easily be used to 'enhance' the species as to ease or ameliorate illness."[9]

Whether or not you buy Fukuyama's argument about the dangers of these human enhancement technologies, he was right that the line between basic scientific research and human enhancement projects was blurring conspicuously in the early twenty-first century. In 2003, Bostrom also emphasised how profoundly transhumanist ideas, technologies and aspirations were implicit in the major social and ethical issues of the day. He wrote:

[9] Francis Fukuyama, "Transhumanism – the world's most dangerous idea," *Foreign Policy* (2004), http://www.au.dk/fukuyama/boger/essay/.

> The relevance of transhumanist ethics is manifest in such contemporary issues as stem cell research, genetically modified crops, human genetic therapy, embryo screening, end of life decisions, enhancement medicine, information markets, and research funding priorities. The importance of transhumanist ideas is likely to increase as the opportunities for human enhancement proliferate.[10]

In the intervening years, modern technologies have certainly proliferated, giving rise to new and vigorous ethical debates. We can now add to Bostrom's list legislation regarding self-driving cars, the implications of virtual reality porn, the ethics surrounding robot sex workers, the robots and AIs that have already been granted residency or citizenship in countries like Japan and Saudi Arabia,[11] modern debates over workplace automation and a universal basic income, advances in gene editing technologies like CRISPR-Cas9, robot surgeons and diagnostic algorithms that co-operate with, and in some cases outperform their human counterparts, digital privacy and identity debates, and discussions over human-level artificial intelligence and artificial superintelligence.

Human enhancement technologies are now pervasive in modern societies and are rapidly pushing us towards a recognisably cyborgian, or transhuman, state. Arguments have long existed stating that humans are natural cyborgs, or a kind of *Homo faber*—a toolmaking species whose capabilities have always been enmeshed with, and extended by, technology.[12] But the reach and visibility of this idea is much greater today than in the past, in no small part because the modern means of enabling human-machine convergence are more advanced and more deeply affect our modes of thinking and biological constitution. We now live in a world of pervasive artificial intelligence,

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[10] Bostrom, "The Transhumanist FAQ v. 2.1," 27.

[11] See: Patrick Caughill, "An Artificial Intelligence Has Officially Been Granted Residency," *Futurism*, November 6, 2017, https://futurism.com/artificial-intelligence-officially-granted-residency/.; Andrew Griffin, "Saudi Arabia Grants Citizenship To A Robot For The First Time Ever," *Independent*, October 26, 2017, https://www.independent.co.uk/life-style/gadgets-and-tech/news/saudi-arabia-robot-sophia-citizenship-android-riyadh-citizen-passport-future-a8021601.html.

[12] See: Andy Clark, *Natural Born Cyborgs* (Oxford: Oxford University Press, 2003). The orgin of the word "cyborg" is widely dated to 1960. Two scientists, Manfred Clynes and Nathan Kline proposed altering human biology and consciously seizing the evolutionary reins as a means of adapting humans for space travel. See: Manfred E. Clynes and Nathan S. Kline, "Cyborgs and Space," in *The Cyborg Handbook*, ed., Chris Hables Gray (New York: Routledge, 1995), 29-34. Reprinted from *Astronautics*, September, 1960.

machine-brain interfaces, 3D printed body parts and precise gene editing methods, all of which have the potential to alter and augment humanity in novel ways.

Transhumanist ideas, movements and technologies are integral to this important modern story of technological disruption and human-machine convergence. Given this, it is remarkable that not a single academic historian has yet chronicled the history of transhumanism in any detail.[13] There is an abundance of literature in the fields of philosophy and bioethics that explores the broadly transhumanist theme of human enhancement, covering genetic, neurocognitive and pharmacological interventions, and the ethical dilemmas associated with the hypothetical transhumanist project of human moral enhancement.[14] Yet historians have been much slower to realise that an array of broadly transhumanistic phenomena have been steadily influencing our lives, and our conceptions of personhood and the human future.

As far as I am aware, no academic historian has undertaken any detailed work on transhumanism, a phenomenon that has been around in its modern form for thirty years. I aim to bridge that knowledge gap in the field of modern history here, and to foster a greater awareness of the social significance of transhumanism—a growing philosophy, movement, and field of study, that has profound potential to affect the lives of us all.

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[13] See the 'existing scholarship' section later in the introduction for the key works that discuss aspects of tranhumanist history. One book that is missing from this discussion is David Livingstone's e-book, *Transhumanism: The History of A Dangerous Idea* (2015). Livingstone's book contains accurate dates and chronologies for parts of transhumanist history. For the snippets of accurate history it contains, the text might be considered worth reading. However, his thesis is that of a conspiracy tome; he claims that Darwinism is a religious cult propagated by "secret societies" and that "ultimately transhumanism is the latest expression of an age-old occult idea: evolution" (kindle, loc. 633). On his website, Livingstone claims that, "transhumanism is an occult project, rooted in Rosicrucianism and Freemasonry, and derived from the Kabbalah." See: http://www.conspiracyschool.com/transhumanism. The reader may wish to explore this text further, though it is not cited in this thesis as it is self-published by an independent scholar and, in many parts, the author makes sweeping claims that lack scholarly rigour.

[14] See: Jonathan Glover, *What Sort of People Should There Be?* (London: Penguin, 1984); Michael J. Sandel, *The Case Against Perfection* (Cambridge, MA: The Belknap Press of Harvard University Press, 2007); Julian Savulescu and Nick Bostrom, *Human Enhancement* (Oxford: Oxford University Press, 2009); Allen Buchanan, *Better Than Human: The Promise and Perils of Biomedical Enhancement* (Oxford: Oxford University Press, 2011); Steve Clarke et al., ed., *The Ethics of Human Enhancement: Understanding the Debate* (Oxford: Oxford University Press, 2016).

Who is a transhumanist?

The people who self-identify as transhumanists and who pursue transhumanist projects share an interest in most, if not all, of the following themes.

Core transhumanist themes
Possibility and desirability of posthumanity
Scientific/evolutionary worldview (adherence to the scientific method)
Existential risks
Space colonisation
Intelligence augmentation
Healthspan extension and life-extension
Cryonic suspension and optional death
Conscious evolution
Morphological freedom (including biohacking, cyborgism and human enhancement projects)
The proactionary principle
Evolutionary acceleration (via cultural and technological evolution)
The Technological Singularity
NBIC technologies (nanotechnology, biotechnology, information technology and cognitive science)

Fig. 1. Table of core transhumanist themes. See Glossary for definitions of unfamiliar terms.

The common denominator linking the key thinkers I discuss here as important transhumanists (whether because they are leaders of organised transhumanist movements, authors of important transhumanist philosophical documents, or because they head companies with explicitly transhumanist aims) is their interest in, and promotion of, several of the core transhumanist themes and goals listed in *Fig. 1*. The exceptions are the very general themes of a scientific worldview, and an interest in cosmic evolution and NBIC technologies, which alone, is not enough to declare someone a transhumanist. The overwhelming majority of thinkers discussed here engage with most, if not all of the themes listed above, and take outcomes like radical life-extension,

posthumanity, and the development of human level artificial intelligence, or superintelligence, seriously.

Do you need to identify as a transhumanist to be discussed in this history of transhumanism? No. Just as you don't need to identify as homosexual to find someone of the same sex attractive, or be Italian to support the Italian football team. If you don't identify as a transhumanist, have no association with transhumanist ideas, research projects, investments, or organisations, then you are certainly not a transhumanist and nor are you relevant in this history. But if you make your living, or spend significant time, promoting, researching, or investing in projects that are designed to make humans dramatically more than human (such as reversing the ageing process, or reverse engineering the human brain and integrating it with artificial intelligence) then, like Elon Musk, you are a person of interest here.

Musk's aim of sending humans to Mars, and developing a human machine-brain interface (MBI) to connect our minds to the cloud, are profoundly transhumanist projects, and they are being pursued with the help of NBIC technologies.[15] Creating a human MBI is a transhumanist project because it furthers the philosophical goals of card-carrying transhumanists and aligns precisely with the transhumanist objectives of expanding human potential and intelligence and blurring the lines between humans and machines to create new opportunities and experiences for sentient life. So does colonising another planet as a hedge against the extinction of intelligent, terrestrial life. These are goals that Musk, and many other influential modern thinkers and entrepreneurs, are playing a major role in popularising, validating and pursuing.

[15] See: Liat Clark, "Elon Musk reveals more about his plan to merge man and machine with Neuralink," *Wired*, April 21, 2017, https://www.wired.co.uk/article/elon-musk-neuralink.; Olivia Solon, "Elon Musk: we must colonise Mars to preserve our species in a third world war," *The Guardian*, March 11, 2018, https://www.theguardian.com/technology/2018/mar/11/elon-musk-colonise-mars-third-world-war.

Existing scholarship

Most scholarly works on transhumanism are journal articles written by transhumanists. The next two largest groups of authors on the subject are probably philosophers and theologians. Some touch briefly on the history of the philosophy and movement, but this is usually an introductory preamble to contextualise present agendas and philosophical questions. A clear benefit of producing an academic history that is not written by a leading transhumanist, or member of any transhumanist organisation (though in the spirit of full disclosure, my worldview is broadly transhumanistic) is that the author is less likely to censor aspects of the history that may make it seem less credible to an outsider's eyes. I have found many sources that I would consider censoring if I was an early transhumanist thought leader writing this history, and it is notable that these sources are absent from all other scholarship on transhumanism.

The sources in question are primarily the defunct websites and mailing lists of the first transhumanist organisations, thought leaders, and devotees in the 1990s and early 2000s. It is understandable that early transhumanists, many of whom have gone on to become prominent academics and public intellectuals, would not choose to dredge up a website they made when they were twenty. But many of these sources are well worth bringing to light, as they help paint a clearer picture of the lively, kooky, histrionic and playful culture of early transhumanism. These sources provide meaningful points of contrast with many modern transhumanist publications and help to illustrate how transhumanist culture has evolved throughout the twenty-first century.

Another source worth mentioning, which is sadly absent from my own history, is the self-published book, *Create/Recreate: The 3rd Millennial Culture* (1999) penned by the early transhumanist, Natasha Vita-More. The book is not housed in any library that I have access to, and although I personally corresponded with Natasha in an attempt to acquire a copy (she was very generous in replying and tried to supply me with one) this ultimately proved too difficult due to the limited number of physical copies in circulation and the difficulties in locating her physical copies and digitising them. This is a source I

hope to acquire in the future, as it was written during the heyday of the first wave of transhumanist culture and contains some history of the early transhumanist period. It is also likely to be an interesting source in terms of its language and style, which may highlight aspects of transhumanist culture that are not often written about, or portrayed, today.

I am of course indebted to a number of academic texts that have discussed key proto-transhumanist thinkers and intellectual influences—in particular, Nick Bostrom's widely cited article, "A History of Transhumanist Thought."[16] This paper has become a major reference point for all subsequent scholarship that introduces and contextualises transhumanism. The article is succinct and informative and provides a very good, albeit general, introductory summary of transhumanism's main intellectual roots and antecedents.

However, it is problematic that such a brief article stands virtually alone as a major reference point for historical scholarship on transhumanism, especially as it is now thirteen years old, and many more proto-transhumanist roots have been uncovered in the intervening years. Other notable works containing reliable historical information include James Hughes' book *Citizen Cyborg* (2004) and his paper, "Contradictions from the Enlightenment Roots of Transhumanism" (2010), as well as Max More's chapter, "The Philosophy of Transhumanism," in *The Transhumanist Reader* (2013).

A number of wonderful anecdotes and fun historical tidbits are also scattered throughout the many popular and journalistic books that have covered techno-geeks and early transhumanist culture and cyberculture. The best of these include the journalist Ed Regis' *Great Mambo Chicken and the Transhuman Condition* (1990), and the historian W. Patrick McCray's *The Visioneers: How a Group of Elite Scientists Pursued Space Colonies, Nanotechnologies, and a Limitless Future* (2013). Both texts are superbly researched and

[16] Bostrom's widely cited 2005 essay is a revision of an earlier essay on the same subject, published as: "A Short History of Transhumanist Thought," in Robert C. W. Ettinger, *Man Into Superman: The Startling Potential of Human Evolution—And How to Be Part of It (Plus Additional Comments By Others "Developments In Transhumanism 1972-2005)*, ed. Charles Tandy (Palo Alto: Ria University Press, 2005), 315-349.

highlight some fascinating thinkers and events that are not well chronicled elsewhere. However, neither author presents a linear academic history or hones in on transhumanist movements, thinkers or philosophy as their primary subject.[17]

I have also incorporated insights from other popular and journalistic texts of a similar style, such as Mark Dery's *Escape Velocity: Cyberculture at the End of the Century* (1996), Brian Alexander's *Rapture: A Raucous Tour of Cloning, Transhumanism, and the New Era of Immortality* (2004),[18] John Markoff's *What the Doormouse Said: How the Sixties Counterculture Shaped the Personal Computer Industry* (2005), and R. U. Sirius and Jay Cornell's *Transcendence: The Disinformation Encyclopedia of Transhumanism and the Singularity* (2015). I have endeavoured to synthesise the most important examples and anecdotes from existing accounts of transhumanist history, while adding those that I have independently discovered, so that a detailed and rigorous chronological history can be presented in a single text.

Finally, I wish to acknowledge the late Bruce Mazlish, a historian of science and technology at MIT, who explored some key transhumanist themes in his 1993 book, *The Fourth Discontinuity: The Co-Evolution of Humans and Machines*. Mazlish composed one of the first rigorous scholarly histories to seriously discuss the modern co-evolution of humans and technology. The book had a profound impact on me when I first read it in 2012 and it has shaped my ongoing view of the history of science, technology and transhumanism.

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[17] Two other very recent books that explore transhumanist phenomena are: Mark O'Connell's, *To Be A Machine: Adventures Among Cyborgs, Utopians, Hackers, and the Futurists Solving the Modest Problem of Death* (London: Granta Books, 2017), kindle; and Judith Bessant's, *The Great Transformation: History for a Techno-Human Future* (London: Routledge, 2018). Both texts are very general and I did not find them particularly useful as sources of historical insight, but the reader may be interested in consulting them. I also mention them here as they are penned by a former literary scholar and anthropologist respectively, and appear to be a testament to the growing, cross-disciplinary academic interest in the now increasingly visible phenomenon of transhumanism.
[18] First published in 2003 as *Rapture: How Biotech Became the New Religion*.

Chapter outline

This thesis is a work of intellectual history, or a history of ideas. In part one, I trace the intellectual roots of the dominant, Western transhumanist worldviews, back to the Scientific Revolution. In part two, I characterise the culture, and chart the evolution, of the two major transhumanist organisations of the twentieth and early twenty first centuries. I discuss these movements within the context of the major scientific breakthroughs and cultural and political shifts that occurred in the 1990s and in the first decade of the new millennium, as transhumanist movements burgeoned and became more influential.

In part three, I explore why transhumanism matters. I primarily discuss the governments, policies, academics, and entrepreneurs that are now popularising and instantiating an effectively transhumanist vision of the future. I also discuss the rapid evolution of modern biotechnologies and their posthuman potential and highlight the importance of the modern AI awareness explosion and the AI 'arms race' that is currently in play. Although I do not have the scope to explore the ethical implications of all of these phenomena in detail, these final chapters will provide the reader with the context to begin thinking about why they matter in the modern world and how they could fundamentally change human nature and lifeways this century.

I deliberately focus on the Western world throughout this history because it has been the birthplace of all leading contemporary transhumanist movements and the pioneers of this intellectual culture pervasively identify Western thinkers as their major precursors. Due to the dearth of English language translations of many foreign texts in the twentieth century, the influence of non-Western proto-transhumanists on modern Western transhumanists was minimal.

The focus on the West in this thesis is further due to the fact that Western countries, particularly America, are also global leaders in the development of advanced technologies with transhumanist implications, like artificial intelligence. While countries

like China have recently began to nip at America's heels in an advanced technological arms race (see chapter 12) the history of Chinese technological development and transhumanist culture remains beyond the scope of this thesis, as I could not do it justice in a text of this size.

I am also aware that a number of Russian thinkers, from Leon Trotsky to Konstantin Tsiolkovsky, Nikolai Fedorovich Fedorov and Alexander Bogdanov, did explore key transhumanist themes, from life-extension, to space colonisation. No doubt there are also many thinkers in other non-Western cultures who could be said to have meaningfully anticipated many sensibilities and goals of modern transhumanists. But, as few of these thinkers have influenced the prominent group of Western transhumanist thought leaders, or the entrepreneurs who are funding and spearheading many of the most ambitious modern transhumanist initiatives, I do not include them here.

My ultimate aim is to present the history of an idea, movement and affiliated set of technologies that conveys, in broad strokes, how they are changing the world in profound and irrevocable ways. Transhumanist endeavours have changed your life already. They may not ever advance far enough to render you posthuman, but barring any major setbacks they will continue to change the way you live, communicate, think and exist. In the coming years and decades they could make you more than human—or less, depending on your point of view. The time is ripe to start getting to grips with where this idea originated, what it's all about, and the many ways it could dramatically change humanity in our lifetimes and beyond.

PART 1

Proto-transhumanism

In this first part, we meet a number of key proto-transhumanists whose ideas foreshadow, or directly inform, modern transhumanist thinking. Proto-transhumanist thinkers share a common Promethean drive. They are, to co-opt a phrase of Oscar Wilde's, "people who see beyond the moment, and think beyond the day."[19] Like their modern counterparts, proto-transhumanists believed that many aspects of human nature, biology and culture could be altered, enhanced, or overcome, using technology and human ingenuity. While the science and technology of their day did not allow for the full range of modern transhumanist ambitions or projects to emerge as serious endeavours, it is remarkable how ambitious these thinkers' visions were, and how many aspects of human nature they thought could be transformed.

All of the thinkers in this section lived from the dawn of the Scientific Revolution onwards. There is no question that many earlier thinkers, from poets and politicians, to priests and alchemists, have dreamed of various forms of transcendence, both earthly and divine.[20] Yet we hone in on the Renaissance and the dawn of the Scientific Revolution here, as the period in which the first major intellectual antecedents of contemporary transhumanism appear. The simple reason is that modern transhumanism is based on a modern scientific worldview. Transhumanists pervasively champion reason, the pursuit of human progress and enhancement, and the scientific method; ideals that began to take root and gradually coalesce into a new epistemology from the seventeenth century onwards.

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[19] Oscar Wilde, "The Critic as Artist Part II," in *Oscar Wilde: The Major Works*, ed. Isobel Murray (Oxford: Oxford University Press, 2000), 279.

[20] Max More touches on the search for the Philosopher's Stone or Elixir of Life as a historical pursuit with transhumanist resonances in: "Beyond the Machine: Technology and Posthuman Freedom," paper in proceedings of Ars Electronica 1997, archived Nov 11 1999, https://web.archive.org/web/19991111063105/http://www.maxmore.com:80/machine.htm.

The thinkers I discuss in this section have to meet at least one of the following criteria to be discussed as a proto-transhumanist. The first is an acknowledgement of intellectual kinship by modern transhumanists. The second is that the thinker expressed sentiments that directly foreshadow more than one core theme in modern transhumanist thinking, from life-extension, materialism, the belief in progress and perfectibility through science, and the overcoming of biological constraints on human nature, to the potential to one day overcome death. Their exploration of these topics must also enhance a discussion of modern transhumanism and help set up a meaningful exploration of the core themes that will be discussed in later sections.

The one category of thinker that I don't discuss in detail here is the science fiction writer. It is undeniable that there are many overlaps between core transhumanist themes and those explored in science fiction.[21] Certainly, there are also some science fiction writers who wrote non-fiction works in which proto-transhumanist themes appear, from H. G. Wells, to Arthur C. Clarke.[22] But although science fiction works have sometimes inspired scientists and philophers, the causal chain of influence seems to flow largely in the other direction where transhumanist themes are concerned, with science fiction writers drawing from transhumanist ideas for inspiration.[23]

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[21] For an excellent short survey of science fiction texts that explore the concepts of human-machine convergence and the creation of artificial life, see: Bruce Mazlish, "The Man-Machine and Artificial Intelligence," in *Mechanical Bodies, Computational Minds*, Franchi and Güzeldere eds., 175-201.

[22] Texts worth consulting if the reader is interested include: Wells, *World Brain*; Arthur C. Clarke, *Profiles of the Future: An Inquiry into the Limits of the Possible*, revised edition (London: Victor Gollancz Ltd, 1974); Gene Youngblood, "*Free Press* Interview: Arthur C. Clarke," in *The Making of 2001: A Space Odyssey*, ed. Stephanie Schwam (New York: The Modern Library, 2000), 267.

[23] The editor of the transhumanist *Journal of Evolution and Technology*, Russell Blackford, has pointed out that no academic has successfully demonstrated that modern transhumanist thinking was influenced by particular works of science fiction (with the exception of J. B. S. Haldane's *Daedalus*). Blackford is right that few direct lines of influence have been traced. See: Russell Blackford (posting as Metamagician3000), "Origins in SF Literature," May 7, 2006, 10.59 UTC in Talk:Transhumanism/Archive 8, *Wikipedia*, https://en.wikipedia.org/wiki/Talk:Transhumanism/Archive_8. In my own exploration of transhumanist pre-history, no particularly strong lines of direct influence have become apparent (though, as Blackford suggests, Robert Heinlein's novels do appear to have influenced the first generation of extropian transhumanists). Francis Bacon's *The New Atlantis* has also been hailed as a proto-transhumanist text, but not until after the first transhumanist philosophies and movements were established.

Discussing science fiction works in detail here would also confuse the distinction between proto-transhumanists who genuinely believed it was possible that the human species would one day extend their life and health spans, cast off their mortal bodies, colonise the stars and become posthuman, and writers who simply utilised these and other similar concepts for narrative effect—often in texts that express stronger moral affinities with the *human* condition than with machines or posthuman entities. Below, we meet the thinkers who avidly explored and seriously contemplated and championed techno-scientific projects that they believed could engender radical human progress and tangible human transformation.

1. 17th Century Proto-transhumanism

And new Philosophy calls all in doubt.

— John Donne, "An Anatomie of the World" (1611)

During the seventeenth century, Europe underwent a period of explosive philosophical and social change. Following the publication of Copernicus' *On the Revolutions of the Heavenly Spheres* (1543) a major shift in cosmological worldviews was afoot. But the acceptance of revolutionary ideas was gradual. As the American historian of science, Margaret C. Jacob notes, by 1600 "only a handful of people accepted Copernicus's argument... that the sun, and not the earth, occupied the central place in our cosmos."[24] Yet, over the course of the century, the geocentric worldview of Aristotle and Ptolemy continued to be eroded and "by 1750, no European or American colonial could be considered educated if he or she still believed that the earth stood still and in the center of the universe, as the sun revolved around it."[25]

This gradual demotion of our planet from the centre of the universe dealt a big blow to human egos. The comfort that a subset of educated Europeans derived from their belief in divine predestination and cosmic centrality was lost. Yet the loss was partly made up for by the intrepid innovations of a great many scientists and artisans who epitomised the humanist virtue of self-determination. The seventeenth century saw the birth and flourishing of new forms of science and technology, financed by wealthy patrons. This was the dawning age of a new intellectual era, characterised by the gradual flourishing of a 'Scientific Revolution.'[26] While alchemy, religion and Aristotelianism were not

[24] Margaret C. Jacob, *The Scientific Revolution: A History with Documents* (Boston: Bedford/St. Martin's, 2010), 1.
[25] Jacob, *The Scientific Revolution*, 1.
[26] While the concept and periodisation of the Scientific Revolution has come under increasing academic scrutiny and revision in recent years, I maintain that the Scientific Revolution remains a useful concept, when defined as a gradual but growing movement towards knowledge derived from evidence based on reason and empiricism. The periodisation is also particularly relevant and helpful in this thesis, which links the culture and ideas of the early Scientific Revolution to those of the Enlightenment and modern transhumanism, which also emphasise the value of reason, empiricism and evidence over faith, tradition and the wisdom of ancient texts.

completely supplanted by scientific materialism in this age, they were increasingly challenged by ideas and methods that laid the bedrock of what later became a dominant Western epistemology.

Galileo is notorious for his influential championing of Copernican heliocentrism in the seventeenth century.[27] Meanwhile, Isaac Newton was hailed as an idol for his work on motion, gravity, optics and calculus. But another thinker set out on a remarkable quest to reform the very methods by which knowledge was sought and attained across all major fields of inquiry. The man is the English philosopher, politician and polymath, Sir Francis Bacon. Bacon was one of the earliest champions of aspects of the modern scientific method. Along with his near contemporary, René Descartes, he was also one of the two major proto-transhumanist thinkers of the seventeenth century.

Although Bacon and Descartes were far from the only scientific visionaries of their age to have imagined materialistic progress well beyond the limits of the science of the day, Bacon's works give us an accessible outline of the scientific epistemology that was slowly coalescing in this era. While other contemporaries like John Wilkins imagined that humans would one day fly to the moon and that people would come to view themselves in terms of their "infinite capacity,"[28] Bacon's specific visions contain more direct parallels with modern transhumanist sensibilities, touching on themes like life-extension, cryonics and bodily augmentation. Meanwhile, Descartes' outline of the mind/body problem, and his views on humanoid automata, continue to be referenced and debated by modern researchers in fields like neuroscience and artificial intelligence. Findings from these fields have directly influenced modern transhumanist philosophy and the development of transhumanist technologies.

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[27] Galileo published *Dialogue Concerning Two Chief World Systems, Ptolemaic and Copernican* in 1632, at the age of 68. He was put on trial in 1633 and was placed under house arrest after publicly renouncing heliocentrism. See: Barry Gower, *Scientific Method: An Historical and Philosophical Introduction* (London: Routledge, 1997), 22.

[28] John Wilkins, quoted in "The Wilkins Lecture 2000. Medical Futures," by Roy S. Porter, *Notes and Records by the Royal Society of London* 55, no. 2 (2001): 310.

Francis Bacon (1561-1626)

Francis Bacon has been named as a proto-transhumanist by both Nick Bostrom and James Hughes.[29] Bostrom notes that Bacon's ideal of a scientific revolution was fuelled by his desire to use "science to achieve mastery over nature in order to improve the living condition of human beings."[30] The same goal is avidly shared by modern transhumanists.[31] Max More also considers Bacon an important intellectual forebear. He writes, "the realization of transhumanist goals—or perhaps even the full articulation of the philosophy—would not be possible before the development and use of [the] scientific method." As Bacon was one of the earliest advocates of many core ideals of this method, More affirms that modern transhumanists "can see Francis Bacon as a precursor."[32]

Bacon as a champion of early modern science

Bacon is one of many thinkers throughout history to have declared that the major orthodoxies and epistemological systems of his day were inadequate. He wanted to do away with the blind repetition of traditional axioms and Aristotelian syllogisms and discover new intellectual horizons for the sake of human betterment. In his own words, "the entire fabric of human reason which we employ in the inquisition of nature is badly put together and built up, and like some magnificent structure without any foundation." To remedy this situation, Bacon thought that only one solution was fitting: "to try the whole thing anew upon a better plan, and to commence a total reconstruction of sciences, arts, and all human knowledge, raised upon the proper foundations."[33]

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[29] Nick Bostrom, "Transhumanist FAQ: A General Introduction, Version 2.1," *World Transhumanist Association* (2003): 39, http://www.nickbostrom.com/views/transhumanist.pdf.; Nick Bostrom, "A History of Transhumanist Thought," *Journal of Evolution and Technology* 14 (2005): 2; James Hughes, *Citizen Cyborg: Why Democratic Societies Must Respond to the Redesigned Human of the Future*, (Westview Press, 2004), kindle, ch.10; James J. Hughes, "The Politics of Transhumanism and the Techno-Millennial Imagination, 1626-2030," *Zygon* 47, no. 4 (December 2012): 759-760, doi: 10.1111/j.1467-9744.2012.01289.x.
[30] Bostrom, "A History of Transhumanist Thought," 2.
[31] Bostrom, "Transhumanist Values," 3-4.
[32] Max More, "The Philosophy of Transhumanism," in *The Transhumanist Reader*, ch.1.
[33] Francis Bacon, *The New Organon and Related Writings* (Indianapolis: The Bobbs-Merrill Company Inc., 1960), 3-4.

Bacon took umbrage with Aristotle's reliance on first principles, because he believed that they were derived from observation in narrow domains and then generalised without being tested under altered conditions.[34] He thought that in his world of Aristotelian devotees, too much rhetoric and too many assumptions were standing in for experiment and observation. Looking at the world in new ways and by new means was essential if new facts, methods and principles were to be discovered—and new knowledge *must* be discovered if humans were to have any hope of avoiding the repetition of error, curbing the perpetuation of ignorance, and ultimately enhancing humankind's powers of mastery over the natural world.

An intellectual pioneer who dreamed avidly of new horizons, Bacon has often been compared to the explorers of his age.[35] Like modern transhumanists, he believed that by unlocking the secrets of nature's laws, humans would undoubtedly reach formidable new heights of discovery that far exceeded the normative expectations of his day. He was confident that mankind's capacity for innovation could radically extend our power over the natural world and enable humans to live longer and healthier lives in a more enlightened age.

While Bacon's writings do not mirror a modern scientific work in language or form, they anticipate many of the core values and methodological underpinnings of modern science. Bacon was adamant that conventional wisdom should never be taken on faith, rather, existing principles should be questioned, revised, tested, and where possible, put to new uses.[36] He repeatedly emphasised the virtue of intellectual humility and stressed the importance of embracing uncertainty, and admitting when one's ideas are imperfect or incomplete[37] (which he correctly assumed many of his own ideas were).[38] He also

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[34] Fulton H. Anderson, introduction to *The New Organon and Related Writings*, by Francis Bacon (Indianapolis: The Bobbs-Merrill Company Inc., 1960).
[35] See: Anderson, introduction to *The New Organon and Related Writings*, vii.
[36] Bacon, *The New Organon*, 8-9.
[37] Bacon, *The New Organon*, 13-14.
[38] Bacon, *The New Organon*, 16, 108.

stressed that the primary ends of naturalistic enquiry should not be fame or glory, but the enhancement of human life and charity.[39]

Bacon also thought it important that authors and naturalists make every step of their logic and methods known so that their findings and assertions could be scrutinised and verified independently.[40] As an empiricist, he deemed observation and experiment to be essential for the building up of a new, inductive modern method of inquiry, writing, "I admit nothing but on the faith of eyes, or at least of careful and severe examination, so that nothing is exaggerated for wonder's sake."[41] But he cautioned against the methods of some of his empiricist contemporaries, who observed nature in narrow domains and generalised their observations into universal principles.[42]

Bacon as a champion of human betterment

Through the proper application of science and reason, Bacon believed that human beings could "extend the power and dominion of the human race itself over the universe,"[43] and that we could use this power to better our situation. He intuited what most modern transhumanists overtly declare: that even though history and science are not inherently progressive, the general trajectory of scientific development has tended to progress faster, and in more advanced (though not necessarily always beneficial) directions over time.[44]

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[39] Bacon, *The New Organon*, 15.
[40] Bacon, *The New Organon*, 26.
[41] Bacon, *The New Organon*, 26.
[42] Bacon, *The New Organon*, 60-61.
[43] Bacon, *The New Organon*, 119.
[44] While many transhumanists have made observations of this nature, it is worth noting that Bostrom also critically examines the assumption that this trend will necessarily continue into the future in: "The Future of Human Evolution," in *Death and Anti-Death: Two Hundred Years After Kant, Fifty Years After Turing*, ed. Charles Tandy (Ria University Press: Palo Alto, California, 2004), 339-371, http://www.nickbostrom.com/fut/evolution.pdf.

While Bacon didn't have the language, or neo-Darwinian principles of evolution, (yet alone the concept of Moore's Law)[45] at his disposal, a similar sentiment is conveyed in his declaration: "far better things, and more of them, and at shorter intervals, are to be expected from man's reason and industry and direction and fixed application than from accident and animal instinct."[46] In the simplest terms, he believed that scientific advances accelerate the pace of progress, which means we can expect more change at a faster rate in the future than in the present.

Like modern transhumanists, Bacon also believed that human discovery and innovation could extend far beyond the known principles and inventions of his age. He wrote:

> But such is the infelicity and unhappy disposition of the human mind in this course of invention, that it first distrusts and then despises itself: first will not believe that any such thing can be found out; and when it is found out, cannot understand how the world should have missed it so long. And this very thing may be justly taken as an argument of hope, namely, that there is a great mass of inventions still remaining which not only by means of operations that are yet to be discovered, but also through the transferring, comparing, and applying of those already known... may be deduced and brought to light.[47]

Modern transhumanists often make similar arguments, emphasising that we are not at the pinnacle of innovation or discovery—there is much more to come, and we should not

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[45] Moore's Law is based on an observation first made by the co-founder of Intel, Gordon E. Moore, in 1965. Moore observed that the number of components on silicon computer chips appeared to double every year, a trend that he expected to continue for 10 years (which it did). In 1975, he revised his prediction to a doubling of components every 2 years. The result of the continuation of Moore's Law has been a trend of exponential growth in the price-performance of computing that has held for over 50 years. Moore's Law has notably facilitated the extremely rapid evolution of modern information technologies with transhumanist applications. The transhumanist inventor and entrepreneur, Ray Kurzweil, has incorporated the Moore's Law trend into a broader Law of Accelerating Returns, which extends further back into the evolutionary history of technology. Today, Moore's Law is often used in a broader sense to describe the exponential growth of computing power and speed of technological adoption. See: Peter J. Denning and Ted G. Lewis, "Exponential Laws of Computing Growth," *Communications of the ACM*, 60, no.1 (January 2017), doi: 10.1145/2976758; Ray Kurzweil, *The Age of Spiritual Machines: When Computers Exceed Human Intelligence* (New York: Penguin, 1999); Ray Kurzweil, "The Law of Accelerating Returns," *KurzweilAI*, March 7, 2001, http://www.kurzweilai.net/the-law-of-accelerating-returns.

[46] Bacon, *The New Organon*, 100.

[47] Bacon, *The New Organon*, 103.

be surprised if what follows unseats the normative expectations of our age.[48] In a similar vein, Bacon believed that by unlocking the secrets of nature, humans could work to manipulate "a given body, to generate or superinduce a new nature."[49]

The unifying theme in Bacon's scientific worldview is the promotion of the human arts (including early forms of science) as tools to be wielded over nature. Like most transhumanists, Bacon did not believe in the separation of natural and artificial things—the artificial is a by-product of the natural, the properties of which have simply been manipulated into a new form.[50] In Bacon's words, "in things artificial nature takes orders from man and works under his authority," and "without man, such things would never have been made."[51] It is also impossible to make something artificial that contravenes the laws of nature, "for we cannot command nature except by obeying her."[52] In learning to master nature more fully, Bacon believed that radical improvements could be made to the human condition.

Bacon as a life-extensionist

Life-extensionist themes are pervasive in Bacon's *oeuvre*, though they have received markedly less scholarly attention than the classic portrait of Bacon as an early champion of the scientific method.[53] Like modern transhumanists, Bacon desired to better understand the causes of physical decay, and to learn how these causes interact—for ageing, as Bacon reminds us, is not the outcome of a single cause, but of many causes that have combined deleterious effects.[54] Once the causes of decay and decrepitude were

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[48] See: Ray Kurzweil, *The Singularity is Near: When Humans Transcend Biology* (London: Duckworth Overlook, 2005), kindle, ch.1.
[49] Bacon, *The New Organon*, 121.
[50] See: Bostrom, "The Transhumanist FAQ v. 2.1," 35.
[51] Bacon, *The New Organon*, 273.
[52] Bacon, *The New Organon*, 119.
[53] Benedino Gemelli, "The History of Life and Death: A 'Spiritual' History from Invisible Matter to Prolongation of Life," *Early Science and Medicine* 17, no. 1 (2012): 134-136.
[54] Francis Bacon, *The Instauratio magna: Part III: Historia naturalis et experimentalis: Historia ventorum and Historia vitae & mortis* (Oxford: Oxford University Press, 2007), 146-147.

understood, he hoped that it would be possible to discover how to halt and reverse them.[55]

Bacon was confident that as science advanced it would yield "new profitable inventions" and that many such inventions could be deployed for the "curing of some diseases and the prolongation of life."[56] In his utopian story, *The New Atlantis* (1627) he wrote about a future society in which science was staggeringly advanced; where youth could be restored, ageing slowed, physiques and dispositions altered by design, and human capabilities augmented.

In an addendum to *The New Atlantis*, he included a list of ideal ends that could be realised if humans, like those he depicted in Bensalem (the utopian society in his tale), developed the means of exerting greater mastery over nature. These ideals include:

> The prolongation of life. The restitution of youth in some degree. The retardation of age. The curing of diseases counted incurable. The mitigation of pain. More easy and less loathsome purgings. The increasing of strength and activity. The increasing of ability to suffer torture or pain. The altering of complexions, and fatness and leanness. The altering of statures. The altering of features. The increasing and exalting of the intellectual parts. Versions of bodies into other bodies. Making of new species. Transplanting of one species into another.[57]

Bacon presents a markedly proto-transhumanist vision in the passage above, embracing morphological freedom (a term first used in a transhumanist context by Max More in 1993)[58] and championing the design of a superior and more resilient human form.

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[55] Graham Rees, introduction to *The Instauratio magna: Part III: Historia naturalis et experimentalis: Historia ventorum and Historia vitae & mortis*, by Francis Bacon (Oxford: Oxford University Press, 2007), xlvi; Gemelli, "The History of Life and Death," 134.

[56] Francis Bacon, *The Advancement of Learning and The New Atlantis* (London: Oxford University Press, 1913), 275; 266.

[57] Quoted in modern English in: Gemelli, "The History of Life and Death," 136. For original text see: Francis Bacon (The Right Honorable Francis Lord *Verulam*, Viscount St. Albans), "New Atlantis," in *Sylva sylvarum, or, A natural history in ten centuries : whereunto is newly added the History natural and experimental of life and death, or, Of the prolongation of life ; whereunto is added Articles of enquiry, touching metals and minerals, and the New Atlantis*, 9th ed., (London: Printed for J.R. by William Lee, 1670), 30-31, Ovid, http://ovidsp.tx.ovid.com/sp-3.31.1b/ovidweb.cgi.

[58] See: Max More, "Technological self-transformation: Expanding personal extropy," *Extropy* 10 (Winter/Spring 1993): 17. The concept of morphological freedom was further explored by Anders Sandberg in, "Morphological

Importantly, these ideals were not just convenient thematic fodder for a science fiction story; they were recurrent preoccupations of Bacon's, discussed at length in his *History of Life and Death* (1623).

Bacon as a cryonics pioneer

Bacon also thought about the basic principles of cryonics, long before the term, or modern practice, was invented. Modern cryonic suspension involves applying cryoprotectants to the body. These prevent ice crystals forming and causing cellular damage. The body is cooled in liquid nitrogen and vitrified, (turned into a glass-like state) and hardens without damaging the tissue.[59] Back in the 1600s, nothing like this procedure existed. Bacon was only just grappling with the basic principles of refrigeration, but aptly wondered whether cooling a body could be a viable means of preservation.

He theorised at length about the preservative properties of the cold in his *History of Life and Death*, enthusiastically remarking that fruits and nuts have been known to have fallen in the snow, or have sometimes been buried in purpose built ice vaults. When recovered months later they have been found to be "as fresh and fine as if they had been picked yesterday."[60] This was an exciting observation. If refrigeration could preserve plants, perhaps it could do the same for animals. Bacon hypothesised that elephants live long lives because their blood is cold. [61] He also believed that people who live in colder climates live longer and suggested that bathing in cold water might promote longevity.[62]

In one notable instance, he embarked on an experiment to test the effects of freezing on organic matter. According to his biographer John Aubrey, Bacon was travelling by coach

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Freedom—Why We not just Want it But Need it," (based on a talk given at the TransVision 2001 conference), *Aleph*, http://www.aleph.se/Nada/Texts/MorphologicalFreedom.htm. Republished in *The Transhumanist Reader*, ch.5.

[59] *Alcor Life Extension Foundation*, "What is Vitrification?" accessed April 24, 2017, http://www.alcor.org/Library/html/vitrification.html.

[60] Bacon, *The Instauratio magna*, 169.

[61] Bacon, *The Instauratio magna*, 179.

[62] Bacon, *The Instauratio magna*, 289.

in the snow in April 1626 when "it came into my lord's thoughts, why flesh might not be preserved in snow, as in salt." Bacon and his travelling companion, Dr. Witherborne, who was one of King James' physicians, decided to test the theory on the spot. They stopped at a poor woman's house, "bought a hen, and made the woman exenterate it, and then stuffed the bodie with snow, and my lorde did help to doe it himselfe."[63]

The idea was clever, but the outcome of this experiment was a sad one, especially given the objective of finding out whether cold could prevent decay and one day be harnessed to promote longevity. Bacon became severely ill from the exposure to the cold and died several days later.[64] You might say he ultimately embodied what has since become a glib, tragi-comic line, variants of which have been attributed to Groucho Marx, used by Joseph Heller in *Catch 22*, and of course proclaimed by modern transhumanists—*live forever, or die trying*.[65]

René Descartes (1596-1650)

When we think of Rene Descartes it is unlikely that our mind will swiftly leap to a contemplation of transhumanism or artificial intelligence. We are more likely to envisage a French philosopher, the mind/body problem, and the man who declared 'I think, therefore I am.' Perhaps we also dimly recall his prowess as a mathematician. But it may come as a surprise to hear that many of Descartes' ideas have fascinating parallels with modern transhumanist concepts and values. These parallels are worth exploring, as many of Descartes' thought experiments anticipate what are now fully fledged transhumanist and computer science concepts, like narrow artificial intelligence (ANI), the domain-specific and presently pervasive form of AI that "is designed to perform a

[63] John Aubrey, *Brief lives chiefly of contemporaries set down between 1669 and 1696*, ed. Andrew Clark (Oxford: Clarendon Press, 1898), 76.
[64] Aubrey, *Brief lives chiefly of contemporaries*, 76.
[65] See: Joseph Heller, *Catch 22* (London: Vintage, 1955), kindle, ch. 3; Anders Sandberg, "Immortalism and Life Extension," *Aleph*, archived February 20, 1999, https://web.archive.org/web/19990220103942/http://www.aleph.se:80/Trans/Individual/Life/; Will Ockenden, "Living forever: Biohackers focus on human longevity, say it is not as far away as you think," *ABC News*, October 24, 2016, https://www.abc.net.au/news/2016-10-24/could-the-cure-to-death-be-around-the-corner/7958732.

narrow task (e.g. only facial recognition or only internet searches or only driving a car)."[66]

Descartes was one of the first thinkers to anticipate major philosophical and scientific questions about the nature of artificial intelligence, cognition and consciousness. While he had no knowledge of our present day terminology or technology, he was adamant that something akin to humanoid ANI's could, and would, be created. But, unlike most modern transhumanists, he doubted that human level *general* intelligence—or, what modern AI researchers term artificial general intelligence (AGI) —could ever be instantiated in a machine.

This second position aligns him more closely with many detractors of the common transhumanist claim that human, or greater than human levels of intelligence and consciousness could be instantiated in a non-biological substrate.[67] However, the anticipation of these concepts and the general emphasis on materialism in Descartes' philosophy warrants a discussion of him as a proto-transhumanist here, as does his influence on a number of proto-transhumanists in later centuries.

Descartes' worldview

Like Bacon, Descartes was a pioneer of transformative ideas about science, philosophy and human nature. He developed an early modern version of a materialist philosophy and grappled with the possibility of replicating human and animal functions in the form of man-made automata.[68] Naturally, Descartes was not the only thinker of his age to

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[66] *Future of Life Institute*, "Benefits and Risks of Artificial Intelligence," accessed April 30, 2017, https://futureoflife.org/background/benefits-risks-of-artificial-intelligence/.

[67] For a summary of major critiques of claims that it is possible to develop human level machine intelligence (HLMI) see: Konstantine Arkoudas and Selmer Bringsjord, "Philosophical Foundations," in *The Cambridge Handbook of Artificial Intelligence*, eds. Keith Frankish and William M. Ramsey (Cambridge: Cambridge University Press, 2014), 46-52.

[68] The earliest roots of materialism can be traced back to the Ancient Greeks, particularly to Democritus and the Greek atomists. Materialism underwent a rebirth in the seventeenth century and was further developed after Descartes by Pierre Gassendi and Thomas Hobbes. See: Frederick Albert, *History of Materialism and Criticism of Its Present Importance, vol 1*, trans. Ernest Chester Thomas (London: Trübner & Co, 1877), 14-15; 216.

consider the transformative possibilities that computation or robotics (automata being the precursor robots of the day) could unleash. As Konstantine Arkoudas and Selmer Bringsjord outline in *The Cambridge Handbook of Artificial Intelligence*:

> Hobbes had already anticipated strong AI back in the seventeenth century, when he famously proclaimed that 'ratiocination is computation.' Roughly in that same era, Leibniz dreamed of a 'universal calculus' in which all disputes could be settled by rote calculation. And Descartes had already considered something like the Turing Test long before Turing, albeit adopting a rather pessimistic view of the matter in perhaps a somewhat glib fashion."[69]

We focus on Descartes here, however, as he was one of the most influential thinkers of his age and his influence in philosophy, cognitive science, and the philosophy of AI, continues to be felt centuries later. Like Bacon, Descartes was fed up with arcane belief systems and methods of inquiry that failed to establish facts without reliance on dogmatic presuppositions about the world. He believed that a more rational method was needed if humans were to better "understand the world and make it work for us to free us from labor, pain, and anxiety"[70]—though unlike Bacon he advocated a top-down, deductive form of reasoning over empiricism and induction.

Neither Bacon nor Descartes ever relinquished their belief in a creator-God, but both saw God and human freedom as compatible. God had created a rational world and it was up to humans to employ their God-given rationality to live a good life.[71] Descartes did not develop a worldview based around the scientific method in its modern sense, but he believed that more rigorous knowledge could be used to master and improve the human condition. In his most famous work, *Discourse on the Method of Properly Conducting One's Reason and of Seeking the Truth in the Sciences* (1637), he wrote:

> [I]t is possible to arrive at knowledge which is most useful in life, and that, instead of the speculative philosophy taught in the Schools, a practical philosophy can be found by which, knowing the power and the effects of fire, water, air, the stars, the heavens and all the other

[69] Arkoudas and Bringsjord, "Philosophical Foundations," 40.
[70] Peter A. Shouls, *Descartes and the Possibility of Science* (Ithaca: Cornell University Press, 2000), 6.
[71] Shouls, *Descartes*, 5-6.

> bodies which surround us, as distinctly as we know the various trades of our craftsmen, we might put them in the same way at all the uses for which they are appropriate, and thereby make ourselves, as it were, masters and possessors of nature.[72]

He went on to stress that a key endeavour that humans should pursue in their mastery over nature is, "the preservation of health, which is undoubtedly the first good, and the foundation of all the other goods of this life."[73] Noting that one's state of mind is powerfully affected by one's physical disposition, Descartes affirmed that humans should endeavour to alleviate physical pain, reverse ageing, and prolong our healthy lifespans. He declared:

> [I]f it is possible to find some means of rendering man as a whole wiser and more dexterous than they have been hitherto, I believe it must be sought in medicine. It is true that the medicine practised now contains little of notable use; but without intending to do it any dishonour, I am sure there is no one, even among those who practise it, who does not admit that what is known of it is almost nothing compared to what remains to be known, and that we could free ourselves of an infinity of illnesses, both of the body and of the mind, and perhaps also of the decline of age, if we knew enough about their causes and about all the remedies with which nature has provided us.[74]

In short, by conquering new intellectual horizons, unravelling the secrets of human biology, and building on the collective discoveries of the species, Descartes believed that "we might all together go much further than each man could individually."[75]

Cartesian materialism

Descartes was a keen mathematician and undertook pioneering studies in geometry, optics and astronomy. He was also a devoted student of physiology and deemed all animal functions, and most human functions to be mechanistic—we are made of matter and move and respond to the world in a machine-like way, based on our nerve firings

[72] René Descartes, *Discourse on Method and Other Writings*, trans. F. E. Sutcliffe (Middlesex: Penguin, 1968), 78.
[73] Descartes, *Discourse*, 78.
[74] Descartes, *Discourse*, 79.
[75] Descartes, *Discourse*, 79.

and other physiological impulses. This materialistic view of animals and humans, portrayed as biological machines (or matter in motion) is one that almost all modern transhumanists subscribe to in some form.[76]

But the waters are muddied by the one Cartesian principle that seems to receive more academic attention than any other: mind/body dualism. In keeping with the teleological assumptions of a Christian worldview, Descartes held that the higher functions of sentient human minds are part of the soul, which is an ethereal and non-physical entity, distinct from all other bodily functions—the lower functions are governed by physical principles only.[77] He declared in *Discourse* that, "our soul is of a nature entirely independent of the body." This turns out to be a happy thing, for, as Descartes points out, a non-corporeal soul will not die when our bodies do. The soul, being independent of the body and imparted by God, "is immortal."[78]

What is less often emphasised in brief explanations of Cartesian dualism, which sometimes frame mind and body as completely separate entities, is that Descartes explained all animal and many human functions, "including low-level cognitive functions," as being mechanistic and physically mediated.[79] As the philosopher Gary Hatfield points out, "Descartes held that very few of the actual thoughts of any human being occur independently of the body," and even those processes that Descartes held to be of the soul, like "metaphysical insight"[80] are sometimes spoken about in terms of the soul's interaction with the brain. It is only the "true mentality involving higher cognition," which separates humans from the rest of the animal kingdom that Descartes believed to require "an immaterial mind."[81]

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[76] See: More, "The Philosophy of Transhumanism."
[77] Shouls, *Descartes*, 25.
[78] Descartes, *Discourse*, 76.
[79] Gary Hatfield, "The *Passions* of the soul and Descartes' machine psychology," *Studies in History and Philosophy of Science Part A* 38, no. 1 (2007): 2, doi: 10.1016/j.shpsa.2006.12.015.
[80] Hatfield, "The *Passions of the soul*," 4.
[81] Hatfield, "The *Passions of the soul*," 1.

The philosopher Peter A. Shouls further emphasises this distinction, remarking that "sensation, and (at least important forms of) imagination and memory are, for Descartes, body-based." The sensations of "seeing, hearing, tasting, touching [and] smelling" are all considered products of the "corporeal imagination," while "the process of memory he explains in terms of brain traces."[82] This distinction will be important as we go on to explore Descartes' views on humanoid automata and thinking machines.

Descartes anticipated narrow AI

Descartes never imagined the kinds of narrow AIs that are pervasive in today's world, from spell check software, to spam filters and robot vacuum cleaners. These would have seemed like magic to him. But he *did* imagine creating humanoid and animal machine replicas that could be so convincing that we might consider them indistinguishable from their 'real' biological models. The only thing he believed couldn't be replicated in a machine was human-level general intelligence (AGI).[83]

Descartes imagined that, among the "many different automata or moving machines the industry of man can devise" it might be possible to come up with a machine, "using only a very few pieces, by comparison with the great multitude of bones, muscles, nerves, arteries, veins and all the other parts which are in the body of every animal." He further argued that if we could create such an automaton:

> … which had the organs and appearance of a monkey or of some other irrational animal, we would have no means of recognizing that they [the automaton] were not of exactly the same nature as these animals."[84]

In other words, an embodied artificial intelligence made to look and move and act like a monkey could readily convince us that it was indeed a monkey. Essentially, Descartes believed that all of the functions of an animal could be instantiated in a machine. For

[82] Shouls, *Descartes*, 28.
[83] Hatfield, "The *Passions of the soul*," 18.
[84] Descartes, *Discourse*, 73.

humans, however, he was adamant that this was not the case. Yet he thought that we *could* build a humanoid robot that would do many things that humans do, from speaking words like a parrot does (without higher reasoning), to expressing sensory responses, like claiming to feel pain.[85] He even conceded that these machines: "might do many things as well as, or perhaps better than, any of us," though of course "they would fail, without doubt" at other tasks.[86]

What Descartes incidentally provides here is a textbook definition of ANI. Narrow AI's are often as capable, or more capable, than humans in their specific domains.[87] The best chess-playing algorithm can reliably beat every living human at chess. But the chess-playing algorithm can't drive a car, trade on the stock exchange, or write poetry. Other narrow AIs can do each of these tasks very well, but they can't readily switch to other tasks that they haven't been programmed to perform.

Descartes believed that creating AGI was impossible

In Descartes' view, animals lack general intelligence because they lack a mind (that is, a thinking soul beyond their brain). He declared:

> [A]lthough there are many animals which show more skill than we do in certain of their actions, yet the same animals show none at all in many others; so that what they do better than we do does not prove that they have a mind, for it would follow that they would have more reason than any of us and would do better in everything; rather it proves that they do not have a mind, and that it is nature which acts in them according to the disposition of their organs, as one sees that a clock, which is made up of only wheels and springs, can count the hours and measure the time more exactly than we can with all our art.[88]

Descartes argued that we could create animal-machines that make noises, respond to external stimuli, and behave as animals do. But we "cannot imagine that the soul of

[85] Descartes, *Discourse*, 74.
[86] Descartes, *Discourse*, 74.
[87] Kevin Warwick, *Artificial Intelligence: The Basics* (London: Routledge, 2011), 7, 65.
[88] Descartes, *Discourse*, 75-76.

animals is of the same nature of our own,"[89] because humans are capable of higher reasoning, which no other animal displays. In these sentiments, Descartes effectively anticipated one of the most common modern counter arguments against the widespread transhumanist assertion that it is possible to create AGI.

An AGI is "a machine that is capable of matching or exceeding human *performance* in most areas, whatever its metaphysical status."[90] Descartes' reasoning, as we can see in retrospect, was limited by the context in which he wrote. The 'God of the gaps' was tempting to invoke every time he came across a physical phenomenon that was complex and not yet explicable. Seventeenth century thinkers couldn't figure out where human cognition and intellect came from. Even now, "there is nothing even approaching an orthodox theory of why there is consciousness in the first place."[91] But in the seventeenth century, Descartes noted that human brains and bodies looked much the same as those of animals when dissected, hence he concluded that human minds must be imbued with something additional, but non-material, which other animals lack. Where could something so special come from? God, naturally.

Of course, many modern skeptics still believe that higher human cognitive functions are more than just the mechanistic sum of their parts and interactions. The English physicist and mathematician, Roger Penrose, has famously argued that consciousness is non-algorithmic and reliant on quantum processes; therefore, it cannot be replicated artificially.[92] The English philosopher, John Searle, has also mounted the famous Chinese Room Argument, in which he argues that there is a fundamental distinction between human brains and computer programs that can emulate human functions.

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[89] Descartes, *Discourse*, 76.
[90] Stuart Armstrong, *Smarter Than Us: The Rise of Machine Intelligence* (Berkeley: Machine Intelligence Research Institute, 2014), kindle, ch. 3. Note: Armstrong refers to AGI as Human Level Machine Intelligence (HLMI), and thereafter just as AI, but the acronyms AGI and HLMI are roughly interchangeable (though an AGI could also surpass average human capabilities in one or more domains).
[91] David Chalmers, "The Singularity: A Philosophical Analysis," *Journal of Consciousness Studies* 17, no. 9-10 (2010): 33.
[92] See: Roger Penrose, *The Emperor's New Mind: Concerning Computers, Minds, and the Laws of Physics* (Oxford: Oxford University Press, 1999 [1989]); Roger Penrose, *Shadows of the Mind: A Search for the Missing Science of Consciousness* (Oxford: Oxford University Press, 1994).

Searle imagines being locked in a room with boxes full of Chinese symbols. He does not speak Chinese but receives messages, in the form of questions, in Chinese. There is a rulebook (analogically a computer program) that tells him which symbols to manipulate and return. He (the human-algorithm) replies coherently and passes the Turing Test. But, according to Searle, these kinds of machines would not really be 'thinking.' He argues that human intentionality is driven by the architecture of the brain, which allows us to understand the context of our actions and the meaning behind words. Conversely, a computer that has simply been programmed to perform a task at human level, like speaking or writing in Chinese, would not have true understanding as it would be merely following semantic rules without having a sense of the meaning of the symbols.[93]

The veteran AI researchers John McCarthy[94] and Marvin Minsky[95] have expressed skepticism over these kinds of critiques of AGI, as has the modern AI researcher Kevin Warwick,[96] the philosopher David Chalmers[97] and the prominent transhumanist Ray Kurzweil.[98] Kurzweil deems Searle's Chinese room arguments to be "fundamentally tautological, as they just assume his conclusion that computers cannot possibly have any real understanding."[99] In fairness, however, Searle did allow for the possibility of thinking machines being developed artificially (after all, they already exist in the form of human brains). He acknowledged that it is possible that "very special kinds of machines… with internal causal powers equivalent to those of brains" might be able to truly think and understand. Modern neural networks might fulfil these criteria, as they are loosely modelled on the distributed architecture of the human brain.

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[93] See: John R. Searle, "Minds, brains, and programs," *The Behavioural and Brain Sciences* 3, no. 3 (1980), doi: 10.1017/S0140525X00005756.
[94] John McCarthy, "Review of The Emperor's New Mind by Roger Penrose," 1996, http://www-formal.stanford.edu/jmc/reviews/penrose1/penrose1.html.
[95] Marvin Minsky, "Why Freud Was the First Good AI Theorist," in *The Transhumanist Reader*, ch.16.
[96] Warwick, *Artificial Intelligence*, 62-64.
[97] Chalmers, "The Singularity," 36, 40.
[98] Kurzweil, *The Singularity is Near*, ch.9.
[99] Kurzweil, *The Singularity is Near*, ch.9.

When it comes to what modern transhumanists believe about AGI and non-biological intelligence, the overwhelming majority believe it is theoretically possible for machines to think. Most transhumanists reject Cartesian dualism and pervasively identify with the related sub-branches of materialism known as *patternism* (identity is reliant on evolving patterns of memory and values with causal continuity and your identity can survive if this pattern is preserved, even if transferred to a non-biological substrate)[100] and *functionalism* (the function of the entity is more important when defining it than its component parts or substrate).[101] Transhumanists follow Descartes as far as believing that humans are, in essence, biological machines. Yet they overwhelmingly disagree with his view that humans have a higher non-material soul that would prevent human intelligence being reverse engineered or instantiated in a non-biological machine.

Descartes didn't believe that a machine could pass the Turing Test

Descartes had no idea what the Turing Test was, because it had yet to be conceived, but by his logic, no machine could imitate a human and pass it. The Turing Test (originally called The Imitation Game) was proposed by the British computer scientist Alan Turing in 1950.[102] The test can take many forms and some versions are more controversial than others, but the basic idea is that a human judge or judges interact with a machine via online chat (originally teletype) and if a machine can converse so fluently with the judges that they believe it to be human then it can be said to have passed the Turing Test. While simply passing or failing a Turing Test is not a sufficient condition for determining intelligence, "Turing's central claim is that there would be no reason to deny intelligence to a machine that could flawlessly imitate a human's unrestricted conversation."[103]

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[100] Notable transhumanist proponents of patternism include Max More and Ray Kurzweil. See: James Hughes, "Transhumanism and Personal Identity," in *The Transhumanist Reader*. Notably, Hughes (who is also a Buddhist) identifies himself as an exception here, stating that he believes "the self is an illusion."
[101] For two formal definitions of functionalism see: Arkoudas and Bringsjord, "Philosophical Foundations," 43; Stuart Russell and Peter Norvig, *Artificial Intelligence: A Modern Approach*, 3rd ed., (New Jersey: Pearson Education, Inc., 2010), 1029-1030.
[102] A. M. Turing, "Computing Machinery and Intelligence," *Mind* 59, no. 236 (October, 1950).
[103] Robert M. French, "The Turing Test: the first 50 years," *Trends in Cognitive Sciences* 4, no. 3 (2000): 116, doi: 10.1016/S1364-6613(00)01453-4.

Descartes was thinking about a very similar scenario nearly four hundred years earlier. But, unlike Turing, he was adamant that no machine could fool a person into believing that it was human. He conceded that:

> [O]ne can well conceive that a machine may be so made as to emit words… but not that it may arrange words in various ways to reply to the sense of everything that is said in its presence, in the way that the most unintelligent of men can do.[104]

A machine could never be so fluent or intelligent that it could avoid semantic and logical slip-ups of the kind we are familiar with today when we converse with chatbots or use speech to text translation software. Descartes would surely have considered this kind of software to be dumb and mechanical in the same way that he considered birds and other animals to be: "for one sees that magpies and parrots can utter words as we do, and yet cannot speak as we do, that is to say, by showing what they are saying is the expression of thought."[105]

Parallels between Descartes' thought experiments on machine intelligence and Turing's Imitation Game have been drawn as early as 1964,[106] though very little has been made of the links until recently.[107] Yet these parallels are becoming more noteworthy as they are a key part of an emerging historical narrative that is of growing contemporary significance: the pre-history of transhumanist ideas and technologies.

Concluding remarks

Like Bacon, Descartes is an important figure in proto transhumanist history. Although some of his ideas presage those of transhumanism's detractors as well as its

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[104] Descartes, *Discourse*, 74.
[105] Descartes, *Discourse*, 74-75.
[106] Keith Gunderson, "Descartes, La Mettrie, Language, and Machines," *Philosophy: Journal of the Royal Institute of Philosophy* 39, no. 149 (1964), https://www.jstor.org/stable/3749220.
[107] See: Darren Abramson, "Descartes' influence on Turing," *Studies in History and Philosophy of Science Part A* 42, no. 4 (2011), doi: 10.1016/j.shpsa.2011.09.004.

advocates,[108] his interest in consciousness, automation, and artificial intelligence, hundreds of years before they became prominent social and intellectual concerns, is remarkable.

Descartes also went on to influence subsequent generations of materialists, including one of our major proto-transhumanists of the eighteenth century, Julien Offray de La Mettrie, and Charles Darwin's ardent supporter in the nineteenth century, Thomas Henry Huxley.[109] As the next chapter affirms, both Bacon and Descartes were two significant pioneers of the ideas and methods that went on to be revised, adopted and revered in the era where proto-transhumanism really began to take off: the Enlightenment.

[108] Though even some transhumanists are skeptical about if, and when human, or greater than human level AI will be developed. Positions also vary regarding slow and fast takeoffs for an intelligence explosion and what impacts advanced AI is likely to have in the twenty-first century.
[109] Thomas. H. Huxley, "On The Hypothesis That Animals Are Automata, and Its History," in *Methods and Results: Essays*, by Thomas. H. Huxley (New York: D. Appleton and Company, 1894), 205.

2. 18th Century Proto-transhumanism

> *Our hopes for the future condition of the human race can be subsumed under three important heads: the abolition of inequality between nations, the progress of equality within each nation, and the true perfection of mankind.*
>
> — Marquis de Condorcet, *Sketch for a Historical Picture of the Progress of the Human Mind* (1795)

> *This partial view of human-kind*
> *Is surely not the last!*
>
> — Robert Burns, "Man Was Made to Mourn, A Dirge" (1784)

In the eighteenth century, the links between our proto-transhumanist forebears and their modern successors strengthen. The seeds of a modern scientific culture were sown in the seventeenth century, but they flourished and grew rapidly in the eighteenth. While the real capabilities of seventeenth century scientists lagged far beyond their grandest ambitions, by mid-century there were stirrings of techno-scientific optimism throughout Europe. A growing number of intellectuals became enthralled by the idea that science, mathematics and machinery could, "compel Nature to deliver to the man who knew her secrets a Faustian capacity to achieve all his desires."[110] This scientific optimism carried over into the eighteenth century and profoundly shaped the intellectual culture of the Enlightenment.[111]

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[110] A. C. Crombie and M. A. Hoskin, "The Scientific Movement and Its Influence 1610-50," in *The New Cambridge Modern History IV: The Decline of Spain and the Thirty Years War 1609-48/59*, ed. J. P. Cooper (Cambridge: Cambridge University Press, 2008), 165, doi: 10.1017/CHOL9780521076180.

[111] As with the Scientific Revolution, there has been significant controversy over the periodisation, historical depictions, and cultural and intellectual legacy of the Enlightenment. I apply the term broadly here to connote a revolution in British, European and American intellectual sensibilities in the period roughly spanning the eighteenth century. The growing emphasis on individual agency, education, reason, science, literacy and progress, links the period to the sensibilities and values that started to emerge during the Scientific Revolution, which have been subsequently championed and extended by modern transhumanists. Steven Pinker's book, *Enlightenment Now*, is a very recent response to modern critiques of the Enlightenment's legacy. An excellent and accessible summary of the problematic periodisation and historical depictions of the Enlightenment can he found in: Avi Lifschitz, "The Enlightenment: Those Who Dare to Know," *History Today* 63, no. 9 (2013), https://www.historytoday.com/avi-lifschitz/enlightenment-those-who-dare-know.

Bostrom and Hughes both affirm that modern transhumanism has strong roots in the tradition of Enlightenment humanism.[112] While the Enlightenment has been periodised in different ways by historians and unfolded differently in Britain, Europe and America,[113] the essential characteristics that modern transhumanists identify with are "reason, technology, scientific method, and human creativity rather than faith."[114] They also affirm that we should be committed to promoting "continual ethical, intellectual, and physical self-improvement, through critical and creative thinking, perpetual learning, personal responsibility, proactivity, and experimentation."[115]

As a clear period of intellectual history, the Enlightenment was framed after the fact and its periodisation varies among scholars, but I defer here to Isaac Kramnick who notes that "a rough guide would emphasize the hundred-plus years from the 1680s to the 1790s,"[116] after which point the counter-Enlightenment sensibilities of Romanticism emerged in the wake of the French Revolution.[117] The bookends of 1700-1800, loosely applied, serve adequately here to frame the story of the next generation of proto-transhumanists.

A brief introduction to the Enlightenment

The Enlightenment saw a growing emphasis on science, reason, progress and secular humanism, as well as the flourishing of print media and the waning of the belief in monarchies and the divine right of kings. The doctrine of original sin was also questioned and gradually superseded by a belief in individual agency and self-improvement. Democratic political movements and cosmopolitanism were also on the

[112] Bostrom, "The Transhumanist FAQ v. 2.1," 4, 40; Bostrom, "A History of Transhumanist Thought," 2; Hughes, "Contradictions from the Enlightenment Roots of Transhumanism."
[113] Kieron O'Hara, *The Enlightenment: A Beginner's Guide* (Oxford: Oneworld Publications, 2010), 28.
[114] More, "The Philosophy of Transhumanism."
[115] More, "The Philosophy of Transhumanism."
[116] Isaac Kramnick, ed., *The Portable Enlightenment Reader* (New York: Penguin, 1995), x.
[117] Roy Porter, "Introduction," in *The Cambridge History of Science Volume 4: Eighteenth-Century Science*, ed. Roy S. Porter (Cambridge: Cambridge University Press, 2003), 7, doi: 10.1017/CHOL9780521572439.002.

rise, as was religious tolerance among intellectual elites.[118] Moreover, the Malthusian cycles of demographic growth and decline that had characterised previous centuries came to an end and population growth continued unfettered into the modern era.[119]

In the Western intellectual culture of the period, coercive rule and collective responsibility were also pitted against individual values, agency and the freedom to pursue self-improvement. Many leading thinkers of the age did not view man as inherently corrupt, as orthodox Christian doctrine suggested. The philosopher John Locke famously argued that the mind is a blank slate; humans are ethically neutral and can either be corrupted or improved through experience.[120] While modern transhumanists do not necessarily subscribe to the blank slate argument, they are supportive of the idea that it is in our best interests "to modify our nature, to alter ourselves, to augment and shape ourselves according to our values."[121] They also reject "the assumption that the 'human condition' is at root a constant.'"[122]

With Democratic political movements afoot, and calls to separate Church and State, new governments were formed, like the first independent government of America, which was set up with the ideal of protecting the individual's rights to "Life, Liberty, and the pursuit of Happiness."[123] In *The Wealth of Nations* (1776), the Scottish economist and philosopher, Adam Smith, argued that the 'invisible hand' of the free market should determine economic success without governments stacking the deck in favour of certain competitors. In a truly free-market system individuals could better themselves through

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[118]A. Wolf, *A History of Science Technology, and Philosophy in the Eighteenth Century* (London: George Allen & Unwin Ltd, 1938), 27-44.
[119] Isser Woloch, *Eighteenth Century Europe: Tradition and Progress, 1715-1789* (New York: W.W. Norton & Company, 1982), 107-109.
[120] John Locke, *An Essay Concerning Human Understanding*, abridged, ed., Kenneth P. Winkler (Indianapolis: Hackett Publishing Company, 1996).
[121] Max More, "Beyond the Machine: Technology and Posthuman Freedom."
[122] Nick Bostrom, "Predictions from Philosophy?: How philosophers could make themselves useful," archived April 9, 1997, accessed August 2, 2018, https://web.archive.org/web/20000817094452/https://www.hedweb.com/nickb/predict.htm.
[123] The American Declaration of Independence, in *The Portable Enlightenment Reader*, 448-452.

hard work and would rise or fall by their own initiative. In turn, he believed that the community would benefit from rising productivity.[124]

In his widely cited essay "What Is Enlightenment?" (1784), the German philosopher Immanuel Kant argued that the Enlightenment ideal was characterised by the promotion of individual thought and self-determination. He declared, "*Sapere aude!* 'Have courage to use your own reason!'—that is the motto of Enlightenment." Kant believed that humans could improve themselves and their societies and "work themselves gradually out of barbarity."[125] This Enlightenment ideal of progress, associated with reason, science and free inquiry, is a major source of inspiration to modern transhumanists and a major intellectual foundation on which modern transhumanist worldviews are built.[126]

In this chapter we explore the ideas of three key eighteenth century thinkers who display clear proto-transhumanist sensibilities: the French materialist physician Julien Offray de La Mettrie, the French polymath and political scientist Jean-Antoine-Nicolas Caritat (known as the Marquis de Condorcet), and the American founding father and inventor Benjamin Franklin. These are not the only three thinkers of the age who we could discuss as proto-transhumanists, but they have been selected for their links with other predecessors and successors, and for the diverse range of transhumanist themes that, between them, they explored.

Julien Offray de La Mettrie (1709-1751)

Nearly three hundred years before modern transhumanism took root, Julien Offray de La Mettrie extrapolated from much of Descartes' research on human physiology, extending his ideas about biology being mechanistic, while rejecting Descartes' most famous premise of mind-body dualism. But although La Mettrie's brand of materialism was unencumbered by the religious compromises and logical inconsistencies of dualism, he

[124] Isaac Kramnick, introduction to *The Portable Enlightenment Reader*, xv-xvii.
[125] Immanuel Kant, "What Is Enlightenment?," in *The Portable Enlightenment Reader*, 1-7.
[126] See: Bostrom, "A History of Transhumanist Thought," 2-4.

still considered Descartes to be a key pioneer of materialist philosophy and acknowledged him as a formative influence on his own ideas.[127] La Mettrie rebuked the critics of Cartesianism declaring, "without him the field of philosophy, like science without Newton, would still be fallow ground." Taking the context of Descartes' world into consideration, he insisted, "only a churl would not forgive him his errors!"[128]

A physician with a keen interest in neuroscience, La Mettrie's challenges to Cartesian dualism place him on common ground with the modern philosopher and cognitive scientist Daniel Dennett. For La Mettrie and Dennett there is no soul extrinsic to the human body; the characteristics often attributed to a soul or higher cognitive faculties are the emergent properties of brain function and physiology; humans are biological thinking machines. This supposition is now the dominant scientific position regarding mind, body and consciousness,[129] though the position remains philosophically contentious.[130]

While transhumanists have yet to make much of La Mettrie as an intellectual forebear, the contemporary neuropsychiatrist Jeffrey M. Schwartz and his co-author Sharon Begley have dubbed La Mettrie's perspective on consciousness "remarkable" for "how contemporary it sounds in this, the age of computer intelligence."[131] In 1964, connections between La Mettrie's ideas and modern cybernetics were drawn by the philosopher Keith Gunderson, who mused:

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[127] Albert, *History of Materialism*, 243.
[128] Julien Offray de La Mettrie, *Man A Machine and Man A Plant*, trans. Richard A. Watson and Maya Rybalka (Indianapolis: Hackett Publishing Company, Inc., 1994), 71.
[129] Philip H. Gray, "The Nature of Man or Man's Place in Nature? Bruno, Spinoza, and La Mettrie," *The Journal of General Psychology* 17 (1967): 190; Jeffrey M. Schwartz and Sharon Begley, *The Mind and The Brain: Neuroplasticity and the Power of Mental Force* (New York: Regan Books, 2002), 35.
[130] Stefano Franchi and Güven Güzeldere, "Machinations of the Mind: Cybernetics and Artificial Intelligence from Automata to Cyborgs, in *Mechanical Bodies, Computational Minds: Artificial Intelligence from Automata to Cyborgs*, ed., Stefano Franchi and Güven Güzeldere (Massachusetts: The MIT Press, 2005), 39.
[131] Schwartz and Begley, *The Mind and The Brain*, 35.

> Cyberneticians and those working in the areas of computer simulation of cognitive processes and artificial intelligence may turn out to be a kind of collective 'Prometheus' who will provide us with the linguistically proficient mechanical man envisioned by La Mettrie.[132]

In 1994, the philosopher and science fiction writer, Justin Leiber, made a similar observation, writing:

> Rightly or wrongly, we are beginning to think of ourselves as biological thinking machines. We are also trying to make artificial thinking machines… Today, Mr. Machine, as La Mettrie mechanically dubbed himself, finally has his audience.[133]

The only mentions I have found of La Mettrie in transhumanist literature are a brief note by Bostrom recognising him as an important early materialist,[134] an even briefer note by More, aligning La Mettrie with Dennett and the view that "humans are machines,"[135] and some commentary by Natasha Vita-More on the possible connection between La Mettrie's idea of man as a machine and the transhumanist theme of man-machine convergence.[136] However, La Mettrie's materialistic ideas are more relevant in proto-transhumanist history than has yet been noted, as they implicitly support the prospect of AGI, which, if developed, would create a possible pathway to posthumanity.

La Mettrie hints at the possibility of one day making a talking man with the same powers of speech and reason as a real person; the kind of machine that Descartes believed could never truly be intelligent. His ideas about free will and personhood are also profoundly modern and support many transhumanists' (patternist and functionalist) arguments that

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[132] Gunderson, "Descartes, La Mettrie, Language, and Machines," 222.
[133] Justin Leiber, introduction to *Man A Machine and Man A Plant*, by Julien Offray de La Mettrie (Indianapolis: Hackett Publishing Company, Inc., 1994), 7.
[134] Bostrom, "A History of Transhumanist Thought," 3.
[135] Max More, "Beyond the Machine: Technology and Posthuman Freedom," Paper in proceedings of Ars Electronica 1997, archived Nov 11 1999, accessed July 31, 2018, https://web.archive.org/web/19991111063105/http://www.maxmore.com:80/machine.htm. More distinguished his view from La Mattrie's and Dennet's in this paper, but has subsequently expressed a broadly similar (materialist) view of human nature.
[136] Natasha Vita-More, "Life Expansion Media," in *The Transhumanist Reader*.

it may be possible to attribute intelligence and human-like characteristics to non-biological beings.

La Mettrie on nature and nurture

In La Mettrie's view, all humans are not created equal. Innate characteristics and environmental interactions condition our personalities and abilities. It is not the generic human form that makes us what we are, for he observed that when dissected our brains and bodies are almost identical to those of the great apes; "same shape, same structure everywhere."[137] He also noted that "man has the largest and most convoluted brain of all the animals in proportion to the size of his body," but insisted that "brain volume alone" is not sufficient to determine intelligence and capability.

He further observed that many madmen have larger brains than animals, yet the function of their brains is impaired by physical defects that physicians have not yet learned to detect; "*A trifle, a tiny fiber, something the most subtle anatomical dissection cannot discover*." For La Mettrie, the cause of these problems had to be physical and he believed that these imperceptible defects were the tiny switches that if flipped "would have made idiots of Erasmus and Fontanelle."[138]

Like most modern transhumanists, La Mettrie believed that humans were both pre-programmed and re-programmable. Free will is ultimately circumscribed by the limits of one's physiology and genetic endowment—or, to use La Mettrie's pre-Mendelian turn of phrase, "the father's semen has sovereignty over the minds and bodies of their children."[139] However, inherited characteristics manifest themselves in different ways according to environmental influences, which can alter the complex workings of the bodily machine.

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[137] La Mettrie, *Man A Machine and Man A Plant*, 36.
[138] La Mettrie, *Man A Machine and Man A Plant*, 36-37.
[139] La Mettrie, *Man A Machine and Man A Plant*, 35.

In 1742, La Mettrie was employed as a military physician and he accompanied his employer, the Duke of Grammont, into battle. The Duke was killed by a cannon blast and "La Mettrie became ill with that fever during which he was supposed to have seen how dependant the mental life is on the physical life." He subsequently reached the conclusion "that thought is but a consequence of the organization of the human machine."[140] The smallest things, from fatigue and lack of sleep, to fever and illness can affect one's cognitive abilities, disposition and behaviour. La Mettrie went on to cite many examples in *Man A Machine and Man A Plant (1747)* in which lifestyle and environment influence the body, and subsequently, the mind, from stimulants and opioids, to food, pregnancy and the weather.[141]

Transcending biological limits

Roughly a hundred years before Charles Darwin presented and published his theory of evolution by natural selection, La Mettrie had already divined that plants, animals, humans, and by extension, machines, fall on an evolutionary continuum—all are comprised of the same elementary particles and in the case of animals and humans, these elementary particles are remarkably similar in assemblage. Existing on a continuum with other organisms, a human being is nothing more than "a well-enlightened machine" and differs from animals only in having "a few more cog wheels and springs."[142]

With this basic premise underpinning his worldview, it was not much of a leap for La Mettrie to begin envisioning ways of adding yet more cogs and springs and artificially augmenting the capabilities of animals and humans. Much like modern transhumanists, the only hard limits he could see restricting human augmentation came in the form of natural laws, which appeared to him to have a fairly wide scope for manipulation. In his

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[140] Philip H. Gray, "The Nature of Man or Man's Place in Nature? Bruno, Spinoza, and La Mettrie," *The Journal of General Psychology* 17 (1967): 189.
[141] La Mettrie, *Man A Machine and Man A Plant*, 31-35.
[142] La Mettrie, *Man A Machine and Man A Plant*, 59.

words, "set no bounds on nature's resources; they are infinite, particularly when aided by great art."[143]

Like Descartes, La Mettrie imagined the creation of a human automaton, or "a *talker*," a creation he declared, "which can no longer be regarded as impossible, particularly in the hands of a new Prometheus."[144] Like Descartes, La Mettrie was one of the first thinkers to lay the philosophical and neuroscientific foundations for a vision of a human-like artificial intelligence.[145] Unlike Descartes, however, he believed that an AGI *could* be built, though it would require incredible skill and would be a very complex machine.

While La Mettrie may not have placed indefinite life-extension projects at the centre of his agenda, or looked ahead to a clear vision of a likely posthuman future, he did hint at the possibility of reverse engineering human biology and enhancing the current capabilities of the human-machine. His ideas form part of an important continuum linking seventeenth century materialism, to modern transhumanist views of humans as biological and upgradeable machines.

The Marquis de Condorcet (1743-1794)

The French philosopher and polymath, the Marquis de Condorcet, is another thinker who saw beyond the moment and thought beyond the day. He was a strong believer in reason, empiricism, and the natural sciences, and was optimistic about the potential for the human race to better itself by eliminating national and sectarian divisions, slavery, and inequality of opportunity.[146]

Condorcet's visions of future progress extended far beyond the normative expectations of his contemporaries. He believed that most orthodox opinions, particularly those based

[143] La Mettrie, *Man A Machine and Man A Plant*, 40.
[144] La Mettrie, *Man A Machine and Man A Plant*, 69.
[145] Franchi and Güzeldere, "Machinations of the Mind," 40.
[146] Marquis de Condorcet, "The Sketch," in *Condorcet: Political Writings*, ed. Steven Lukes and Nadia Urbinati (New York: Cambridge University Press, 2012), ch.1.

on faith rather than reason, science and experience, were "founded on ignorance of the laws of nature." Hence, he declared:

> The inventors, the defenders of these absurdities could not foresee the successive perfection of the human mind. Convinced that men in their day knew everything that they could ever know and would always believe what they then believed, they confidently supported their idle dreams on the current opinions of their country and their age.[147]

Condorcet thought it was a preposterous assumption that Enlightenment values and the sum total of human knowledge in his day would remain constant. There was much more to know, and in the wake of new discoveries the chasm of present ignorance would seem to grow in retrospect. Meanwhile, values and expectations would surely change with more advanced understanding and innovation.[148]

An optimistic meliorist

Condorcet was acutely aware of the substantial progress humanity had made since the Agricultural Revolution, and believed that the strides made in understanding human cognition and physiology would only continue to lengthen, with no ultimate limits being, as yet, foreseeable. He considered it logical that, as long as humanity was not confronted by a cataclysmic setback, our species and our societies would continue to advance at a rapid rate. He declared that the principal aim of his *Sketch for a Historical Picture of the Progress of the Human Mind* (1794)[149] was:

> [T]o show by appeal to reason and fact that nature has set no term to the perfection of human faculties; that the perfectibility of man is truly indefinite; and that the progress of this perfectibility, from now onwards independent of any power that might wish to halt it, has no other limit than the duration of the globe upon which nature has cast us. This progress will doubtless vary in speed, but it will never be reversed as long as the earth occupies its present place in the system of the universe, and as long as the general laws of this system produce neither

[147] Condorcet, "The Sketch."
[148] Condorcet, "The Sketch."
[149] *The Sketch* was written shortly before Condorcet's death in March 1794, and published posthumously later that year.

> a general cataclysm nor such changes as will deprive the human race of its present faculties and its present resources.[150]

Condorcet was extremely optimistic about the future. But within this declaration there is still the acknowledgement that "a general cataclysm" or massive setback is possible. This acknowledgement is important as it parallels the acknowledgements made by many modern transhumanists that (in spite of, or perhaps because of, accelerating technological progress) major setbacks, or existential catastrophes, are possible. Even the most utopian of transhumanists tend to acknowledge, and aspire to mitigate, the risks posed by transhumanist technologies.[151]

Condorcet and life-extension

Bostrom and More have each noted that Condorcet grappled with the question of whether it was possible to use science to extend the human lifespan.[152] In the final chapter of his *Sketch*, Condorcet pondered:

> Would it be absurd, then, to suppose that this perfection of the human species might be capable of indefinite progress; that the day will come when death will be due only to extraordinary accidents or to the decay of the vital forces, and that ultimately the average span between birth and decay will have no assignable value? Certainly man will not become immortal, but will not the interval between the first breath that he draws and the time when in the natural course of events, without disease or accident, he expires, increase indefinitely?[153]

More refers to the passage above as a "transhumanistic statement"[154] and hails it approvingly for its scientific and secular emphasis. The Mormon transhumanist Lincoln Cannon also cites Condorcet as an influential proto-transhumanist, citing his interest in

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[150] Condorcet, "The Sketch."
[151] Ray Kurzweil is probably the transhumanist who is most frequently accused of being a utopian techno-optimist, yet he certainly takes the risks posed by advanced technologies seriously. See: *The Singularity is Near*, ch.8.
[152] Bostrom, "A History of Transhumanist Thought," 3; More, "The Philosophy of Transhumanism," loc. 790.
[153] Condorcet, "The Sketch."
[154] More, "The Philosophy of Transhumanism."

the possibility of using medical science to prolong human life.[155] Hughes finds an additional aspect of Condorcet's thinking to praise, dubbing the French philosopher, "one of the most interesting early champions of democratic transhumanism."[156]

Democratic transhumanism is a brand of transhumanist thought that emphasises the need for democratic nation states to promote transhumanist technologies, while helping to mitigate the new risks they pose and ensuring equal access to their benefits. Condorcet was a Republican in his day, who advocated for the rights of women and blacks, before he was branded a traitor in the tumultuous years following the French Revolution. As a democratic transhumanist, Hughes strongly identifies with Condorcet's, "optimistic faith in humanity's ability to liberate itself with technology and democracy."[157]

Condorcet further noted that human lifespans do not appear to be fixed, stating, "we do not know what the limit is which it can never exceed. We cannot tell even whether the general laws of nature have determined such a limit or not."[158] In an age where new innovations like vaccines symbolised humanity's growing power over nature, Condorcet believed that humanity's means of manipulating nature and biology would surely expand in the years to come. Medicine, in particular, would "become more efficacious," especially "preventative medicine." Basic lifestyle improvements like better "food and housing" could eliminate the risk factors posed by both "misery and excessive wealth." Condorcet also envisaged the elimination of "all other diseases… as their distant causes are discovered."[159]

When it comes to the prospect of radical life-extension, modern transhumanists have more in common with Condorcet than with most of their non-transhumanist contemporaries. According to a 2013 Pew study, radical life-extension that could extend

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[155] Lincoln Cannon, "What is Mormon Transhumanism?" *Theology and Science* 13, no. 2 (2015): 207, doi: 10.1080/14746700.2015.1023992.
[156] Hughes, *Citizen Cyborg*, ch.11.
[157] Hughes, *Citizen Cyborg*, ch.11.
[158] Condorcet, "The Sketch."
[159] Condorcet, "The Sketch."

a human lifespan beyond the age of one hundred and twenty years is not considered a worthwhile goal by most Americans. Given the option, fifty-six percent of Americans said that they would *not* choose to slow the aging process and live beyond a hundred and twenty. However, two thirds of Americans said that they would like to live longer than the average US life expectancy (78.7 years in 2013), the median ideal being 90 years.[160]

This survey indicates that most Americans value their lives and health considerably and want at least a little more of it. Yet the average person seems to struggle considerably with the concept of *radical* life-extension, which contravenes ingrained expectations about human life and the natural order. In contrast, proto-transhumanists and transhumanists seem to naturally default to a very different view of life-extension. They tend to be very comfortable with the idea of radical longevity, at least when it is coupled with healthspan extension, and consider these goals, when pursued together, to be both technically feasible and desirable.

Benjamin Franklin (1706-1790)

The renowned eighteenth century American polymath, Benjamin Franklin, was an intrepid scientist, inventor and explorer of the unknown. He is mentioned by both Hughes and Bostrom as an important early life-extension enthusiast.[161] In 1999, the transhumanist Greg Burch also wrote, "I am currently reading a biography of Benjamin Franklin… as part of my on-going study of the 18th century Enlightenment as a rich lesson-plan for extropians and the transhumanist movement."[162]

In a letter to his friend, the French physician, botanist and writer, Jacques Barbeu-Duborg (1773), Franklin wistfully imagined having his own body preserved so that he could be revived in the future to see the progress of humankind. He wrote:

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[160] *Pew Research Center*, "Living to 120 and Beyond: Americans' Views on Aging, Medical Advances and Radical Life Extension," August 6, 2013, http://www.pewforum.org/2013/08/06/living-to-120-and-beyond-americans-views-on-aging-medical-advances-and-radical-life-extension/.
[161] Bostrom, "A History of Transhumanist Thought," 3; 10; Hughes, *Citizen Cyborg*, ch.10.
[162] Greg Burch, "Franklin and the Fire From Heaven," archived Feb 21, 1999, accessed July 27, 2018, https://web.archive.org/web/19990221054222/http://users.aol.com/gburch3/franklin.html.

> I wish it were possible, from this instance, to invent a method of embalming drowned persons, in such a manner that they may be recalled to life at any period, however distant; for having a very ardent desire to see and observe the state of America a hundred years hence, I should prefer to any ordinary death, the being immersed in a cask of Madeira wine, with a few friends, till that time, then to be recalled to life by the solar warmth of my dear country! But since in all probability we live in an age too early and too near the infancy of science, to hope to see such an art brought in our time to its perfection, I must for the present content myself with the treat, which you are so kind as to promise me, of the resurrection of a fowl or a turkey cock.[163]

Franklin is responding here to Duborg's previously conveyed, "observations on the causes of death" and his proposed experiments "for recalling to life those who appear to have been killed by lightning." Musing on the viability of such an ambitious undertaking, Franklin reflected that it was impossible to know if such a feat could be achieved as, "the doctrines of life and death in general are yet but little understood."[164] However, his letter displays an interest in reanimation and a willingness to take the possibility of such a process seriously, which few people do even now, barring those (mostly transhumanists) who are signed up for cryonic suspension.

In a later epistle, addressed to the English natural philosopher Joseph Priestley in 1780, Franklin reflected (again, with some regret) that he had probably been born too soon to see the astounding advances that science may one day engender. He imagined that potential future advances might include: rising wealth, safe and efficient air travel, the decline in subsistence living and hard labour, the curing of disease, and the lengthening of the human lifespan, though he was less optimistic about similar advances in human compassion and moral sensibilities. In his words:

> The rapid progress true science now makes, occasions my regretting sometimes that I was born so soon. It is impossible to imagine the height to which may be carried, in a thousand years, the

[163] Benjamin Franklin, "655. To Barbeu Duborg," in *The Writings of Benjamin Franklin*, *Volume VI*, ed. Albert Henry Smyth (New York: Haskell House Publishers Ltd, 1970), 43-44. A shoter version of this quote appears in: Bostrom, "A History of Transhumanist Thought," 3. I first became aware of Franklin as a proto-transhumanist after consulting this source.
[164] Franklin, "655. To Barbeu Duborg," 42.

> power of man over matter. We may perhaps learn to deprive large masses of their gravity, and give them absolute levity, for the sake of easy transport. Agriculture may diminish its labour and double its produce; all diseases may by sure means be prevented or cured, not excepting even that of old age and our lives lengthened at pleasure even beyond the antediluvian standard. O that moral science were in as fair a way of improvement, that men would cease to be wolves to one another, and the human beings would at length learn what they now improperly call humanity![165]

In a later letter, written in 1783 to the President of the Royal Society of London, Sir Joseph Banks, Franklin reiterated his lament that he was born too soon, writing:

> I am pleased with the late astronomical discoveries made by our society. Furnished as all Europe now is with academies of science, with nice instruments and the spirit of experiment, the progress of human knowledge will be rapid, and discoveries made, of which we have at present no conception. I begin to be almost sorry I was born so soon, since I cannot have the happiness of knowing what will be known 100 years hence.[166]

Many transhumanists also consider truncated human potential and the inability to live long enough to see the changes of the future to be lamentable. Franklin was indeed born too soon to have any hope of being reliably preserved or reanimated, but he was already envisaging something similar to cryonic suspension and had no doubt that advances far beyond his own imaginings would come. His greatest regret was that he would not live to see them materialise.

Other thinkers of the period

As there are many other thinkers of the period whom we could mention as proto-transhumanists, I will briefly refer to a few of them here. The English physician and author Thomas Beddoes (1760-1808) was reportedly swept up by the fever of "late Enlightenment perfectibilism." Although he was aware of the limitations of medicine in his day, Beddoes reasoned that, eventually, "'the same power will be acquired over

[165] Benjamin Franklin, "Franklin, Letter to Joseph Priestly," in *The Age of Enlightenment*, ed. Lester G. Crocker (London: Macmillan, 1969), 294-295.
[166] Benjamin Franklin, "'There Never Was A Good War…'" in *The Portable Enlightenment Reader*, ed. Isaac Kramnick (New York: Penguin, 1995), 551.

living, as is at present exercised over some inanimate bodies." Such power would lead not only to "the cure and prevention of diseases, but the art of protracting the fairest season of life and rendering health more vigorous," thereby constituting a partial realisation of the age old "dream of Alchemy."[167]

In a letter to the English poet, philosopher and physician, Erasmus Darwin, Beddoes opined that, regarding medicine, "a great revolution in this art is at hand." He wrote:

> If you do not, as I am almost sure you do not, think it absurd to suppose the organization of man equally susceptible of improvement from culture with that of various animals and vegetables, you will agree with me in entertaining hopes not only of a beneficial change in the practice of medicine, but in the constitution of human nature itself.[168]

Another leading French Enlightenment thinker, who co-authored one of the most influential early modern encyclopedias, Denis Diderot (1713-1784), also had some remarkably ambitious ideas about the ways that matter and human biology could be manipulated through science and technology. Hughes has acknowledged Diderot as a potential transhumanist precursor, writing:

> Denis Diderot suggested that humanity might evolve into a great variety of posthuman species. In *D'Alembert's Dream*, Diderot (1769) proposed that brains might be taken apart and reconstituted later, that intelligent animals and animal-human hybrids might be possible, and that sophisticated machines might have minds.[169]

In a fictional exchange in the Socratic dialogue of *D'Alembert's Dream*, two characters discuss the differences between unassembled matter and the clumps of matter that compose a human being. If parts of the human could be removed or disassembled, they query to what extent the original person would remain. In addition, if a person was

[167] Porter, "The Wilkins Lecture 2000," 313.
[168] Porter, "The Wilkins Lecture 2000," 312-313.
[169] Hughes, "The Politics of Transhumanism," 760.

disassembled and reassembled again from the same matter, would they be someone else entirely if the pattern of their memories and original assembly was lost?[170]

In another exchange in *D'Alembert's Dream* between the fictional Diderot, and the fictionalised version of his friend, D'Alembert, the pair explore the idea that modern transhumanists now call patternism:

> Diderot: Could you tell me what the existence of a sentient being is in relation to itself?
> D'Alembert: It's the consciousness of having been itself from the first moment of reflection until the present moment.
> Diderot: And what is this consciousness founded on?
> D'Alembert: On the memory of its actions.
> Diderot: And without this memory?
> D'Alembert: Without this memory there'd be no 'itself.' Since it would not sense its existence except at the moment of receiving an impression, it would have no history of its life. Its life would be an interrupted series of sensations in which nothing was connected.[171]

Another thinker of the period, whose life also extended into the nineteenth century, was the British philosopher and novelist William Godwin (1756-1836). Godwin was the father of Mary Shelley, the author of the classic gothic novel, *Frankenstein; or, The Modern Prometheus* (1823). He was also an ardent believer in the power of reason and mind to improve the human condition. According to the *Stanford Encyclopedia of Philosophy*, Godwin was a prolongevist who:

> … looked forward to a period in which the dominance of mind over matter would be so complete that mental perfectibility would take a physical form, allowing us to control illness and ageing and become immortal.[172]

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[170] Denis Diderot, *D'Alembert's Dream and Rameau's Nephew*, trans. Ian Johnston (Virginia: Richer Resources Publications, 2014), kindle, part 2, D'Alembert's Dream.
[171] Diderot, *D'Alembert's Dream and Rameau's Nephew*, kindle, part 1, Conversation Between D'Alembert and Diderot.
[172] *Stanford Encyclopedia of Philosophy*, "William Godwin," Jan 16, 2000, revised Feb 16, 2017, https://plato.stanford.edu/entries/godwin/.

He also imagined a future world in which few people die and few are born. According to the historian of science, Roy Porter, Godwin, "positively looked forward to a future geriatric paradise" believing it "would be an extremely eligible state of affairs, because maturity brought wisdom, independence and happiness."[173] A number of modern transhumanists have also stressed that the death of older, experienced people who have spent a lifetime accruing valuable knowledge and skills is a great loss to society, and they have argued in favour of developing life-extension technologies to give those who wish to live longer, in a state of health, the option.[174]

Godwin was very optimistic about human progress and embraced radical ideas that he believed could promote a better version of the good life. In contrast, his contemporary, Thomas Malthus, mounted what he considered to be a conclusive argument "against the perfectibility of the mass of mankind." In his *An Essay on the Principle of Population* (1798) Malthus famously argued that the human population was increasing exponentially while food production was linear, therefore society would soon find itself unable to support such rapid expansion and famine and misery would ensure. Malthus was adamant that no technological intervention or "agrarian regulations… could remove the pressure" of this resource burden "even for a single century."[175]

Godwin wasn't convinced. His counterargument, neatly summarised by Porter, was that "such a threat would be averted by the simultaneous withering away of sexual desires—a proposal which notoriously reduced Malthus to guffaws."[176] In response to his detractors, "Godwin countered that it was 'our vanity' which prompted us 'to suppose that we have reached the goal of human capacity'—they it was, not he, who were being presumptuous."[177] In *An Enquiry Concerning Political Justice* (1793), Godwin imagined that in the future:

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[173] Roy S. Porter, *Flesh in the Age of Reason* (London: Allen Lane, 2003), 427.
[174] See: Bostrom, "The Transhumanist FAQ v. 2.1," 31.
[175] Thomas Malthus, "An Essay on the Principle of Population," in *The Age of Enlightenment*, ed. Lester G. Crocker (London: Macmillan, 1969), 316.
[176] Porter, "The Wilkins Lecture 2000," 319.
[177] Porter, *Flesh in the Age of Reason*, 428.

> The men therefore who exist when the earth shall refuse itself to a more extended population, will cease to propagate, for they will no longer have any motive, either of error or duty, to induce them. The whole will be a people of men, and not of children. Generation will not succeed generation, nor truth have in a certain degree to recommence her career at the end of every thirty years.[178]

While we have not yet reached such a point, concerns regarding population growth and resource scarcity are widespread today. Notably, transhumanists are among the few modern voices contemplating radical Godwinesque solutions, like promoting radical life-extension and ceasing to procreate biologically.[179]

Concluding remarks

The Enlightenment is an important period in proto-transhumanist history. As print culture and literacy proliferated, the Enlightenment values of free inquiry, rationality and self-determination spread across Britain, Europe and America, along with the ideal of promoting human progress through science, technology and cultural development. During this period, leading thinkers began to contemplate the prospect of human perfectibility on a historically unprecedented scale.

Building on the developments of the Scientific Revolution, the ideals of progress and self-determination that proliferated during the Enlightenment laid the foundations of the secular humanist worldview on which modern transhumanism builds. But it was too early for a modern transhumanist philosophy and social movement to emerge in the eighteenth century. First, humans needed to industrialise.

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[178] William Godwin, *An Enquiry Concerning Political Justice* (Oxford: Oxford Univeristy Press, 2013), 458.
[179] For transhumanist reflections on the future of sex and procreation, see: Bostrom, "The Future of Human Evolution," 9; Robert C. W. Ettinger, *Man Into Superman: The Startling Potential of Human Evolution—And How to Be Part of It (Plus Additional Comments By Others "Developments In Transhumanism 1972-2005)*, ed. Charles Tandy (Palo Alto: Ria University Press, 2005), 88-121; Natasha Vita-More, "Future of Sexuality," Presented at *EXTRO 3* Conference, 1997, archived January 17, 1999, https://web.archive.org/web/19990117021554/http://www.extropic-art.com:80/sex.htm; Natasha Vita-More, "SEX!," archived February 3, 1999, https://web.archive.org/web/19990203074340/http://transhuman.org:80/sex.htm; Sirius and Cornell, "Sexbots," in *Transcendence*.

3. 19th Century Proto-transhumanism

Who can set bounds to the possibilities of man?

— Ralph Waldo Emerson, *Nature* (1836)

Let us believe in a kind of optimism in which we are our own gods.

— Percy Bysshe Shelley, "Letter XXIV. To Mrs. Gisborne" (1819)

We are ourselves creating our own successors… we are daily giving them greater power and supplying by all sorts of ingenious contrivances that self-regulating, self-acting power which will be to them what intellect has been to the human race. In the course of ages we shall find ourselves the inferior race.

— Samuel Butler, "Darwin among the Machines" (1863)[i]

I held it truth, with him who sings
To one clear harp in divers tones,
That men may rise on stepping stones
Of their dead selves to higher things.

— Alfred Lord Tennyson, "In Memoriam" (1850)

The nineteenth century was an era of rapid and radical change. As the Industrial Revolution gained momentum, Europeans developed ever-more divergent views about the promise and peril of machines, the value of nature and urbanisation, and the virtues of classicism and modernity. The English poet Matthew Arnold captured the tension between established values and lifeways, and those emerging in the Victorian age, when he wrote of, "Wandering between two worlds, one dead, / The other powerless to be born."[180] Orthodox institutions, practices and belief systems did not disappear overnight; they co-existed and jousted with the new. Revolutionary individualism and optimistic

[180] Matthew Arnold, "Stanzas from the Grand Chartreuse," *Poetry Foundation*, first published 1855, https://www.poetryfoundation.org/poems/43605/stanzas-from-the-grande-chartreuse.

fervor competed with restoration sensibilities and reactionary conservatism. The rationalism of the Enlightenment was also challenged, though not completely opposed, by the sensuality and naturalism of Romanticism.[181]

With so many profound social, political, and scientific milestones occurring in such a short period, it is difficult to do justice to the many diverse facets of the age and treat the important events with due depth and care. The thinkers and events covered here necessarily comprise an incomplete representation, not just of the nineteenth century, but also of nineteenth century proto-transhumanism. Almost every industrial technology and system is peripherally relevant to the pre-history of transhumanism, from the Jacquard Loom to the assembly line. So, too, is the sudden proliferation of stimulants like caffeine, which enhanced concentration and alertness on an unprecedented scale, in effect, augmenting the functioning of the human-machine.

Throughout the century, hundreds, if not thousands, of scientists and polymaths conducted experiments, or came up with inventions, that were designed to improve the human condition, extend humanity's reach over the natural world and/or bridge the gap between man and machine. Many diverse artistic movements and subcultures of the period also developed ideas that overlap with some transhumanist themes, from Italian futurism, to Russian Cosmism, to *fin de siècle* science fiction writing, both utopian and dystopian.

Yet it is not possible to cover every peripheral precursor in this chapter and I have made the choice to focus more on the major revolutions in lifeways and modes of thinking in this period than on specific thinkers. A discussion of these broader revolutions will give us a better insight into the nature and culture of the time, and will help highlight how the major changes of the period were crucial in facilitating the future emergence and proliferation of modern transhumanism. Interspersed between these discussions of major changes, I explore the ideas of two significant nineteenth century proto-

[181] Robin W. Winks and Joan Neuberger, *Europe and the Making of Modernity, 1815-1914* (New York: Oxford University Press, 2005), 11, 42.

transhumanists: the British anatomist and Darwinist, Thomas Henry Huxley, and the French journalist and futurist, Jean Finot.

The Industrial Revolution

The Industrial Revolution is the first strong historical analog for the modern phenomenon of a quantum leap in human progress, resulting in radically altered ways of life in a short span of time.[182] The only other equal, or greater, quantum leap in human history has been the more recent jump into the Information Age in the late twentieth and early twenty-first centuries.[183] Unlike the many developments that occurred throughout the Agricultural Revolution, the effects of industrialisation were discernible in Britain and Europe within a single human lifetime.

From the steam engine, to electric motors, incandescent light bulbs, and early calculating machines, like Charles Babbage's Difference Engine and Analytical Engine, the nineteenth century saw more game-changing revolutions in technology and society than any previous age in human history. A number of profoundly modern scientific theories also emerged, which forever changed dominant Western conceptions of humanity's place in the natural order. Some of these revolutionary ideas included Charles Darwin and Alfred Russel Wallace's theory of evolution by natural selection, Sigmund Freud's concept of the unconscious mind, James Clerk Maxwell's unification of electricity and magnetism, and the basic principles of heredity outlined by Gregor Mendel.

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[182] The Industrial Revolution is not just an analog but an important socio-historical transformation that enabled previously untapped energy, contained in fossil fuels, to be harnessed and put to work on a massive scale. The historians John McNeill and Peter Engelke chronicle the unprecedented acceleration of global population growth, rising technological capabilities, growing urbanisation, and profound ecological impacts, which began to occurr from the Industrial Revolution onwards. Enabled by the Industrial Revolution, these trends began accelerating extremely rapidly in the mid-twentieth century. See: J. R. McNeill and Peter Engelke, *The Great Acceleration: An Environental History of the Anthropocene since 1945* (Cambridge, MA: The Belknap Press of Harvard University Press, 2014).

[183] For key discussions of rapid modern techno-social evolution, see: Kurzweil, *The Singularity is Near*; Jeremy Rifkin, *The Third Industrial Revolution: How Lateral Power is Transforming Energy, the Economy, and the World* (New York: St. Martin's Press, 2011); and Erik Brynjolfsson and Andrew McAfee, *The Second Machine Age: Work, Progress, and Prosperity in a Time of Brilliant Technologies* (New York: W. W. Norton & Company, 2014), kindle.

Of all the innovations and revolutions of the period, we must be selective when choosing which to highlight. However, there is no doubt that there is one that we *must* emphasise.

The Darwinian Revolution

Charles Darwin's evolutionary theories are crucial, not only for contextualising the intellectual culture of the nineteenth century, but for making sense of every subsequent philosophy or movement based on a modern scientific worldview. The idea of evolution by natural selection does not directly foreshadow specific transhumanist ideas or principles, as Darwin never argued that humans should use technology to accelerate the pace of evolution or augment their capabilities. Yet biological evolution is a scientific orthodoxy that most, if not all, modern transhumanists accept.[184] The major revelations of Darwinism—especially the phenomenon of the mutability of all species, including our own—are integral to the core projections and worldviews of modern transhumanists.

Harking back to Darwin as a key thinker who revolutionised dominant views about humanity's place in nature and our species' capacity for transformation and evolution, Bostrom affirms that:

> After the publication of Darwin's *Origin of Species* (1859), it became increasingly plausible to view the current version of humanity not as the endpoint of evolution but rather as a possibly quite early phase.[185]

Unsurprisingly, transhumanists extend the implications of Darwinian logic much further than Darwin ever did, framing transhumanist technologies, and the emergence of posthuman entities, as a natural and likely evolutionary step. This next step is seen to be enabled by biological evolution, as humans and their toolmaking abilities are emergent properties of biological natural selection. However, transhumanists believe that the next major stage in terrestrial evolution is not likely to be fuelled by the slow pace of

[184] I do not know of a single transhumanist who rejects neo-Darwinism, but it is possible that exceptions exist.
[185] Bostrom, "A History of Transhumanist Thought," 3.

biological evolution, via the natural selection of adaptive genetic traits. Instead, they argue that the much faster forces of conscious, cultural and technological evolution will ultimately determine how the future of humanity, the Earth, and perhaps even the Cosmos, will play out.[186]

In *Human Purpose and Transhuman Potential* (2013), Ted Chu expands on the transhumanist logic of extending the implications of Darwinian principles into the realms of culture and technology, writing:

> … the real significance of Darwin's evolutionary theory is not that humans descended from lower species, but that *we can continue to evolve*, and that some of our descendants will be 'higher' in the sense that we are higher than *Homo erectus*, *Homo habilis*, *Homo ergaster*, or any other partially human species. Denying our past would purge our hope for the future. As a species that shares a common ancestor with all forms of life on Earth, we are not the exception to the rule of mutability of species. What is different, however, is that posthuman evolution can be guided by conscious decisions in addition to natural forces. The more we recognize the true nature of ourselves and place it in the context of cosmic evolution, the more we realize that our species cannot be the end—and that 'the end' need not be the end of our species.[187]

While Darwin never envisaged anything like modern computers, genomic sequencing, germline engineering, or advanced artificial intelligence, he did hint that humanity could one day be surpassed as natural selection gradually resulted in the emergence of more intelligent and capable beings. In *The Descent of Man* (1871), he wrote:

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[186] Although there is not scope to explore this thread in depth, it is worth noting that transhumanists are hardly the first group of thinkers to have explored the nature and significance of conscious and cultural evolution. Significant bodies of literature exist in anthropology and biology on the subject of cultural evolution, its relationship to the Darwinian algorithm of natural selection, and its possible impacts on the future of human evolution. See: Peter J. Richerson and Robert Boyd, *Not By Genes Alone: How Culture Transformed Human Evolution* (Chicago: The University of Chicago Press, 2005); Joseph Henrich, *The Secret of Our Success: How Culture is Driving Human Evolution, Domesticating Our Species, and Making Us Smarter* (Princeton: Princeton University Press, 2016). The cyberneticist Francis Heylighen, along with other researchers affiliated with the Belgium-based Global Brain Institute (GBI) have also explored theories of cosmic evolution in which cognition and human generated technology are viewed emergent forms of complexity that may in turn engender the emergence of a global superorganism or global brain. There are more obvious overlaps with transhumanist theory and culture among this group of scholars. Some transhumanists, like Ben Goertzel, are also affiliated with the GBI. See: *The Global Brain Institute*, accessed November 12, 2018, https://sites.google.com/site/gbialternative1/.

[187] Ted Chu, *Human Purpose and Transhuman Potential: A Cosmic Vision for Our Future Evolution* (San Rafael: Origin Press, 2014), kindle, ch.9.

> Man may be excused for feeling some pride at having risen, though not through his own exertions, to the very summit of the organic scale, and the fact of his having thus risen, instead of having been aboriginally placed there, may give him hopes for a still higher destiny in the distant future.[188]

Yet Darwin's ability to imagine what a higher, posthuman being might be like was very limited and he was still thinking about biological natural selection generating these changes over a very long period of time. Notably, however, Bostrom and Kurzweil have since constructed modern, 'techno-Darwinian' arguments to emphasise the role that technology might play in the future of human and posthuman evolution. Kurzweil argues that artificial intelligence will one day far surpass human biological intelligence, for, in his view, "a more intelligent process will inherently outcompete one that is less intelligent, making intelligence the most powerful force in the universe."[189] Similarly, Bostrom argues that:

> … the potential for intelligence in a machine substrate is vastly greater than in a biological substrate. Machines have a number of fundamental advantages which will give them overwhelming superiority. Biological humans, even if enhanced, will be outclassed.[190]

Using the historical lessons of Darwinism, which show that change has been a constant in biological history as organisms respond to changing environments and selection pressures, transhumanists believe it is incontrovertible that humanity is not an evolutionary end point—humans will ultimately change, and eventually, many transhumanists believe our species will be superseded.[191] While Darwinian principles do not mandate that organisms must always become more complex or intelligent in order to adapt and survive, Bostrom and Kurzweil argue that intelligence clearly enhances

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[188] Charles Darwin, *The Descent of Man and Selection in Relation to Sex* (Hertfordshire: Wordsworth, 2013), 646-647.
[189] Kurzweil, *The Singularity is Near*, ch.5.
[190] Nick Bostrom, *Superintelligence: Paths, Dangers, Strategies* (Oxford: Oxford University Press, 2014), kindle, ch.3.
[191] Bostrom, *Superintelligence*, loc. ch.2, ch.3; Marvin Minsky, "Will Robots Inherit the Earth?" *Scientific American* 271, no. 4 (October 1994); Hans Moravec, *Robot: Mere Machine to Transcendent Mind* (New York: Oxford University Press, 1999), 11.

survival ability in the *modern* world. As such, they believe it is likely to be consciously selected for in both humans and machines, which they wager might one day become indistinguishable.

It is easy to take the idea of gradual, divergent evolution for granted today. But if a Darwinian revolution had *never* occurred and pre-Darwinian worldviews were widely held in the scientific community today, it would have been much harder for a modern transhumanist worldview to emerge in the late twentieth century, as conscious cultural and technological evolution are seen by transhumanists as natural extensions of the process of biological evolution.

As important as Darwin is in the history of modern science, he is more important here as a symbol than as a specific thinker. Other evolutionary thinkers who predate Darwin and the theory of evolution by natural selection include Jean-Baptise Lamarck and Erasmus Darwin. Darwin's contemporary Alfred Russell Wallace also independently arrived at a near-identical theory of evolution. Additionally, the ideas and theories that we think of today under the banner of 'Darwinism' have evolved over time to incorporate new scientific insights, including a more precisely determined age of the Earth, and an understanding of the genetic mechanism of heredity.

But Darwin is the most recognisable proponent of the profoundly revolutionary idea that species are mutable and evolve in response to environmental selection pressures. The theory of evolution by natural selection foregrounds and supports the idea of the mutability of humanness. While the logical expectation in Darwin's day was of a very slow mutability of human nature, a new expectation about the nature and pace of human evolution has started to emerge today, as human minds and bodies merge ever more rapidly with advanced information technologies. The emergence of a new kind of human, or posthuman, though not inevitable, is an idea that now seems increasingly plausible.

T. H. Huxley (1825-1895)

Thomas Henry Huxley coined the term Darwinism in the nineteenth century and was famously nicknamed "Darwin's bulldog,"[192] for his loyal support of evolutionary theory. Although I have found no mention of Huxley in any text discussing proto-transhumanist ideas, the British biologist and anatomist anticipated many of the general questions that punctuate modern debates over human nature, transhumanism, and the future of human evolution.

Huxley was medically trained, but he had initially hoped to begin a career in mechanical engineering and his primary interest in medicine centered on physiology and the "mechanical engineering of living machines."[193] He was also a self-proclaimed materialist who overtly rejected Cartesian dualism.[194] However, he credited Descartes for championing an essentially materialist worldview and for identifying the brain as the organ in which consciousness (though not, for Descartes, the soul) resides. He wrote:

> This definite allocation of all the phenomena of consciousness to the brain as their organ, was a step the value of which it is difficult for us to appraise, so completely has Descartes' view incorporated itself with every-day thought and common language… Modern physiology, aided by pathology, easily demonstrates that the brain is the seat of all forms of consciousness, and fully bears out Descartes' explanation.[195]

Building on Descartes' materialist premises and extending them into a hard-materialist metaphysic, Huxley conducted an experiment, which he used to show that there is no life force independent of human physiology or physical laws. He connected "a special apparatus to the open, beating heart of a living frog,"[196] in order to demonstrate that

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[192] Peter Bowler, "Darwinism in Britain," in *The Cambridge Encyclopaedia of Darwin and Evolutionary Thought*, ed. Michael Ruse (Cambridge: Cambridge University Press, 2013), 218.
[193] T. H. Huxley, quoted in Bruce Mazlish, *The Fourth Discontinuity: The Co-Evolution of Humans and Machines* (New Haven: Yale University Press), 141.
[194] T. H. Huxley, "On Descartes' 'Discourse Touching The Method of Using One's Reason Rightly, And Of Seeking Scientific Truth,'" *Macmillan's Magazine* 22 (May 1, 1870): 78.
[195] Thomas. H. Huxley, "On The Hypothesis That Animals Are Automata," 205.
[196] Mazlish, *The Fourth Discontinuity*, 98.

organisms are animated by biomechanical processes and that these processes can be replicated artificially.

Huxley also associated mechanical engineering with human improvement and eagerly aspired to forms of technological augmentation that could make humans more rational and moral.[197] In his 1870 essay, "On Descartes' 'Discourse,'" Huxley wrote:

> I protest that if some great Power would agree to make me always think what is true and do what is right, on condition of being turned into a sort of clock and wound up every morning before I got out of bed, I should instantly close with the offer. The only freedom I care about is the freedom to do right; the freedom to do wrong I am ready to part with on the cheapest terms to anybody who will take it of me.[198]

The following month, the journalist R. H. Hutton declared in *The Spectator* that Huxley's "daring bid" to "become a correct thinking and acting machine" was a preposterous notion. Hutton considered Huxley's declaration (which he sincerely hoped was a joke) to be based on an overzealous extension of the Darwinian principle of the survival of the fittest, culminating in a coldly utilitarian ideal that "may well benefit the race physically… while injuring it spiritually or intellectually."[199] Hutton's objections are pertinent as they foreshadow many common objections made against modern transhumanist ideas, particularly against the ideas of radical life-extension, brain uploading, intelligence augmentation and the pursuit of posthumanity.

On a fundamental level, Hutton's objections are grounded in the humanistic assumption that there is innate value in being biologically human and in having all of the characteristics (including cognitive and moral fallibility) that humans have historically possessed. Hutton believed that the hypothetical transformation of Huxley into a

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[197] Several modern transhumanists, including Nick Bostrom and David Pearce have also argued that human moral enhancement, enabled human augmentation technologies, should be pursued as an ethical goal. See: Savulescu and Bostrom, *Human Enhancement*; and David Pearce, "The Hedonistic Imperative," *hedweb*, archived July 1, 1998, http://web.archive.org/web/19980701135105/http://www.hedweb.com/hedab.htm.
[198] Huxley, "On Descartes' 'Discourse,'" 78.
[199] R. H. Hutton, "Professor Huxley as a Machine," *The Spectator*, April 30 (1870), http://aleph0.clarku.edu/huxley/comm/Hutton/Hut-Mach.html

clockwork man (the dominant cyborgian image of the pre-computer age) would be a great loss to humanity, as the mechanical professor could no longer enrich intellectual culture by engaging "with sailor-like delight in the squalls and perils of the infinite ocean of speculation." Instead, we would be left with:

> … the infallible response of a calculating machine, striking the oracular answer to our scientific an[d] moral questions with as much certainty as that with which the observatory clock at Greenwich strikes the mean time.[200]

Hutton's image of intrepid intellectual seafaring is placed in stark contrast with the dull, monotonous chiming of the clock. His assumption seems to be that if humans could think and act with perfect precision, we would become "dry, monotonous, and business-like." Our intellectual pursuits would be stripped of intrigue and meaning and these kinds of beings would ultimately be inferior in important ways to biological humans. This may or may not be true—the value judgement is subjective and is contingent on the specifics of the clockwork man's experiences, capabilities and context. But Hutton's logic is not far removed from that of many prominent critics of modern transhumanism, like Francis Fukuyama, who has argued that by changing human nature and human capabilities we will lose something essential.[201]

Transhumanists are not convinced by this logic. They frequently argue, along similar lines to Bostrom, that, "there is no intrinsic value in being human, just as there is no intrinsic value in being a rock, a frog or a posthuman. The value resides in who we are as individuals, and what we do with our lives."[202] Huxley seems to have held similar views. In *Evolution and Ethics* (1893), he argued that changing and augmenting human abilities and cultures has been a mainstay of human history, imparting humans with great and marvellous (though not fully understood) powers:

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[200] Hutton, "Professor Huxley."
[201] Francis Fukuyama, *Our Posthuman Future: Consequences of the Biotechnology Revolution* (London: Profile Books, 2002).
[202] Bostrom, "The Transhumanist FAQ v. 2.1."

> The history of civilization details the steps by which men have succeeded in building up an artificial world within the cosmos… In every family, in every polity that has been established, the cosmic process in man has been restrained and otherwise modified by law and custom; in surrounding nature, it has been similarly influenced by the art of the shepherd, the agriculturist, the artisan. As civilization has advanced, so has the extent of this interference increased; until the organized and highly developed sciences and arts of the present day have endowed man with a command over the course of non-human nature greater than that once attributed to the magicians. The most impressive, I might say startling, of these changes have been brought about in the course of the last two centuries; while a right comprehension of the process of life and of the means of influencing its manifestations is only just dawning upon us.[203]

In the same essay, Huxley grappled extensively with the ethics of conscious evolution. He mused that humans have ascended "to the headship of the sentient world" by virtue of qualities that were naturally selected, like cunning, sociability, curiosity and ferocity. Such qualities have helped us to survive, but Huxley worried that in modern civilisations many of our more instinctive and aggressive "qualities have become defects." To become a moral animal and cultivate better lives for more humans, he argued that we must combat the hostile and indifferent forces of nature and overcome them.[204]

The Freudian revolution

While the name Sigmund Freud does not typically crop up in discussions of transhumanism and its antecedents, a few observations are worth making about his background and ideas, with the acknowledgement that his life and career also extended well into the twentieth century. Freud helped pave the way for the emergence of modern, neuroscientific materialism, arguing, like La Mettrie (and to a large extent, Descartes before him) that the mind is physiologically mediated. To their claims he added the new and revolutionary idea of the unconscious mind and challenged the belief in the mind as a unified whole, seeding a theory of consciousness that continues to influence modern AI theory and development.

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[203] Thomas H. Huxley, *Evolution And Ethics And Other Essays* (New York: D. Appleton and Company, 1899), 83-84.
[204] Huxley, *Evolution And Ethics And Other Essays*, 51-52.

Like La Mettrie and Huxley, Freud studied medicine and rejected the metaphysics of Cartesian dualism. He began his career as a neurologist and by the 1890s, declared his interest in developing "a psychology that shall be a natural science: that is, to represent physical processes as quantitatively determinate states of specifiable material particles."[205] Like Huxley, Freud was also profoundly influenced by Darwin. In fact, his concept of the Oedipus complex was built upon Darwinian assumptions about sexual competition, which led him to hypothesise that incest taboos have adaptive value, as they can help promote social cohesion by limiting competition between adult males and their offspring.[206]

According to the historian Bruce Mazlish, Freud sought to explain the fraught psychological condition of humanity in the modern era, in which the conditions and demands of civilisation were very different to the Palaeolithic conditions in which humans evolved, and to which we are biologically adapted. By the time the twentieth century dawned, Freud believed that cultural evolution was outpacing biological evolution and had led to the emergence of the modern "psychological Man." Mazlish explains:

> Rooted as the human being is in a physical animal nature—and thus with potentially mechanistic features—humans have evolved, on this schema, into the uniquely cultural, neurotic, and sometimes psychotic animal of the civilized world.[207]

Although Freud eventually focused heavily on psychoanalysis and psychosexual theory, he has been dubbed by the artificial intelligence pioneer, Marvin Minsky, as "the first good AI theorist."[208] Minksy credits Freud's *The Interpretation of Dreams* (1899) as "the first major work which discusses the mind as though there weren't a single homunculus

[205] Mazlish, *The Fourth Discontinuity*, 110.
[206] Mazlish, *The Fourth Discontinuity*, 109-111.
[207] Mazlish, *The Fourth Discontinuity*, 120.
[208] Minsky, "Why Freud Was the First Good AI Theorist."

or mastermind in the middle of it pulling the strings."[209] In his "Project for Scientific Psychology," Freud also drew diagrams that Minsky argued are "sort of neural network like."[210]

Neural networks are an approach to artificial intelligence modelled on the architecture of the human brain and the distributed nature of human cognition. Values and responses are not pre-programmed; they develop in response to interactions with the environment. Decision-making is not made by one part of the brain (or one single algorithm, or node) but by the complex interactions between many parts. Like humans, the AI's 'take stock' of their errors and learn over time in response to feedback.[211]

In a 1998 interview with the neuroscientist Renato E. M. Sabbatini, Minsky further explained Freud's significance as a precursor to modern AI theory and cognitive science, stating:

> According to Freud, the mind is organized as a sandwich. It is made of three layers: the superego, which provides us with attachment, self-image, etc., and that learns social values and ideas, prohibitions and taboos, acquired mainly from our parents. Under it there's the ego, which mediates conflict resolution and connects to sensory input and motor expression. Under the ego, we find the id, which is responsible for the innate drives system, our basic urges, such as hunger, thirst, sex, etc.[212]

Minsky opined that this cognitive hierarchy "could be a model for a computer program having personality, knowledge and emotion, social perception, moral constraints, etc." At the time, Minsky believed that "truly intelligent computers will need to have emotions" because emotions "have a survival value."[213] He cited Freud's argument that human behaviour, emotion and instinct is governed by evolutionary programming and

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[209] Minsky, "Why Freud Was the First Good AI Theorist."
[210] Minsky, "Why Freud Was the First Good AI Theorist."
[211] Arkoudas and Bringsjord, "Philosophical Foundations," 52-53.
[212] Renato M. E. Sabbatini, "The mind, artificial intelligence and emotions: Interview with Marvin Minsky," *Brain & Mind: Electronic Magazine on Neuroscience* 7 (1998), http://www.cerebromente.org.br/n07/opiniao/minsky/minsky_i.htm.
[213] Sabbatini, "The mind, artificial intelligence and emotions."

imperatives. This programming, though not optimal in every situation, has helped us to survive.

Minsky also emphasised that, "Freud was one of the first computer scientists, because he studied the importance of memory. He was also a pioneer in proposing the role of emotions in personality and behavior." In Minsky's view "emotion is only a different way to think" and if a computer scientist could "understand the relationship between thinking, emotion and memory, it will be easy to implement these functions into the software."[214] Freud laid the groundwork by showing that the various components of human nature and intelligence are physical and therefore, by the reckoning of some AI theorists, they could be reverse-engineered and mimicked in non-biological substrates.

In 1988, the sociologist and psychologist Sherry Turkle also began exploring the links between psychology, psychoanalysis and AI. Like Minsky, she asserted that, "the very idea of AI—to create mind in machines—subverts traditional notions of the autonomous self in a way that parallels the psychoanalytic enterprise."[215] While she conceded that psychoanalytic and computational cultures differ, and even acknowledged that in some areas they may be incompatible, she sought to explore a specific theoretical linkage between the Freudian idea of the unconscious mind, leading to the notion of the "decentered self,"[216] and Frank Rosenblatt's idea of perceptrons, a forerunner of modern neural networks, once dubbed, "the simplest learning machines."[217]

As with Darwin, it is not Freud's ideas, in the exact way that he presented them in the nineteenth century, which are most important here. What really matters are the profound and ongoing effects of the Freudian revolution. Freud was not the only contributor to this revolution, but his work has played a major role in changing and challenging how modern humans conceive of mind, self, agency and personhood. These

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[214] Sabbatini, "The mind, artificial intelligence and emotions."
[215] Sherry Turkle, "Artificial Intelligence and Psychoanalysis: A New Alliance," *Daedalus* 117, no. 1 (1988): 244-245, https://www.jstor.org/stable/i20025133.
[216] Turkle, "Artificial Intelligence and Psychoanalysis," 245.
[217] Marvin L. Minsky and Seymour A. Papert, *Perceptrons: An Introduction to Computational Geometry* (Cambridge, MA: The MIT Press, 1988 [1969]), vii.

ideas also have profound implications when we begin to consider transhumanist scenarios like mind uploading and creating artificial general intelligence, or superintelligence.

The Nietzsche controversy

The German philosopher Friedrich Nietzsche is one of the most enduringly popular and controversial thinkers of the nineteenth century. Recently, his relationship to transhumanism has become the subject of a rapidly proliferating cluster of scholarly publications. It seems that more ink has been spilled debating the significance of this one thinker in proto-transhumanist history than has been dedicated to discussing all the other proto-transhumanists combined. I find this extremely strange, given that many stronger and more interesting historical precursors exist.

I wager that the extent of the controversy may have more to do with Nietzsche's enduring appeal as a subject for scholarly inquiry, coupled with the fact that he was a writer who is widely known to have dabbled in "many styles and masks."[218] Nietzsche's writings are profoundly ambiguous and his sentiments appear to vacillate across his major works.[219] Few works or bodies of work can be read and re-read with such wildly contradictory interpretations. Where there is extreme textual ambiguity, lively and polemical debates are more likely to emerge, which in turn often incite further commentary.

To be clear, Nietzsche *is* a proto-transhumanist and a brief mention of him belongs in any book length history of transhumanism. Addressing the question of whether Nietzsche's ideas have directly influenced modern transhumanists, Max More asserts:

[218] Nicholas Davey, "Introduction," in *Thus Spake Zarathustra*, by Friedrich Nietzsche (Hertfordshire: Wordsworth, 1997), xxix.
[219] Kristen Brown, *Nietzsche and Embodiment: Discerning Bodies and Non-dualism* (New York: State University of New York Press, 2006), 3.

> I can state with complete confidence that such an influence does indeed exist. I know that because his ideas influenced my own thinking. That thinking led to my introduction of the term 'transhumanism' (only later did I discover [Julian] Huxley's prior use of the term), to the publication of my essay, "Transhumanism: Towards a Futurist Philosophy"… and to my original transhumanist statement, "The Extropian Principles"… While these essays are far from the only sources of contemporary transhumanism, these seminal writings have been influential. Since they were themselves influenced by some of Nietzsche's core ideas, the direct connection between transhumanism and Nietzsche is established.[220]

Given More's statement, some connection between Nietzschean thinking and the germination of modern transhumanist philosophy is undeniable. But the connection is a weak one. More is right to point out that the sources he composed are far from the only transhumanist publications. Moreover, his own views on Nietzsche, whom he personally admired, should not be considered representative of the majority of transhumanists.

Nietzsche's works contain a vast repository of evocative images and concepts. The concept that is most frequently linked with modern transhumanism is the Superman.[221] Nietzsche famously depicted man as "a rope stretched between the animal and the Superman—a rope over an abyss," and declared, "what is great in man is that he is a bridge and not a goal."[222] He also wrote, "*I teach you the Superman*. Man is something that is to be surpassed. What have ye done to surpass man?"[223] As tempting as it may be to quote these passages out of context and declare that Nietzsche advocated a project of transcendence that involved becoming superhuman, there is no strong evidence to support such a claim.

These passages appear in *Thus Spake Zarathustra*. Nietzsche's speaker, Zarathustra, then goes on to remark, "what is loveable in man is that he is an *over-going* and a *down-going*" and proclaims, "I love those that know not how to live except as down-goers, for they are

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[220] Max More, "The Overhuman in the Transhuman," *Journal of Evolution and Technology* 21, no. 1 (2010), https://jetpress.org/v21/more.htm.
[221] The German term *Übermensch* is also frequently translated as the overman or overhuman.
[222] Nietzsche, *Thus Spake Zarathustra*, 8.
[223] Nietzsche, *Thus Spake Zarathustra*, 6.

the over-goers." In these passages, we see an example of the one trait that *is* consistent in Nietzsche's writings, the constant interplay of opposing and irreconcilable statements that render truth and fixed meaning impossible to divine.

The above quotes introduce the possibility that to become Supermen we may need to embrace the chaotic and limiting elements of our nature, constantly question orthodoxy (including modern scientific orthodoxies and doctrines of progress) and revel more in instinct and feeling than herd mentalities. Perhaps to be superior and to achieve an *over-going* of what we are, we need a *down-going* in order to cast off the shackles of culture and belief?[224]

In my forthcoming paper on Nietzsche and transhumanism, I argue that there is no evidence that Nietzsche harboured any proto-typically transhumanist views, or that he ever wrote unambiguously about core transhumanist themes. It is not enough to suggest that some of his writings hint vaguely at a non-specific—possibly even 'regressive' or animalistic form of self-transcendence. I also argue that there is a strong possibility that Nietzsche's speaker in *Thus Spake Zarathustra*, the mouthpiece through which the Superman imagery is conveyed, is intended to be a satirical figure speaking half-truths in a parody of religious proseletysing.[225]

In the same paper, I show that the following links between transhumanists and Nietzsche do exist. Early extropian transhumanists shared a stylistic literary bravado with Nietzsche (each having a clear penchant for brazen declarations that ran against the grain of orthodox views, punctuated with lots of italics and exclamation marks). Both also rejected religion and moral certitude and placed a strong thematic emphasis on self-transcendence and the overcoming of orthodoxy. However, the means by which

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[224] This idea has been suggested by the philosopher Vanessa Lemm in: *Nietzsche's Animal Philosophy: Culture, Politics, and the Animality of the Human Being* (Fordham University Press, 2009), 4; 6; 90-91.
[225] See: Elise Bohan, "Nietzsche and Transhumanism: Much Ado About Nothing?" (forthcoming, 2019). This paper was accepted by Francesco Biazzo for the following project: https://ieet.org/index.php/IEET2/more/Sorgner20171121#comments. A copy of the text can be supplied on request.

Nietzsche thought humans may transcend themselves and those championed by modern transhumanists are not demonstrably aligned.[226]

I will not try the reader's patience by delving into a detailed discussion of the Nietzsche/transhumanism debates here. There are at least eighteen journal articles on the subject, with several more forthcoming, yet nothing approaching a consensus view on his significance as a proto-transhumanist has emerged.[227] Ultimately, I side with Bostrom who detects only "surface-level similarities" between Nietzsche's ideas and those of modern transhumanists.[228] I also believe that a normative reading of Nietzsche as a weak proto-transhumanist should be widely adopted in histories of transhumanism.

Jean Finot (1858-1922)

Jean Finot was born in Warsaw and originally named Jean Finkelstein. His life spanned the nineteenth and twentieth centuries and his most relevant proto-transhumanist text, *The Philosophy of Long Life*, was first published in 1900. The transhumanist and historian of life-extension, Ilia Stambler, first brought Finot to light as a proto-transhumanist, arguing that "he deserves recognition, both as an author of an original, consistent life-extensionist philosophy, and as a major *fin-de-siècle* precursor of present-day transhumanism."[229]

Throughout *The Philosophy of Long Life*, Finot espoused two different sentiments about death, which he unified within an overarching philosophy. On the one hand, he thought that humans should learn to accept death more readily, and on the other, he thought we should endeavour to extend our healthy, vital lives as long as possible. In doing so, he

[226] See: Bohan, "Nietzsche and Transhumanism."
[227] Many of the key papers on Nietszsche and Transhumanism can now be found in Yunus Tuncel's edited collection, *Nietzsche and Transhumanism: Precursor or Enemy?* (Cambridge Scholars Publishing: Newcastle upon Tyne, 2017).
[228] Bostrom, "A History of Transhumanist Thought," 4.
[229] Ilia Stambler, "Life extension – a conservative enterprise? Some fin-de-siècle and early twentieth century precursors of transhumanism," *Journal of Evolution and Technology* 21, no. 1 (2010), http://jetpress.org/v21/stambler.htm.

thought that humans would eventually seed an advanced form of organic posthuman life, which would, and should, supersede us.

If this endgame were realised, position two (prolongevism) would ultimately reinforce position one (the acceptance of death), because, as life-extensionists, we would eventually engender the death of our species in its current form, by seeding a more advanced and resilient form of life in the future. These positions are further self-reinforcing as Finot believed that we could only learn to accept death if we conceptualised it more positively and took elementary steps to live longer and healthier lives in the immediate present.

Eventually, Finot thought that scientists would likely perfect the art of creating artificial "*homunculi*," which he described as the "ideal beings of tomorrow."[230] He believed that the creation of posthuman homunculi (a homunculus is a miniature human or humanoid creature) was not only possible, but also desirable. Like most modern transhumanists, he argued that "the human body is full of imperfections"[231] and that there is much room for improvement. Ideally, posthuman homunculi would be devoid of our crude design flaws, including violent and tribal instincts and other cognitive biases. In Finot's view, "by this alone they would be nearly angels."[232]

Finot thought it was a tragic characteristic of the human condition that "at the time when we at last succeed in understanding life we generally quit the world of mortals."[233] In long-lived homunculi, he saw hope for the future—a hope not yet available to his contemporaries, but nevertheless a broader hope for the future of intelligent life. Though not a tangible part of us, these homunculi would be "the living product of our brains"[234] and Finot imagined that "some fine day, strong and powerful, they will perhaps form

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[230] Jean Finot, *The Philosophy of Long Life*, trans. Harry Roberts (London: John Lane, 1909), 277.
[231] Finot, *The Philosophy of Long Life*, 275.
[232] Finot, *The Philosophy of Long Life*, 274.
[233] Finot, *The Philosophy of Long Life*, 275.
[234] Finot, *The Philosophy of Long Life*, 277.

another kind of humanity, and will claim their rights from men."[235] Expanding on this posthuman vision, he wrote:

> In the presence of the evils which devour the world of our days, let us dream of these strange beings which await its old age. For the creation of the distant future, the *brain-man* will come perhaps from the *monkey-man*, the man of our day... Let us taste the charm of the mystery which envelops the road towards the artificial creation of living beings, since the unforeseen and the mysterious are still the most attractive flowers of the surprise tree of science. Let us enjoy the dream which it lets us cherish of *homunculi*, these ideal beings of tomorrow, direct descendants of our *thought*, and resign ourselves with gentle pleasure to the belief that we shall see our planet peopled in the long march of the centuries with other masters, other aspirations, and other virtues.[236]

In Finot's view, crude design flaws were not the only reason to welcome the homunculi of the future. He speculated that humanity might also be approaching an evolutionary dead end with the rise of women's liberation and the emergence of the voluntary "celibacy of women" which he saw becoming "a new social force." Although he noted that "the danger is not yet very visible on the horizon,"[237] Finot thought that the sexual liberation of women was an important trend to monitor for there were already signs that women were cultivating new lifestyles, built around independence from men and their traditional roles as wives and mothers. He wrote:

> Their indifference to conjugal joys, and even their content with celibacy, very often voluntary, acts contagiously upon the women of the Continent. Having diminished the importance of man, the new woman of Germany, France, and Italy is becoming used to the idea of living independently and without him. The celibacy of moneyless women is thus being reinforced by voluntary celibacy, caused by a contempt for man, marriage, and love.[238]

Eventually, Finot thought there was a real danger that humans would cease to procreate, an idea that Godwin also enthusiastically entertained. With such a possibility looming, he

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[235] Finot, *The Philosophy of Long Life*, 275.
[236] Finot, *The Philosophy of Long Life*, 276-277.
[237] Finot, *The Philosophy of Long Life*, 276.
[238] Finot, *The Philosophy of Long Life*, 276.

thought that the creation of artificial life appeared to be an even more interesting and relevant subject for his fellow humans—a subject that, he observed, was "greatly preoccupying the thought of the New World"[239] at the turn of the century, as automata proliferated and began to capture the public's imagination.[240]

Like Bacon and Descartes, Finot saw beyond the scientific orthodoxies of his day and recognised that change and innovation were constants in the history of science, technology, civilisation, and even in biology and cosmology. Finot was very clear that "to rid ourselves of death we must change the nature of man from his very birth."[241] But, while he believed this to be possible, he did not consider the realisation of this proto-transhumanist project to be certain. Finot could not be sure how far the quest for practical immortality would go, but he believed that hope was an essential driver of progress and that we must keep hoping for better things, while resigning ourselves to death, if we must, by dying late and well.[242]

Concluding remarks

The gravity and extent of the social and intellectual developments of the nineteenth century were profound and the impacts of these changes continue to be felt today. Without the Darwinian and Freudian revolutions, we would have a less complete view of human origins, motivations and nature. Darwin and others showed that we are a mutable species, and as a result of their work, a growing number of people in the nineteenth century began to accept that changes to the human species are inevitable. Without the profound revolutions in Western scientific thought and technological capabilities that occurred in the nineteenth century, modern transhumanism might not exist today.

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[239] Finot, *The Philosophy of Long Life*, 261.
[240] Unfortunately there is not scope in this thesis to include detailed sections on the history of automata. However, some excellent accounts of automata in history can be found in: Gaby Wood, *Living Dolls: A Magical History of The Quest for Mechanical Life* (London: Faber and Faber, 2002); E. R. Truitt, *Medieval robots: mechanism, magic, nature, and art* (Philadelphia: University of Pennsylvania Press, 2015); Mazlish, "The Man-Machine and Artificial Intelligence," 175-201.
[241] Finot, *The Philosophy of Long Life*, 66.
[242] Finot, *The Philosophy of Long Life*, 66.

Notes

[i] A common error is worth clearing up regarding this quote (p. 68). The passage I have quoted is Butler's and appears in: Samuel Butler, "Darwin among the Machines," in *A First Year In Canterbury Settlement With Other Early Essays*, by Samuel Butler, edited by R. A. Streatfeild (London: Jonathan Cape, 1923, first published 1863), 182. However, the following (somewhat punchier) quote is more commonly attributed to Butler in the same text: "Who will be man's successor? To which the answer is: We are ourselves creating our own successors. Man will become to the machine what the horse and the dog are to man; the conclusion being that machines are, or are becoming, animate." This quote does not appear in "Darwin among the Machines," the original source is: Henry Festing Jones, "Sketch of the Life of Samuel Butler," in *The Humour of Homer and Other Essays by Samuel Butler*, ed. R. A. Streatfeild (London: A. C. Fifield, 1913), 25. Jones is paraphrasing Butler here, not quoting him. I am not sure where the error originated, however, I think it can likely be traced to Ray Kurzweil in *The Singularity is Near*, ch. 5. The same error has also been made by James Gardner in *The Intelligent Universe: AI, ET, and the Emerging Mind of the Cosmos* (New Jersey: New Page Books, 2007), Google Books, ch.2, https://books.google.com.au/books?id=Oy1xDwAAQBAJ&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false.

4. Proto-transhumanism from 1900 to the Cold War

> *I tell you that as long as I can conceive something better than myself I cannot be easy unless I am striving to bring it into existence or clearing the way for it. That is the law of my life. That is the working within me of Life's incessant aspiration to higher organization.*
>
> — George Bernard Shaw, *Man and Superman* (1903)
>
> *All this world is heavy with the promise of greater things, and a day will come, one day in the unending succession of days, when beings, beings who are now latent in our thoughts and hidden in our loins, shall stand upon this earth as one stands upon a footstool, and shall laugh and reach out their hands amidst the stars.*
>
> — H. G. Wells, *The Discovery of the Future* (1902)

As we inch closer to the inception of the first modern transhumanist movements, the number of important antecedent thinkers increases, as does the volume of relevant ideas they expressed. To do the period justice, twentieth century proto-transhumanism is covered in two chapters, loosely spanning the first and second halves of the century. In this first chapter, we focus on three key thinkers who are representative of a growing brand of early twentieth century, Western techno-optimism: Pierre Teilhard de Chardin, J. B. S. Haldane and J. D. Bernal.

These three thinkers were all born around the turn of the century and lived through an age of unprecedented promise and peril. They readily factored in the likelihood of profound risks and setbacks, both political and technological, but they were also highly proactive meliorists. As scientifically minded polymaths, they were all intimately acquainted with the many profound opportunities for human advancement made available by breakthroughs in modern science and medicine, and the rise of globalisation and formal education.

Our thinkers shared many formative experiences and core beliefs and each hoped and believed that tribalism, national identities and dogmatic ideologies and faiths would soon give way to a global identity focused on the common traits of the human species. However, they also understood that technological advances are often a double-edged sword and were palpably aware of the grave existential risks confronting humanity in an era of modern, globalised warfare. Yet not a single one of them viewed scaling back technological innovation as a viable or sensible option.

Another thinker whose ideas overlap substantially with the three proto-transhumanists discussed here is the British biologist Julian Huxley. Huxley was the grandson of T. H. Huxley, who we met in chapter three, and the brother of the novelist and author of *Brave New World* (1932), Aldous Huxley. Like his grandfather, Julian was a keen evolutionist and a firm believer in the power of science, collective intelligence and education to further social and evolutionary progress. He was also a friend and colleague of Teilhard's and championed a similar, though less teleological, philosophy of "evolutionary humanism,"[243] emphasising that *Homo sapiens* is a truly remarkable species for being, "the first organism [to be] exercising conscious control over its own evolutionary destiny."[244]

Huxley wrote the introduction to Teilhard's *The Phenomenon of Man* (1955) and co-authored the textbook *Animal Biology* (1927) with J. B. S. Haldane.[245] He was also one of the first thinkers to use the word transhumanism in something akin to its modern sense (a discussion of his use of the term can be found in Appendix A). Huxley can certainly be considered a proto-transhumanist, but I do not discuss him in detail here because his ideas overlap so substantially with those of the other three proto-transhumanists in this chapter. He is, however, quoted at length in the Etymology (see Appendix A).

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[243] Julian Huxley, "Introduction by Sir Julian Huxley," in *The Phenomenon of Man* by Pierre Teilhard de Chardin (London: Collins, 1966), 12.
[244] Julian Huxley, "The Vital Importance of Eugenics," *Harper's Magazine*, August 1 (1931): 331, https://harpers.org/archive/1931/08/the-vital-importance-of-eugenics/.
[245] Krishna R. Dronamraju, *Popularizing Science: The Life and Work of JBS Haldane* (New York: Oxford University Press, 2017), 57.

The first half-century

From as early as the eighteenth century, the doctrine of human progress had started to supplant earlier notions about history being cyclical and humanity striving to recover after a fall from its idyllic past. The two world wars undeniably put a dent in humanity's confidence about the liberating power of science and technology. Yet the inter-war period saw a new brand of optimism begin to emerge and progress was eagerly championed in many academic and intellectual quarters—so much so that in 1920, the Irish historian J. B. Bury famously declared that the idea of progress had become "the animating and controlling idea of Western civilisation."[246]

The historian of biology, Peter J. Bowler, has rightly pointed out that, whether a historian characterises the first half of the twentieth century as "a morbid age terrified of future wars or a streamlined era fascinated with speed and convenience" depends on where they choose to look; which country, which decade, which social class, and which cluster of thinkers. In reality, there was "a complex mixture of both attitudes" throughout the Western world in that period.[247] Bowler's point may seem like an unnecessary truism, but it helpfully frames my own approach to compiling this chapter, which deliberately focuses on techno-optimist thinking, predominantly in Great Britain, among elite scientists and intellectuals who were personally acquainted.

Pierre Teilhard de Chardin (1881-1955)

Transhumanists often talk about a convergence of minds, a global brain, or an intelligence explosion. These ideas have roots, though not exclusive ones, in the writings of Pierre Teilhard de Chardin. Teilhard's thoughts on the idea of a global brain also dovetail with H. G. Wells'. In the 1930's, Wells argued that humanity needed to develop a World Brain, which he described as "a world-wide network being woven between all

[246] John Bagnell Bury, *The Idea of Progress: An Inquiry Into Its Origin And Growth* (HardPress Classic Books Series, 2015), kindle, preface.
[247] Peter J. Bowler, *A History of the Future: Prophets of Progress from H. G. Wells to Isaac Asimov* (New York: Cambridge University Press, 2017), 3.

men about the earth."[248] Wells imagined this network functioning as a common, decentralised encyclopedia, connecting institutions and minds all over the world. Teilhard's vision of a global brain is more idiosyncratic than Wells', but we focus on it here because it has particularly strong synergies with certain strands of modern transhumanist thinking, particularly spiritual and religious transhumanism, which we will explore in later chapters. [249]

In a *Wired* magazine article from 1995, Jennifer Cobb Kreisberg introduced Teilhard as, "an obscure Jesuit priest and paleontologist… whose quirky philosophy points, oddly, right into cyberspace."[250] Her description is spot on. Teilhard married a scientific worldview with Christian teleology and argued that evolutionary progress was preordained—though commentators often omit Teilhard's caveat that progress was only certain in the absence of major Malthusian setbacks or "any astronomical or biological catastrophe which would destroy the earth or life on earth."[251] He also believed that a God-like entity would be instantiated in the future as a conscious, omniscient, collective mind, which he called the "Omega Point."[252]

Teilhard viewed science and spirituality as compatible and complementary forces and championed what he described as a, "dynamic and progressive neo-humanism."[253] Throughout his life, he propounded a decidedly idiosyncratic theistic vision, in which he "molded together Darwin and the divine."[254] While the language and imagery of his cosmic-evolutionary worldview was directly inspired by the *symbolism* of Judeo-Christian religion, in essence his worldview was a bold and unique techno-spiritualist ideal with a strong scientific and evolutionary emphasis.

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[248] H. G. Wells, *World Brain* (London: Methuen & Co. Ltd., 1938), 40.
[249] Notable examples of branches of religious and spiritualist transhumanism include: Mormon Transhumanism, the Order of Cosmic Engineers, and Cosmist transhumanism (more on these in chapter 9).
[250] Jennifer Cobb Kreisberg, "A globe, clothing itself with a brain," *Wired*, June 1, 1995, https://www.wired.com/1995/06/teilhard/.
[251] Pierre Teilhard de Chardin, "My Fundamental Vision," in *Toward the Future*, by Pierre Teilhard de Chardin, trans. René Hague (San Diego: Harcourt Inc., 1975), 181.
[252] Pierre Teilhard de Chardin, *The Future of Man*, trans. Norman Denny (London: Collins, 1964), 123.
[253] Teilhard de Chardin, "My Fundamental Vision," 202.
[254] Erik Davis, *TechGnosis: Myth, Magic and Mysticism in the Age of Information* (New York: Harmony Books, 2004), 345.

This scientific emphasis was not to the liking of the Catholic Church, which exiled Teilhard to China for much of his career and banned him from publishing during his lifetime. Hence, while the majority of his "manuscripts were essentially completed during the 1920s and 1930s," most "were printed only posthumously."[255] Yet Teilhard's ideas resurfaced in the mid to late twentieth century, and by the 1990s, they were inspiring a new generation of cyber enthusiasts and transhumanists, many of whom were beginning to "search for the deeper implications of the Net."[256] In the eyes of many late twentieth century thinkers, the Internet was the main medium fueling the rise of a global, collective mind, and many viewed this budding hive mind as a stepping-stone towards a more radically trans, or posthuman future.

Teilhard and the noosphere

Teilhard is particularly famous for popularising the idea of the noosphere, a concept he jointly conceived alongside the French philosopher and mathematician, Édouard Le Roy, and the Russian Cosmist, Vladimir Vernadsky.[257] All three thinkers and colleagues used the term to refer broadly to "the entire sphere of human ideas and technology evolving as an integral part of the biosphere."[258] Yet they each developed unique conceptions of the noosphere with differing philosophical emphases—Teilhard's and Le Roy's being notably more teleological.

The two Frenchmen conceived of the noosphere as "a bridge between science and religion"[259] and viewed it as "a predestined process driven by the human phenomenon." The emergence of the biosphere from the geosphere was a stepping stone towards the "higher plane" of the noosphere, the thinking layer unleashed by the actions of intelligent

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[255] Paul R. Samson and David Pitt, eds., *The Biosphere and Noosphere Reader: Global Environment, Society and Change* (London: Routledge, 1999), 53.
[256] Kreisberg, "A globe, clothing itself with a brain."
[257] Samson and Pitt, *The Biosphere and Noosphere Reader*, 4.
[258] Samson and Pitt, *The Biosphere and Noosphere Reader*, 183.
[259] Samson and Pitt, *The Biosphere and Noosphere Reader*, 5.

biological beings, who they believed would continue to evolve, proliferate and consciously govern the future of evolution.[260]

Teilhard's evolutionary worldview

Teilhard believed that evolution was a fundamental governing principle of the universe and described it as "a general condition to which all theories, all hypotheses, all systems must bow and which they must satisfy henceforward if they are to be thinkable and true."[261] However, his main focus was not on the fundamental principles of evolutionary theory. Like modern transhumanists, he was much more interested in the future trajectory of conscious evolution.

Teilhard consistently argued that, "the main movement in the universe has been, and is, a groping towards consciousness."[262] Evolution, in his view, exhibits a tendency towards increasing complexity and "cerebralisation."[263] To date, this process has resulted in the emergence of humans, highly complex creatures that have in turn given rise to a new "'thinking layer,'" or noosphere—the complex web of collective thought and technologies that have dramatically extended humanity's reach within the biosphere.[264]

In tandem with the emergence of *Homo sapiens*, Teilhard argued that the emergence of the noosphere represented a major "revolution in the very process of natural evolution."[265] He further emphasised the practical and metaphysical importance of modern humans getting to grips with their immense power and potential, writing:

> … as a result of mankind's now standing upon its own feet, life is here and now entering into a new era of autonomous control and self-orientation. As a direct result of his socialization, man is

[260] Samson and Pitt, *The Biosphere and Noosphere Reader*, 17.
[261] Pierre Teilhard de Chardin, *The Phenomenon of Man* (London: Collins, 1966), 219.
[262] Arnold J. Toynbee, "Vision of the Unity," in *The Biosphere and Noosphere Reader*, 88.
[263] Teilhard de Chardin, *The Phenomenon of Man*, 183.
[264] Teilhard de Chardin, *The Phenomenon of Man*, 182.
[265] Teilhard de Chardin, "The Antiquity and World Expansion of Human Culture," in *The Biosphere and Noosphere Reader*, 75.

> beginning, with rational design, to take over the biological motive forces which determine his growth—in other words, he is becoming capable of modifying, or even of creating, his own self.[266]

Teilhard's influence on modern transhumanists

The philosopher Eric Steinhart describes Teilhard as "one of the first to articulate transhumanist themes." Although Teilhard's terminology differs from the language used by most modern transhumanists, Steinhardt argues that Teilhard's idea of a noosphere can be fruitfully updated to parallel a transhumanist vision of the proliferation of superintelligence and the expansion of computation throughout the universe.[267] Other thinkers and commentators, from Kreisberg, to the cyberlibertarian and Grateful Dead lyricist, John Perry Barlow, have also detected similarities.[268]

Conversely, the theologian Ilia Delio rejects the claim that there exists "a sympathetic link between Teilhard and AI transhumanists," arguing that, "technologically perfected life, especially transcending the limits of suffering and death, were not part of Teilhard's vision."[269] Although technological perfection was not as preeminent in every line of Teilhard's writings as it is in works by contemporary transhumanists, Teilhard does explicitly make the argument that technology is a core vehicle for species wide transcendence. He also viewed the spiritual heart of his transcendent vision as distinctly Western, noting that the core values of his vision originate, "not from the East, but here at home, in the very heart of technology and research."[270]

Like modern transhumanists, Teilhard viewed modern science as the chief means "of mastering the world."[271] He also saw the extent of this mastery leading as far as the

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[266] Teilhard de Chardin, "My Fundamental Vision," 181.
[267] Eric Steinhart, "Teilhard de Chardin and Transhumanism," *Journal of Evolution and Technology* 20. no. 1 (2008), http://jetpress.org/v20/steinhart.htm.
[268] See: Kreisberg, "A globe, clothing itself with a brain."
[269] Ilia Delio, "Transhumanism or Ultrahumanism? Teilhard de Chardin on Technology, Religion and Evolution," *Theology and Science* 10, no. 2 (2012): 159, doi: 10.1080/14746700.2012.669948.
[270] Teilhard de Chardin, "My Fundamental Vision," 202.
[271] Teilhard de Chardin, *The Phenomenon of Man*, 249.

cultivation of artificial life, facilitating a posthuman future where conscious, intelligent minds coalesce at the Omega Point.

The Omega Point and the Singularity

There are several parallels between Teilhard's core ideas and those of modern transhumanists, most notably between his Omega Point idea and the transhumanist concept of the Singularity. Steinhart has detected similarities between Teilhard and Kurzweil's evolutionary worldviews, which each describe the rise of complexity in biological and technological systems, eventually leading to a radically different future, "in which the universe wakes up."[272]

In Kurzweil's vision, there is a point at which evolutionary progress becomes so rapid and so profound that we are inevitably catapulted into a radically different future age. This transition will be precipitated by the "expansion of human intelligence by a factor of trillions through merger with its nonbiological form."[273] This point of explosion and its aftermath is described by the term 'the Singularity.'[274]

Like Kurzweil, Teilhard viewed consciousness and complexity as forces proliferating in the universe in a positive feedback cycle, running in a contrary direction to the general entropic movement of the universe as a whole. While Kurzweil argues that the result of this localised increase in complexity will be an intelligence explosion, or Singularity, Teilhard argued that the feedback cycle of consciousness in the biosphere, resulting in

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[272] Steinhart, "Teilhard de Chardin and Transhumanism."
[273] Kurzweil, *The Singularity is Near*, ch.3.
[274] The concept of the technological singularity was first outlined (and branded as 'the Singularity') by the science fiction writer Vernor Vinge in 1993 conference paper. However, Vinge traces earlier intimations of the idea to the physicists Stanislaw Ulam and John von Nuemann in the 1950s and the mathematician I. J. Good in the 1960s. See: Vernor Vinge, "Technological Singularity," originally presented at *VISION-21 Symposium*, sponsored by the NASA Lewis Research Center and the Ohio Aerospace Insitute, March 30-31, 1993, https://www.frc.ri.cmu.edu/~hpm/book98/com.ch1/vinge.singularity.html. The concept has most famously been popularised by Ray Kurzweil in *The Age of Spiritual Machines* and *The Singularity is Near*. For a reference text containing essays by leading thinkers on the subject, see: Amnon H. Eden et al., *Singularity Hypotheses: A Scientific and Philosophical Assessment* (Heidelberg: Springer, 2012).

the noosphere, will eventually culminate in an Omega Point, a central universal mind that draws all consciousness and intelligence into a unified whole.

A slight difference between Kurzweil's vision of the Singularity and Teilhard's concept of an Omega Point is the explicitly religious emphasis of the latter's vision. Teilhard's concept was overtly framed as a Christian ideal. The Omega Point is both an origin and an end, drawing all forces in the universe towards its centre, paralleling Christ's declaration in Revelation, "I am the Alpha and the Omega, the First and the Last, the Beginning and the End."[275] Teilhard believed that a divine plan, of sorts, would be realised when the Omega Point coalesced—the divine plan of physics and cosmic evolution, which would result in the proliferation of consciousness and complexity, fuelled by greater localised concentrations of free energy, giving rise to the "God-Omega."[276]

Unlike Teilhard, Kurzweil does not actively promote the Singularity as a religious vision, and discusses the concept in purely scientific terms. However, like many transhumanists, he acknowledges that there are conceptual overlaps between his evolutionary transhumanist vision and traditional concepts of God. He writes:

> Evolution moves toward greater complexity, greater elegance, greater knowledge, greater intelligence, greater beauty, greater creativity, and greater levels of subtle attributes such as love. In every monotheistic tradition God is likewise described as all of these qualities, only without any limitation: infinite knowledge, infinite intelligence, infinite beauty, infinite creativity, infinite love, and so on. Of course, even the accelerating growth of evolution never achieves an infinite level, but as it explodes exponentially it certainly moves rapidly in that direction. So evolution moves inexorably toward this conception of God, although never quite reaching this ideal. We can regard, therefore, the freeing of our thinking from the severe limitations of its biological form to be an essentially spiritual undertaking.[277]

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[275] The King James Bible, Complete, Revelation 22:13, *Project Gutenberg*, last updated February 21, 2013, produced by Leslie Brooks and David Widger, http://www.gutenberg.org/files/10900/10900-h/10900-h.htm#N6622.
[276] Teilhard de Chardin, *The Phenomenon of Man*, 288.
[277] Kurzweil, *The Singularity is Near*, ch.7.

A number of other transhumanists and techno-optimists have expressed more explicitly religious and spiritual views about future evolutionary scenarios in which intelligence becomes God-like.[278]

Teilhard on posthumanity

In the immediate future, Teilhard predicted that there would be an increase in biomedical innovations, which could engender altered transhuman states. In his words, "with our knowledge of hormones we appear to be on the eve of having a hand in the development of our bodies and even of our brains." He was also optimistic that, "with the discovery of genes it appears that we shall soon be able to control the mechanism of organic heredity." Eventually, Teilhard imagined that scientists would be able to generate, "a new wave of organisms, an artificially provoked neo-life."[279]

Under the influence of human-generated conscious evolution, he even predicted that:

> Thought might artificially perfect the thinking instrument itself; life might rebound forward under the collective effect of its reflection. The dream upon which human research obscurely feeds is fundamentally that of mastering, beyond all atomic or molecular affinities, the ultimate energy of which all other energies are merely servants; and thus, by grasping the very mainspring of evolution, seizing the tiller of the world.[280]

J. B. S. Haldane (1892-1964)

John Burdon Sanderson Haldane was the son of the leading Scottish physiologist, John Scott Haldane, from whom J. B. S. learned "the fundamentals of science," an education that began very early in his life. Throughout the younger Haldane's youth, the pair undertook many "legendary and daring physiological experiments," in which they "acted

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[278] See: Frank Tipler, *The Physics of Immortality* (New York: Anchor Books, 1994), 116; Giulio Prisco quoted in *Transcendence: The Disinformation Encyclopaedia of Transhumanism and the Singularity*, ed. R. U. Sirius and Jay Cornell (San Francisco: Disinformation Books, 2015), see entry "Rapture of the Nerds"; [278] Vinge, "Technological Singularity,"; Hughes, "Contradictions from the Enlightenment Roots of Transhumanism," 627.
[279] Teilhard de Chardin, *The Phenomenon of Man*, 250.
[280] Teilhard de Chardin, *The Phenomenon of Man*, 250.

as their own 'guinea pigs.'"[281] They often took it in turns to inhale methane, carbon monoxide and carbon dioxide while the other monitored the effects (which typically included passing out).[282] One aim of these experiments was to understand the effects that these noxious gases had on miners, leading Haldane Snr. to propose the early detection strategy of the canary in the coalmine. Haldane Snr. also developed the first effective gas masks to combat chlorine gas in World War I.[283]

Haldane Jnr. served in the Scottish Black Watch battalion in the First World War, fighting in the trenches in France. He took up the post of professor of physiology at Oxford University upon his return. In his intellectual life, Haldane was a true polymath. He received no formal training in science at university, studying Classics at Oxford after switching from mathematics. Yet he had a lifelong interest in genetics, which began in early childhood, and his research on the genetic linkages between mammals helped paved the way for the rise of the modern evolutionary synthesis between Darwinian natural selection and the Mendelian principles of heredity. Haldane went on to become one of the most eminent scientists and science writers of his day and has been described by Arthur C. Clarke as, "perhaps the most brilliant science popularizer of his generation."[284]

Haldane on science, progress and the future

Haldane's most notable proto-transhumanist sentiments appear in his 1923 treatise, *Daedalus: Science and the Future*, which was first delivered as a lecture to the Heretics Society at Cambridge University earlier that year. In *Daedalus*, Haldane speculated about the progress of science and human societies over the next century, envisioning artificial wombs, *in vitro* fertilisation, radical life-extension, the abolition of diseases,

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[281] Krishna R. Dronamraju, "Recollections of J.B.S. Haldane, with special reference to Human Genetics in India," *Indian Journal of Human Genetics* 18.1 (2012): 3, doi: 10.4103/0971-6866.96634.
[282] Dronamraju, "Recollections of J.B.S. Haldane," 5; Bill Bryson, *A Short History of Nearly Everything* (London: Transworld Publishers, 2004), kindle, ch.16.
[283] Naomi Mitchison, "Gas Masks," *New Scientist* (May 1, 1975): 279.
[284] Arthur C. Clarke, "Haldane and space," in *Haldane and modern biology*, ed. Krishna R. Dronamraju (Baltimore: Johns Hopkins University Press, 1968), 243.

interplanetary communication, the proliferation of nootropic (mind enhancing) drugs, the rise of clean energy and the development of futuristic foods in a post-agrarian society. The text is widely cited as a pivotal publication in proto-transhumanist history. Bostrom refers to *Daedalus* as, "a significant stimulus in the formation of transhumanism,"[285] while Hughes dubs Haldane one of, "the first intellectual precursors of transhumanism."[286]

Haldane was one of the first scientists to envisage both *in vitro* fertilisation and organismal cloning, and predicted that in the future, procreation would be carried out through a process of "ectogenesis," whereby a fetus is developed in an artificial womb outside of a human body.[287] He also imagined that scientists of the future would be able to prevent menopause and thereby "prolong a woman's youth,"[288] and argued that it may one day be possible for reproduction to be "completely separated from sexual love," rendering mankind "free in an altogether new sense."[289]

Through selective human breeding (eugenics), Haldane believed we may be able effect massive genetic changes across the whole human population, consciously accelerating evolution as we "change [the human] character as quickly as institutions."[290] He also believed that "too many children are born in the slums, too few in the well-to-do suburbs"[291] and argued that a rebalancing, via a change in attitudes in both echelons of society would be beneficial.

Yet Haldane was a reluctant eugenicist, despite his keen interest in the subject, and often pointed out how naïve it was to suppose that deleterious genes could be bred out of a population just by making assumptions based on the discernible traits of two prospective parents. Nevertheless, his interest in breeding a healthier, more intelligent

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[285] Bostrom, "The Transhumanist FAQ v. 2.1," 40.
[286] Hughes, *Citizen Cyborg*, ch.10.
[287] J. B. S. Haldane, *Daedalus: or Science and the Future* (New York: E. P. Dutton & Company, 1923), 65.
[288] Haldane, *Daedalus*, 74.
[289] Haldane, *Daedalus*, 68.
[290] Haldane, *Daedalus*, 69.
[291] J. B. S. Haldane, "My Philosophy of Life," in *The Inequality of Man and Other Essays*, by J. B. S. Haldane (London: Chatto & Windus, 1932), 218.

population at a sustainable carrying capacity earmarks him as a thinker with a strong interest in the consciously designed evolutionary future of the human race.[292]

Haldane was a friend and colleague of Julian Huxley's and along with his brother Aldous, Julian was a regular visitor to the Haldane family's home from childhood. Haldane's vision of a future world in which humans take procreation and human evolution into their own hands and select for specific traits is notable for having directly influenced Aldous Huxley's seminal novel, *Brave New World*, which is often characterised as, "a fictional version of Haldane's *Daedalus*."[293] Haldane's predictions about advanced pharmacology in *Daedalus*, creating a situation in which "the face of the world and the possibilities of existence will be totally altered,"[294] are also widely believed to have influenced Huxley's characterisation of the drug soma in *Brave New World*.[295]

Haldane became a Marxist in the late 1930s[296] and was an active member of the Communist Party of Great Britain in the 1940s. Like Karl Marx and Friedrich Engels before him, Haldane championed a secular, techno-progressive worldview focused on evolutionary becoming over static being. He also acknowledged the influence of socialist techno-progressivism on his worldview in his book, *The Marxist Philosophy and the Sciences* (1938). Haldane was adamant that industrial ways of life were here to stay and that they would be consolidated in a much shorter period than the agrarian lifeways that preceded them. He also believed that those who embrace industrial lifeways "will inherit the earth."[297]

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[292] For a range of opinions Haldane voiced about eugenics, see: J. B. S. Haldane, "Possibilities of Human Evolution," in *The Inequality of Man*; J. B. S. Haldane, "Birth Control," in *The Inequality of Man*.
[293] Krishna R. Dronamraju, "Historical Essay, J.B.S. Haldane (1892-1964): Centennial Appreciation of a Polymath," *The American Journal of Human Genetics* 51, no.4 (1992): 885.
[294] Haldane, *Daedalus*, 75.
[295] Joshua Lederberg, "Foreword: J.B.S. Haldane's Daedalus 1923—70 years before and after," in *Haldane's Daedalus Revisited*, ed. Krishna R. Dronamraju (Oxford: Oxford University Press, 1995), vii.
[296] J.B.S. Haldane, *The Marxist Philosophy and the Sciences* (London: George Alllen & Unwin Ltd, 1938), 13, 16.
[297] Haldane, *Daedalus*, 22.

Like our other proto-transhumanists, Haldane saw far beyond the technologies and physical limitations of the day. He recognised that "the exhaustion of our coal and oil-fields is a matter of centuries only," but was adamant that this exhaustion would not lead to a Malthusian crisis or the collapse of civilisation. Instead, he believed that the energy sustainability problem would eventually be solved by tapping, "those intermittent but inexhaustible sources of power, the wind and the sunlight."[298] In short, it was *more* science and *more* technology, not less, that would provide the best solutions and the way forward for humanity. In Haldane's words, if "civilization as we know it… is to be improved there is no hope save in science."[299]

Promise, peril and existential risk

Haldane believed that developments in science and technology, combined with greater public understanding, were the only viable means of ensuring the long-term survival and prosperity of the human race. He was hopeful that great strides could be made if humans seized the evolutionary reins and chartered a course of conscious technological improvement. However, while he was optimistic about what scientists could achieve, he was also acutely aware of the catastrophic setbacks that humans could face by misusing technology, or fearing it and turning away from it. As vast and exciting as the potential for progress was, he cautioned that "the future will be no primrose path."[300]

The most worrying cause of potential setbacks, in Haldane's estimation, was human nature itself. Like Nick Bostrom, Julian Savulescu and other advocates of human moral enhancement,[301] Haldane was concerned that humanity's mastery over nature, which modern science was increasingly facilitating, could be dangerous in the hands of humans whose understanding of their own power was, as yet, so limited. Of humanity's newfound tools of progress, he wrote:

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[298] Haldane, *Daedalus*, 22-23.
[299] J. B. S. Haldane, "Man's Destiny," in *The Inequality of Man*, 143.
[300] Haldane, *Daedalus*, 87.
[301] See footnote 17.

> It may be urged that they are only fit to be placed in the hands of a being who has learned to control himself, and that man armed with science is like a baby with a box of matches.[302]

The tension between progress and regress is further explored by Haldane in his essay, "Man's Destiny," which contains some of his most strikingly proto-transhumanist sentiments. I reproduce them here, as, to my knowledge they have not yet been quoted in any academic text on transhumanism. Although Haldane observed that the progress of science had been staggeringly rapid in the last hundred and forty years, he considered it, "quite as likely as not that scientific research may ultimately be strangled in some such way as this before mankind has learned to control its own evolution."[303]

After some pessimistic musings on the possibility of a reactionary Luddite culture spreading and triggering waves of anti-scientific thinking, leading to conflict, and perhaps even extinction, Haldane explored the alternate possibility of humanity successfully steering civilisation towards a higher state of being. He wrote:

> In the rather improbable event of man taking his own evolution in hand—in other words, of improving human nature, as opposed to environment—I can see no bounds at all to his progress. Less than a million years hence the average man or woman will realize all the possibilities that human life has so far shown. He or she will never know a minute's illness. He will be able to think like Newton, to write like Racine, to paint like the von Eycks, to compose like Bach. He will be as incapable of hatred as St. Francis, and when death comes at the end of a life probably measured in thousands of years he will meet it with as little fear as Captain Oates or Arnold von Winkelried. And every minute of his life will be lived with all the passion of a lover or a discoverer. We can form no idea whatever of the exceptional men of such a future.[304]

But Haldane couldn't help speculating about the values and pursuits of these possible future men, writing:

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[302] Haldane, *Daedalus*, 82.
[303] Haldane, "Man's Destiny," 145.
[304] Haldane, "Man's Destiny," 146.

> Man will certainly attempt to leave the earth. The first voyagers into interstellar space will die, as did Lilienthal and Pilcher, Mallory and Irvine. There is no reason why their successors should not succeed in colonizing some, at least, of the other planets of our system, and ultimately the planets, if such exist, revolving round other stars than our sun. There is no theoretical limit to man's material progress but the subjection to complete conscious control of every atom and every quantum of radiation in the universe. There is, perhaps, no limit at all to his intellectual and spiritual progress.[305]

Haldane was clear that there were no guarantees of a prosperous future for humankind and that much potential danger lay ahead. But he believed that the best hope for humanity lay in science, education and conscious evolution, for, "unless he can control his own evolution as he is learning to control that of his domestic plants and animals, man and all his works will go down into oblivion and darkness."[306]

Posthumanity and the inevitability of change

For Haldane, science was ultimately about "man's gradual conquest, first of space and time, then of matter as such, then of his own body and those of other living beings, and finally the subjugation of the dark and evil elements in his own soul."[307] Hinting at the eventual emergence of a posthuman future, he wrote, "it follows that our descendants may be creatures as different from ourselves as we are different from apes."[308] Expanding on this idea, he continued, "the time will probably come when men in general accept the future of human evolution of their species as a probable fact, just as to-day they accept the idea of social and political progress."[309]

Haldane frequently pointed out that science "creates new ethical situations" in a constantly changing world.[310] He did not believe that normative values or traditions

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[305] Haldane, "Man's Destiny," 146-147.
[306] Haldane, "Man's Destiny," 147.
[307] Haldane, *Daedalus*, 82.
[308] Haldane, "Possibilities of Human Evolution," 78.
[309] Haldane, "Possibilities of Human Evolution," 96.
[310] J. B. S. Haldane, "Science and Ethics," *The Inequality of Man and Other Essays*, by J. B. S. Haldane (London: Chatto & Windus, 1932), 98.

were sacrosanct, for there is only one constant in biology and human nature: change. Reflecting on how artificial interventions are often considered repugnant, then later enshrined in orthodoxy, he wrote, "the biological invention then tends to begin as a perversion and end as a ritual supported by unquestioned beliefs and prejudices."[311] In Haldane's view, all traditions and orthodoxies would inevitably be overthrown. Human values would evolve beyond human norms, and might be greatly improved in the process.

In one example of future change, Haldane predicted that within a hundred and twenty years, "agriculture will become a luxury, and that mankind will become completely urbanized." A new industrialised food system would prevail, in which, "many of our foodstuffs, including the proteins, we shall probably build up from simpler sources such as coal and atmospheric nitrogen." This transition, for Haldane, was representative of progress. He wrote, "I do not regret the probable disappearance of the agricultural labourer in favour of the factory worker, who seems to me a higher type of person."[312]

Haldane is not the only historical figure to have made these kinds of observations. Uncannily similar sentiments were also voiced by Frederick Edwin Smith, also known as the 1st Earl of Birkenhead, in his book *The World in 2030 A.D.* (1930).[313] Haldane reviewed this book wryly, noting that "certain of the phrases seemed unduly familiar. Where had I seen them before? Finally I solved the mystery. They were my own."[314] Interesting counter sentiments also appear in Bertrand Russell's *Icarus, or The Future of Science* (1924).[315]

Yet Haldane is one of the strongest historical precursors of the modern transhumanist. His musings on science, technology, progress, conscious evolution, space colonisation, life-extension and the good life, have profound resonances with almost all strands of

[311] Haldane, *Daedalus*, 49.
[312] Haldane, *Daedalus*, 38-39.
[313] The Earl of Birkenhead, *The World in 2030* (London: Hodder and Stoughton, 1930).
[314] Quoted in Dronamraju, *Popularizing Science*, 57.
[315] Bertrand Russell, *Icarus, or The Future of Science* (London: Trubner & Co., Ltd, 1924).

modern transhumanist thinking. His futuristic visions were much bolder and more detailed than most others of the time, and *Daedalus* is one of the few texts of the period that modern transhumanists cite as being directly influential.

J. D. Bernal (1901- 1971)

Another forward-looking thinker of the early twentieth-century, the Irish scientist J. D. Bernal, believed that posthumanity was the natural and inevitable consequence of biological evolution in the human era. He boldly declared that "normal man is an evolutionary dead end; mechanical man, apparently a break in organic evolution, is actually more in the true tradition of a further evolution."[316]

Like Haldane, who was both an eminent scientist and a great science communicator, Bernal's career combined years of lab work, including pioneering investigations into the structure of crystals and organic molecules, with extensive publications on the social and political significance of science. His most striking proto-transhumanist sentiments appear in *The World, The Flesh and The Devil: An Enquiry into the Future of the Three Enemies of the Rational Soul* (1929), which Arthur C. Clarke dubbed, "the most brilliant attempt at scientific prediction ever made."[317]

In the 1920s, Bernal was a polyamorous atheist and a fringe member of London's bohemian Bloomsbury set of artists and writers. However, he was raised in an Irish Catholic family and his book title is derived from the Christian tradition, in which the world, the flesh, and the devil, are often presented as the antithesis of the holy trinity, representing the forces that lead humans into unholy temptation. Bernal co-opted the trinity as a framework for his book, deploying it to describe three core and interrelated spheres of scientific phenomena. If left un-manipulated by conscious human

[316] J. D. Bernal, *The World, the Flesh and the Devil: An Enquiry into the Future of the Three Enemies of the Rational Soul* (London: Verso, 2017), kindle, ch.3.
[317] Arthur C. Clarke, *Greetings, Carbon-Based Bipeds: Collected Essays 1934-1998* (New York: St. Martin's Griffin, 2000), 410.

intervention, he believed these phenomena would dramatically limit humanity's evolutionary potential.

The world, in Bernal's text, is the physical world; in the most immediate sense, it is the Earth and its physical systems, which play a profound role in dictating human actions. The flesh is human nature, shaped by biology and evolution, while the devil is an adjunct of the flesh—human psychology, encompassing our unconscious motives, cognitive biases and other vestiges of our evolutionary past, many of which, Bernal believed, had become maladaptive in the modern world.

Like Haldane's *Daedalus*, Bernal's *The World* contains some of the most profound proto-transhumanist sentiments of any non-fiction publication of the twentieth century. Bernal pre-empted almost every key theme in modern transhumanist thought, from intelligence enhancement, to life-extension, brain uploading, atomically precise manufacturing and space colonisation. In his 1972 Bernal lecture, the physicist Freeman Dyson succinctly summarised Bernal's vision of how the human limitations imposed by the world, the flesh, and the devil, may be overcome in the future:

> To defeat the World, the greater part of the human species will leave this planet and go to live in innumerable freely floating colonies scattered through outer space. To defeat the Flesh, humans will learn to replace failing organs with artificial substitutes until we become an intimate symbiosis of brain and machine. To defeat the Devil, we shall first reorganize society along scientific lines, and later learn to exercise conscious intellectual control over our moods and emotional drives, intervening directly in the affective functions of our brains with technical means yet to be discovered.[318]

Below, we explore a number of key examples in which Bernal grappled with what have since become major transhumanist themes.

[318] Freeman J. Dyson, "Appendix D: The World, The Flesh, and the Devil," in *Communication with Extraterrestrial Intelligence*, ed. Carl Sagan (Cambridge, MA: The MIT Press, 1973), 373.

Nanotechnology and atomically precise manufacturing

Bernal anticipated the development of one of the most radical, controversial, and still speculative transhumanist technologies: atomically precise manufacturing (APM). APM is often hailed as the key to the success of transhumanistic visions of uploaded minds, reanimation after cryonic suspension, and a world of abundant resources and dematerialisation.

In 1986, the father of nanotechnology, Eric Drexler, published the landmark book, *Engines of Creation: The Coming Era of Nanotechnology*, which was followed in 2013 by, *Radical Abundance: How a Revolution in Nanotechnology Will Change Civilization*. Building on speculative musings about molecular assembly, made decades earlier by Richard Feynman, John von Neumann, and Freeman Dyson,[319] Drexler outlined a theory in which it would one day be possible to assemble just about anything, atom by atom: a car, a couch, a human being and all of its parts.

Drexler has famously argued that nanotechnology could help solve problems of resource scarcity, senescence, the limitations of cryonic preservation, and, eventually, allow humans to realise the elusive dream of space colonisation. His works are widely read and cited among transhumanists.[320] Like Drexler, Bernal believed that the next step for human development in the postindustrial era would entail, "the development of new materials and new processes in which physics, chemistry and mechanics will be inextricably fused." Specifically, he argued that:

> The stage should soon be reached when materials can be produced which are not merely modifications of what nature has given us in the way of stones, metals, woods, and fibers, but are *made to specifications of a molecular architecture*. Already we know all the varieties of atoms; we

[319] For a succinct summary of the pre-history and history of the quest to make self-replicating molecular machines, see: McCray, *The Visioneers*, ch. 5.
[320] More emphasises the importance of Drexler's nanotechnological visions in transhumanist culture in "The Philosophy of Transhumanism." See also: Kurzweil, *The Singularity is Near*, ch. 3; ch. 5; Bostrom, "The Transhumanist FAQ v. 2.1," 9-12; Natasha Vita-More, "Aesthetics," in *The Transhmanist Reader*; and Eliezier Yudkowsky, "Books of Knowledge," archived January 27, 2001, https://web.archive.org/web/20010127001900/http://sysopmind.com:80/bookshelf.html#fs_n.

> are beginning to know the forces that bind them together; soon we shall be doing this in a way to suit our own purposes.[321]

Like most modern transhumanists, Bernal believed there was nothing objectionable about manipulating nature for human ends. Where humankind could gain, without endangering itself, greater mastery over nature seemed like the logical and obvious thing to strive for. In an age of new materials, Bernal envisaged "the passing of the age of metals and all that it implies—mines, furnaces, and engines of massive construction."[322] In their place, he imagined an age of light, smart and efficient materials.

In the future, Bernal believed that energy transmission would become more efficient, and humans would directly utilise "the high frequency (light) waves of the sun." We would also engineer and revel in the delights of "new synthetic foods," with an array of alluring textures and flavours exceeding those found in natural foods, allowing gastronomy "to rank with the other arts."[323] Bernal also imagined that the "new molecular materials"[324] of the future would be integral to constructing space colonies in the future—a cause that was later taken up by Drexler in the 1970s and 80s.

Bodily alterations and posthumanity

Bernal also thought it likely that humans would continue to alter ourselves and our environments so profoundly that we would eventually seed a "new man;"[325] a form, or forms of life that modern transhumanists would call posthuman. He argued that "men will not be content to manufacture life: they will want to improve on it," creating a "mechanized man or compound man," which would simply be "the logical outcome of the type of humanity that exists at present." Eventually, "bodies… would be left far behind"

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[321] Bernal, *The World, the Flesh and the Devil*, ch.2.
[322] Bernal, *The World, the Flesh and the Devil*, ch.2.
[323] Bernal, *The World, the Flesh and the Devil*, ch.2.
[324] Bernal, *The World, the Flesh and the Devil*, ch.2.
[325] Bernal, *The World, the Flesh and the Devil*, ch.3.

and "the new life which conserves none of the substance and all of the spirit of the old would take its place and contrive its development."[326]

Bernal also made the shrewd observation that many of the scientists of his day were already setting humanity on the path towards posthumanity without any conscious intent. He wrote that scientists believe they are "serving humanity" by unlocking the mysteries of the natural world and helping their fellow humans to attain greater mastery within it. The trouble is, "the scientists are not masters of the destiny of science; the changes they bring about may, without their knowing it, force them into positions which they never would have chosen." Touching on the Promethean side of human nature, he mused that in the end scientist's "curiosity and its effects may be stronger than their humanity."[327]

Nevertheless, Bernal was an advocate of deliberate human augmentation and posthuman design. He viewed many bodily functions as sub-optimal, arguing that we could power our brains more efficiently and increase our mental capacity through a better system than consuming biomass for sustenance. He even wrote of the limbs as "parasites, demanding nine-tenths of the energy of the food and even a kind of blackmail in the exercise they need to prevent disease." Not only that, "the bodily organs wear themselves out in supplying their requirements." Consequently, he argued that, "sooner or later the useless parts of the body must be given more modern functions or dispensed with altogether."[328]

Bernal also had a penchant for the kookier, cyborgian brand of biohacking that is gaining increasing popularity and media coverage today; the kind that aims to confer greater-than-human perception and sensory experiences, in forms that are currently not

[326] Bernal, *The World, the Flesh and the Devil*, ch.3.
[327] Bernal, *The World, the Flesh and the Devil*, ch.6.
[328] Bernal, *The World, the Flesh and the Devil*, ch.3.

particularly essential or useful, given the normative values and pursuits in modern societies.[329] He wrote that:

> We badly need a small sense organ for detecting wireless frequencies, eyes for infra-red, ultra-violet and X-rays, ears for supersonics, detectors of high and low temperatures, of electrical potential and current, and chemical organs of many kinds.[330]

Yet Bernal viewed enhanced sensory perception as merely the beginning of a radical, and more profoundly transhuman, transformation. He hypothesised that in the future, humans may live in a physical body for the first several decades of their lives before undergoing a rather drastic process of organ replacement and re-education, finally emerging as a being of far greater flexibility and capability than any existing human, with qualities "quite transcending the capacities of untransformed humanity."[331]

Like modern transhumanists, who have also reflected on the many possible posthuman states, Bernal noted that it is "difficult to form a picture of the final state," especially since "a great number of typical forms would be developed."[332] But he linked aspirations of bodily alteration with life-extensionist ambitions and the desire to expand the human healthspan.

Decay, death, and the vulnerabilities of a flesh-based existence, also appeared to Bernal as problems well worth trying to solve. He did not revere the idea of 'mere' life-extension

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[329] Noteable examples include the colourblind (he can only see in greyscale) artist, Neil Harbisson, who has had an antenna implanted into his skull. The antenna protrudes over his head and allows him to perceive colour through sound frequencies. His antenna can also detect infrared and ultraviolet light and is Bluetooth enabled. See: James Langton, "Why being the world's only cyborg can be a real headache," *The National*, February 11, 2018, https://www.thenational.ae/uae/why-being-the-world-s-only-cyborg-can-be-a-real-headache-1.703666. The artificial intelligence researcher Kevin Warwick also famously had an RFID chip implanted in his arm in 1998, which allowed him to "operate doors, lights, heaters and other computers without lifting a finger." See: Kevin Warwick, "Project Cyborg 1.0," accessed November 6, 2018, http://www.kevinwarwick.com/project-cyborg-1-0/. In 2002, Warwick had a neural interface chip implanted into the nerve fibres of his arm, which allowed him to "control an electric wheelchair and in intelligent artificial hand" and could be linked to another chip connected to his wife's nervous system. See: Kevin Warwick, "Project Cyborg 2.0," accessed November 6, 2018, http://www.kevinwarwick.com/project-cyborg-2-0/.
[330] Bernal, *The World, the Flesh and the Devil*, ch.3.
[331] Bernal, *The World, the Flesh and the Devil*, ch.3.
[332] Bernal, *The World, the Flesh and the Devil*, ch.3.

in the form of "a man living perhaps an average of a hundred and twenty years but still mortal, and increasingly feeling the burden of this mortality."[333] He also didn't look forward to the prospect of being a head in a jar or a disembodied consciousness: "only a Brahmin philosopher would care to exist as an isolated brain, perpetually centered on its own meditations." He reckoned that, "permanently to break off all communications with the world is as good as to be dead."[334] Yet he reflected that if one's brain could be kept alive (and in theory he thought it could be), this form of preservation could be "perhaps preferable to complete extinction."[335]

Hive minds and paradise engineering

Aspects of Bernal's musings on brains in jars have echoes of Teilhard's concept of the noosphere and more than mild overtones of Marxist techno-utopian collectivism. Bernal was a card-carrying communist and his vision of a future machine-brain hybrid was also a vision of an increasingly collective human consciousness. He believed that nerve endings from individual brains might one day be connected to an "electrical reactor," which could then be connected "with the brain-cell of another person," a process that he thought could probably be done wirelessly. Eventually, "connections between two or more minds would tend to become a more and more permanent condition until they functioned as dual or multiple organisms."[336]

Although he conceded that it might not be possible to keep individual minds alive indefinitely, he thought that death might be postponed for many hundreds of years. Meanwhile, the hive mind would be practically immortal. Bernal explained this outcome, imagining:

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[333] Bernal, *The World, the Flesh and the Devil*, ch.3.
[334] Bernal, *The World, the Flesh and the Devil*, ch.3.
[335] Bernal, *The World, the Flesh and the Devil*, ch.3.
[336] Bernal, *The World, the Flesh and the Devil*, ch.3.

> …the older components as they died being replaced by newer ones without losing the continuity of the self, the memories and feelings of the older member transferring themselves almost completely to the common stock before its death.[337]

He described this future scenario as "a state of ecstasy in the literal sense,"[338] as all the existing physical and mental barriers between humans that so easily breed misunderstanding and miscommunication would break down and thoughts and feelings could be shared in a purer sense. The idea of engineering posthuman states that are tantamount to perpetual ecstasy has strong resonances with the modern transhumanist David Pearce's idea of the hedonistic imperative, a moral argument promoting the use of technology to eliminate human suffering in a project of paradise engineering.[339]

The future of sex, reproduction and emotion

In a posthuman future of hive minds and heads in jars, what would become of sex and reproduction? Bernal thought it eminently plausible that we would "find a more direct way" to reproduce "by the use of intelligence," which "is bound to supersede the unconscious mechanism of growth and reproduction."[340] Like Godwin and Finot, he also thought it likely that at some point in the future "the sexual instincts… would be unrecognizably changed." He hypothesised that in a life characterised by "the intimate intercommunication of minds… the very existence of the ego would be impaired for the first time" and humans may have access to a state that might "perhaps be even greater than sex."[341] Delving deeper into human evolutionary drives, he also pondered whether humans would eventually replace sex as a fundamental motivating force as we became increasingly disembodied and cultivated new values.[342]

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[337] Bernal, *The World, the Flesh and the Devil*, ch.3.
[338] Bernal, *The World, the Flesh and the Devil*, ch.3.
[339] See: Pearce, "The Hedonistic Imperative."
[340] Bernal, *The World, the Flesh and the Devil*, ch.3.
[341] Bernal, *The World, the Flesh and the Devil*, ch.5.
[342] Bernal, *The World, the Flesh and the Devil*, ch.5.

A corollary of the future of sex question is the future of feeling and emotion, a subject that Bernal also pondered. Understandably, he didn't reach a conclusion on this point, but he did raise the salient issue of whether feeling would be "perverted or superseded"[343] in the future; that is, whether the beings of the future would engineer emotions to be enhanced, or dampen them to become hyper-rational.

Public backlash and the social consequences of posthumanity

Like many leading transhumanists, Bernal was well aware that most of his contemporaries would not be amenable to many of the suggestions he proposed in his treatise. For his radically futuristic vision to be brought to life, he knew humanity would have to "overcome the quite real distaste and hatred which mechanization has already brought into being," a distaste he described as "nothing to what the bulk of humans would feel about even the milder of the changes which are suggested here." Regarding distaste at dramatic reconstructive surgery and bodily modifications, Bernal confesses, "I have felt it myself in imagining them."[344]

Pondering the repercussions of radically transformative new technologies on biological humanity and our environment, as well as the intermediary consequences on human psychology during the transition, Bernal expressed fear that negative, or "violent" emotional reactions from the 'non-mechanist' masses could ensue faster than technological transformations could subsume their concerns. He also considered the possibility of a dimorphic split in humanity: one group 'the humanizers' "developing a fully-balanced humanity," and the other group, 'the mechanizers' "groping unsteadily beyond it."[345] This vision is an early version of the modern 'haves and have-nots,' or 'enhanced and unenhanced humans' debate, which has become particularly heated in the current period of technological automation and obsolescence.

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[343] Bernal, *The World, the Flesh and the Devil*, ch.5.
[344] Bernal, *The World, the Flesh and the Devil*, ch.4.
[345] Bernal, *The World, the Flesh and the Devil*, ch.4.

En route to the posthuman future that Bernal envisioned, he predicted, "we shall have very sane reactionaries at all periods warning us to remain in the natural and primitive stage of humanity, which is usually the last stage but one in their cultural history."[346] Yet he believed that even sane resistance would be to no avail. The tide of conscious evolution would not be stopped by anything but a major natural or social upheaval, or extinction event.

A brief note on other thinkers

It would be fascinating to explore further examples of early twentieth century intellectual culture here, and to delve into the ideas and writings of a number of additional thinkers beyond those chosen as key narrative signposts. I will briefly note a few before closing. Many contemporaries of the proto-transhumanists discussed below, including the Irish socialist playwright, George Bernard Shaw, and the scientist and author, H. G. Wells thought at great length about human perfectibility and the future of humanity. Shaw even grappled with the theme of life-extension in his play, *Back to Methuselah* (1918-1920) and just about every word Wells published was thematically relevant.

Nine years before becoming Prime Minister of Great Britain, Winston Churchill also made some insightful and futuristic remarks about the "prodigious speed" of scientific innovation in his 1931 essay, "Fifty Years Hence." Churchill noted that the Industrial Revolution had unleashed enormous power "due to the substitution of molecular energy for muscular energy" and believed that there was "no doubt that this evolution will continue at an increasing rate." He proclaimed that, "the scientific inventions of the next fifty years will be far greater, more rapid and more surprising than those we have already experienced."[347]

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[346] Bernal, *The World, the Flesh and the Devil*, ch.5.
[347] Winston Churchill, "Fifty Years Hence," *TeachingAmericanHistory*, originally published in *Strand Magazine*, December 1931, http://teachingamericanhistory.org/library/document/fifty-years-hence/.

Within fifty years, Churchill predicted that scientists would create new materials that would be radically stronger and enable the invention of much more powerful machinery; telephones would be wireless and video enabled, and "synthetic food will, of course, also be used in the future." Churchill effectively predicted the invention of *in vitro* meat when he wrote, "we shall escape the absurdity of growing a whole chicken in order to eat the breast or wing, by growing these parts separately under a suitable medium." He also argued that modern humans appeared to be on the cusp of consciously effecting "the shaping of human nature."[348] Churchill even considered the idea that humans might eventually be bred and gestated entirely artificially, and that thought that the creation of humanoid robots might be possible within fifty years.[349]

Concluding remarks

By the mid twentieth century, modern technological capabilities were starting to catch up to humanity's age-old transcendent ambitions. The three main proto-transhumanists discussed in this chapter had a strong desire to see the world and human societies mature and develop harmoniously with the aid of scientific knowledge and technological enhancement. They believed that the future could be much better than the past, but to get there, they argued that society would need to embrace scientific literacy, enlightenment values, and education, and begin to consciously cast off the maladaptive vestiges of our evolutionary descent. A new and more enlightened version of humanity lay in wait, if only we could safely navigate our way to such a future.

[348] Churchill, "Fifty Years Hence."
[349] Churchill's vision of humanoid robots was inspired by Karel Čapek's 1920 play, *Rossum's Universal Robots (RUR).*

5. American Proto-transhumanism in the Cold War Period

> *The tool we have invented* is *our successor. Biological evolution has given way to a far more rapid process — technological evolution. To put it bluntly and brutally, the machine is going to take over.*
>
> — Arthur C. Clarke, *Profiles of the Future* (1962)
>
> *We are as gods and might as well get good at it.*
>
> — Stewart Brand, *Whole Earth Catalog* (1968)

As the twentieth century advanced, global population growth continued to soar, along with global GDP and resource and energy consumption.[350] The pace of technological change also accelerated as modern computers emerged and got smaller and cheaper, fast.[351] With so many thinkers, entrepreneurs and subcultures to chronicle in the second half of the twentieth century, I take a slightly different approach here, by telling the story of how computer culture and counterculture co-mingled in postwar America, especially in California. At the cross section of these cultures the most immediate precursor ideas, innovations, and worldviews that shaped the emerging transhumanist culture of the 1990s came into being. Californian counterculture is strongly emphasised here because the State has long been an epicentre for transhumanist movements and related ideas and subcultures.

The reasons for shifting our focus to the Unites States in this chapter should be obvious. After World War II, the US emerged as an economic powerhouse, Western superpower and global leader in science and technological innovation. The second half of the twentieth century was, for Americans, "a time of breathtaking change and transition."[352] The post-war baby boom was "intimately linked to the brilliant emergence of American

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[350] Will Steffen et al., "The Anthropocene: conceptual and historical perspectives," *Philosophical Transactions of the Royal Society A*, January 31, 2011, http://www.uvm.edu/~jfarley/EEseminar/readings/Anthropocene.pdf.
[351] See: Kurzweil, *The Singularity is Near*, ch.2.
[352] Mark C. Carnes, introduction to *The Columbia History of Post-World War II America*, ed. Mark C. Carnes (New York: Columbia University Press, 2007), 1.

technology and economic superiority"[353] as it fuelled a massive rise in consumption, including the growing consumption of knowledge and education. More emphasis than ever went into prenatal care and infant nutrition and science education was actively promoted and well-funded by State governments to fill the increasing demand for experts who could help win the technological arms race against the Soviets.[354] The knock-on effects of these and other policies were profound.

The postwar period saw the widespread use of penicillin, the introduction of the polio vaccine in 1952, and the emergence and widespread adoption of the contraceptive pill in the 1960s. A new wave of federal science funding and investment fuelled postwar technological innovation in the US, following the formation of the National Science Foundation in 1950.[355] Events like the 1964-65 New York World's Fair, where futuristic concept cars, computers and picture phones were displayed to millions of visitors, were also a testament to the high value placed on science and technology in American culture at this time. The featured attractions readily appealed to the public's enthusiasm for high-tech symbols of economic prosperity and a better future.[356]

Of the many important research breakthroughs of the period, a key milestone was the discovery of the structure of DNA by James Watson and Francis Crick in 1953, which led to mounting hopes that humans could soon unravel and rewrite the machinery of life. Bold aspirations to cure diseases became enshrined in public policy, notably in the first National Cancer Act of 1971, signed by President Nixon. Nixon pledged a staggering $1.6 billion for cancer research over a three-year period in an ambitious move that was popularly described as a declaration of "War on Cancer."[357]

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[353] Paula S. Fass, "Bringing It Home: Children, Technology, and Family in the Postwar World," in *The Columbia History of Post-World War II America*, ed. Mark C. Carnes (New York: Columbia University Press, 2007), 79.
[354] Fass, "Bringing It Home," 81-85.
[355] Brian Alexander, *Rapture: A Raucous Tour of Cloning, Transhumanism, and the New Era of Immortality* (New York: Basic Books, 2004), 27.
[356] See: Bill Cotter and Bill Young, *The 1964-1965 New York World's Fair* (Charleston, South Carolina: Arcadia Publishing, 2004).
[357] See: Harold M. Schmeck, "Nixon Signs Cancer Bill; Cites Commitment to Cure," *New York Times*, Dec 24, 1971, https://www.nytimes.com/1971/12/24/archives/nixon-signs-cancer-bill-cites-commitment-to-cure.html; *National Cancer Institute*, "National Cancer Act of 1971," Feb 26, 2016, https://www.cancer.gov/about-nci/legislative/history/national-cancer-act-1971.

Meanwhile, "enthusiasts for nuclear power in the 1950s promised energy too cheap to meter" and a similar brand of techno-optimistic zeal was later, "seen in the enthusiasm for space colonies, in the 1970s and 1980s."[358] The events of the Space Race, including the USSR's successful launch of the first artificial satellite, Sputnik 1 in 1957, the Russian's successful launch of the first human, Yuri Gagarin, into planetary orbit in 1961, and America's Apollo 11 mission, which landed the first two humans on the moon, also symbolised humanity's remarkable ability to transcend age-old limitations. For the first time in history, humans had travelled beyond their home planet and it began to seem conceivable that our progeny might one day find permanent homes among distant stars.

Counterpoints can, of course, be offered to all of these currents of optimism. Some of the most obvious reasons for pessimism in this period stemmed from the fear of atomic weapons, the backlash against the use of chemical weapons in Vietnam, the environmentalist movement's critique of DDT, and the thalidomide crisis of the 1960s.[359] Americans were certainly not uniformly enthusiastic about all new technologies. But as techno-optimists are our subject, we naturally focus on the events and innovations that gave their philosophies and projects momentum.

Later in the century, the rise of personal computing, the Internet and email, fuelled the growing subculture of 'cyberpunk,' which was infused with optimistic rhetoric about the promise of virtual communities and the digital lives and identities that could be created in the emerging realm of 'cyberspace.'[360] Many of the first transhumanist thought leaders grew up and came of age in this later period of techno-optimism and were inspired by

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[358] David Brin, "Comments by David Brin: Singularities," in *The Transhumanist Reader*, ch.37.
[359] A balanced account of America post-war techno-optimism and the competing sentiments of fear and pessimism can be found in: Andrew Kirk, "The New Alchemy: Technology, Consumerism, and Environmental Advocacy," in *The Columbia History of Post-World War II America*, 340-365.
[360] Excellent accounts of cyberculture can be found in: Alexander, *Rapture*; Mark Dery, *Escape Velocity: Cyberculture at the End of the Century* (New York: Grove Press, 1996); John Markoff, *What the Doormouse Said: How the Sixties Counter-culture Shaped the Personal Computer Industry* (New York: Penguin, 2005); Fred Turner, *From Counterculture to Cyberculture: Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism* (Chicago: The University of Chicago Press, 2006).

the space age, computers, psychedelics, and what they viewed as the ever-burgeoning wave of new technological breakthroughs that could liberate and elevate humanity.

From hippie counterculture to cybertopia

In the 1940s, 50s and 60s, computers and advanced information technologies were bulky, expensive and owned and wielded by governments. To many Western civilians in the Cold War nuclear age, these machines represented the military industrial complex and 'the man.' But it is less often noted that by the late 60s and early 70s, computers were already beginning to represent a new vehicle for countercultural optimism and individual expression.[361]

The tension between technology and ecology and their convergence in utopian visions of the 60s was beautifully captured in Richard Brautigan's (possibly tongue in cheek, possibly not) 1967 poem, "All Watched Over By Machines of Loving Grace." It reads:

> I like to think (and
> the sooner the better!)
> of a cybernetic meadow
> where mammals and computers
> live together in mutually
> programming harmony
> like pure water
> touching clear sky.
>
> I like to think
> (right now, please!)
> of a cybernetic forest
> filled with pines and electronics
> where deer stroll peacefully
> past computers
> as if they were flowers

[361] Turner, *From Counterculture to Cyberculture*, 3-4; Dery, *Escape Velocity*, 26-30.

with spinning blossoms.

I like to think
(it has to be!)
of a cybernetic ecology
where we are free of our labors
and joined back to nature,
returned to our mammal
brothers and sisters,
and all watched over
by machines of loving grace.[362]

In his book, *From Counterculture to Cyberculture: Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism* (2006), the historian Fred Turner does a superb job of characterising the major facets and factions of 1960s and 70s counterculture, noting that the well-worn image of a movement "antithetical to the technologies and social structures powering the cold war state and its defence industries" is often rolled out as *the* image of *the* counterculture. In reality, as Turner shows, branches of American counterculture also had roots in the military-industrial research culture.

Government funded research labs spawned monumental and rapid innovations in AI theory and computer science, and gave rise to influential interdisciplinary ideas like cybernetics and systems theory, through which scientists "began to imagine institutions as living organisms, [and] social networks as webs of information."[363] These ideas dovetailed in interesting ways with countercultural communities in California, including Silicon Valley's computer scientists, physicists and engineers, many of whom were eager to form new communities, change the world for the better, and at least in some senses 'get back to nature.'

[362] Richard Brautigan, "All Watched Over by Machines of Loving Grace," first published 1967, *American Dust*, accessed November 7, 2018. http://www.brautigan.net/machines.html.
[363] Turner, *From Counterculture to Cyberculture*, 3-4.

While one element of the 60s counterculture, which Turner broadly characterises as the *new left*, "turned outward toward political action" and actively "registered formerly disenfranchised voters, formed new political parties, and led years of protests against the Vietnam War," another subset of countercultural thinking, broadly characterised as *new communalists*, "turned inward, toward questions of consciousness and interpersonal intimacy."[364] While "the New Left was a primarily political movement," which "retained an allegiance to mainstream political tactics," the new communalists "turned away from political action and toward technology and the transformation of consciousness as the primary sources of social change."[365]

While these two cultures are probably best represented by an overlapping Venn diagram, it is helpful to make some key distinctions between the outer edges, as Turner does, especially regarding attitudes towards technology—a subject on which there was significant variation. Broadly speaking, we can link important currents of proto-transhumanist thinking more directly with what Turner describes as the new communalist counterculture. A key thinker and propagator of new communalist ideas was the maverick environmentalist and tech-enthusiast, Stewart Brand.

<u>The importance of Stewart Brand</u>

In 1968, Brand founded the low budget, but massively influential DIY publication, the *Whole Earth Catalog (WEC)*, which constituted "a pioneering effort in desktop publishing" before desktop publishing was commercially established.[366] The *WEC* was typed on typewriters and text and polaroids were cut and pasted together by hand. The catalog covered issues as diverse as shelter, land use, ecology, woodcraft, and tantra, as well as cybernetics, business, biology and computers. The *WEC* was primarily published between 1968 and 1972, with a few sporadic revival issues appearing thereafter.

[364] Turner, *From Counterculture to Cyberculture*, 31.
[365] Turner, *From Counterculture to Cyberculture*, 34-35; 4.
[366] Markoff, *What the Doormouse Said*, 154.

The zine won a National Book Award in 1972 and exerted an enormous influence on the environmentalist movement and the hacker computer culture of the 1970s. The *WEC* notably influenced the members of the Homebrew Computer Club, a Silicon Valley garage group of hackers and hobbyists founded in 1975, to which twenty-three tech companies would later be able "to trace their lineage directly."[367] Members included Apple's co-founders, Steve Wozniak and Steve Jobs, the latter being a Buddhist, a psychedelics enthusiast, and a techno-optimist, who later credited Brand as a major inspiration in his life and work. Jobs also went on to describe the *WEC* as "sort of like Google in paperback form, 35 years before Google came along."[368]

It is remarkable how often Brand crops up in the modern history of American technology, politics and ideas. In 1961, he was one of the first 153 participants in a series of experiments on the therapeutic benefits of LSD, conducted at the International Foundation for Advanced Study in Menlo Park in the San Francisco Bay area.[369] In the late 70s, he served as a special advisor to California's Governor Jerry "Moonbeam" Brown, who was an advocate of clean energy and space industry and colonisation.[370] Brand also led a movement to help raise awareness of the importance of environmentalism, petitioning NASA with the slogan "why haven't we seen a photograph of the whole earth yet?"[371] He even coined the term "personal computer" in his 1974 book, *II Cybernetic Frontiers*, two years before the Apple Computer Company was founded, which went on to play a major role in the personal computing revolution of the 1980s.[372]

Brand was exposed to computers and their revolutionary potential very early. He was a regular visitor at both the Augmentation Research Center (ARC) at Stanford Research

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[367] Markoff, *What the Doormouse Said*, 282.
[368] Steve Jobs, "'You've got to find what you love,' Jobs says," *Stanford News*, June 12, 2005, https://news.stanford.edu/2005/06/14/jobs-061505/.
[369] Markoff, *What the Doormouse Said*, 59.
[370] Patrick McCray, *The Visioneers: How a Group of Elite Scientists Pursued Space Colonies, Nanotechnologies, and a Limitless Future* (Princeton: Princeton University Press, 2013), introduction; ch. 3.
[371] Stewart Brand, "'Whole earth' origin…" composed in 1976, accessed November 5, 2018, http://sb.longnow.org/SB_homepage/WholeEarth_buton.html.
[372] Stewart Brand, *II Cybernetic Frontiers* (New York: Random House, 1974), 88.

Institute, and Xerox's Palo Alto Research Center (PARC), where groundbreaking innovations in the development of personal computing and the Internet took place. In 1968, Brand assisted in the famous 'mother of all demos' of emerging computer technologies, conducted by Douglas Engelbart, who headed the ARC. The presentation demonstrated the use of text editing on a display screen, using "the mouse-keyboard-screen combination we now take for granted,"[373] as well as hypertext links to switch between documents, and a vision of a linked computer network that presaged the ARPAnet (which in turn presaged the modern Internet). As the journalist John Markoff observed, "in short, every significant aspect of today's computing world was revealed in a magnificent hour and a half."[374]

Figures like Engelbart, as well as many of his colleagues, dabbled in psychedelics in the 60s, and many programmers and engineers in that period ended up in government funded labs, or working for military-industrial companies like Lockheed (now Lockheed-Martin) precisely because they wanted to avoid military service.[375] Far from all being stereotypical, short-haired conservatives, there was a pervasive intermingling of hippie, nudist, psychedelic and computing culture in California in the 1960s and 70s—especially around Stanford University and Palo Alto, where some of the major pioneers of personal computing and artificial intelligence were turning on, tuning in, and inventing the future.

After many other successful forays in writing, publishing and consulting, Brand went on to co-found the Whole Earth 'Lectronic Link (WELL) in 1985 with the tech entrepreneur Larry Brilliant. The WELL was a hugely influential bulletin board system (BBS) which allowed users to "dial up a central computer and type messages to one another in either asynchronous or real-time conversations"—effectively a crude combined prototype of Reddit and instant messaging. As Turner points out, what distinguished WELL from other bulletin boards of the period was the unique groups of "counterculturalists, hackers, and journalists" who came together to "recreate the countercultural ideal of a

[373] Turner, *From Counterculture to Cyberculture*, 110.
[374] Markoff, *What the Doormouse Said*, 148.
[375] Markoff, *What the Doormouse Said*, xviii.

shared consciousness in a new 'virtual community,'"[376] an ideal they propagated and widely disseminated in print, and beyond.

These ideals continued to thrive in the 1990s and inspired the first generation of transhumanists, who looked to the new communalist counterculture and their spirit of individualism, while honing their vision of the potential that new technologies promised for a new, and, in their view, deeply exciting, phase of human evolution.

Cultural seeds of transhumanism in print

In addition to the publications that Brand spearheaded, a number of key magazines in this period were also widely consumed by Silicon Valley tech-heads. The ideas in many of these zines cross-pollinated, the key memes within them mutating and evolving over the years into something eventually resembling a transhumanist philosophy. An important publication of this ilk was *High Frontiers*, founded in 1984 by R. U. Sirius (Ken Goffman) and Queen Mu (Alison Kennedy). The zines' subtitle was "Psychedelics, Science, Human Potential, Irreverence, and Modern Art."[377]

As we will see in the next chapter, these countercultural interests and values clearly overlap with the first official transhumanist philosophies, but are also much more nebulous and do not yet represent a cohesive transhumanist ethos. While human potential and science are key to all transhumanist philosophies, psychedelics and modern art may be of incidental interest to some transhumanist thinkers, but they are not essential to a transhumanist worldview.

In 1989, Sirius and Mu founded a new zine called *Mondo 2000*, in which, "psychedelics… were deemphasized in favour of the idea that digital culture was going to do at least as much to promulgate a new civilization as ketamine, DMAE, or LSD."[378] Mark Dery

[376] Turner, *From Counterculture to Cyberculture*, 141-142.
[377] Alexander, *Rapture*, 56.
[378] Alexander, *Rapture*, 57.

described *Mondo* as having, "one foot in the Aquarian age and the other in a Brave New World,"[379] while Erik Davis characterised it as "mowing down the garden of flower power with cyberpunk glee."[380] By this time, the first official transhumanist movements were just forming, with the first outline of an explicitly transhumanist philosophy a year away from publication. The cultural momentum of the Information Age was gathering steam and Sirius and the readers of *Mondo* often interacted with and influenced (or were influenced by) the first emerging transhumanist culture of extropianism (see chapters 6 and 7).

Kevin Kelly, who was an editor of Brand's *Whole Earth Review*, a co-founder of the WELL, and a writer for *Mondo 2000*, went on become the founding editor of the incredibly successful and still flourishing magazine, *Wired*. Within the milieu of publications focusing on technology and the future, Davis notes that, "*Wired* shaved off *Mondo's* hairier kinks and replaced its anarchist rants with corporate libertarianism."[381] While *Mondo* was deliberately kooky, heavily emphasising gadgetry and digital and virtual sex and fetishes, *Wired* had a broader set of topics and garnered more mainstream consumer appeal.

An important precursor to *Wired* was *Omni* magazine, founded in 1978 by Robert C. "Bob" Guccione and his partner (later wife) Kathy Keeton, who co-founded the soft porn mag *Penthouse* in 1965 in a bid to challenge the market supremacy of *Playboy*. Guccione and Keeton shared a love of science fiction and free enterprise and when they met in the 60s, "both dreamed of being powerful and living forever."[382] *Omni* "presented a hedonistic view of a future made shiny and sexy by sophisticated technology." It contained "stories about personal ultralight aircraft, space tourism, and life-extension research."[383] The mag also published sci-fi stories on these and similar themes by

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[379] Dery, *Escape Velocity*, 33.
[380] Davis, *TechGnosis*, 201.
[381] Davis, *TechGnosis*, 202.
[382] Patricia Bosworth, "The X-Rated Emperor," *Vanity Fair*, Feb 2005, https://www.vanityfair.com/news/2005/02/guccione200502.
[383] McCray, *The Visioneers*, ch.4.

leading authors, including William Gibson, the author of the cyberpunk cult classic, *Neuromancer* (1984).

Omni reportedly sold millions of copies per month, received huge advertising revenue from tech companies including IBM and Apple, and featured interviews with the who's who of science, technology and futurism, including Freeman Dyson, Alvin Toffler and Richard Feynman.[384] The magazine merged high-tech sentiments of space age enthusiasm and pro free-market individualism with a concern for ecology and environmental issues.

Omni featured pieces "opposing whaling and promoting 'ecoshelters,'" and Guccione was a prominent advocate of developing nuclear fusion as a clean power source, investing in (and ultimately losing) $17 million of his personal wealth in a company dedicated to bringing this vision to fruition.[385] But *Omni* didn't just promote 'out there' hippie philosophies or fringe and cutting edge science, it also had elements of new age kookery and pseudoscience, which modern transhumanists pervasively reject. According to longtime staffer Robert Weil, the mag "also published stuff on parapsychology and U.F.O.'s—favorite topics of Bob's."[386]

Although this survey is not exhaustive, other mags of this era worth mentioning include *Future Sex*, *Future Life*, *bOING bOING,* and *Cryonics*, which were avidly read, or contributed to, by many early transhumanists and the thinkers who inspired them.

[384] McCray, *The Visioneers*, ch.4.
[385] McCray, *The Visioneers*, ch.4.
[386] Bosworth, "The X-Rated Emperor."

WHOLE EARTH CATALOG 1968

PURPOSE

We are as gods and might as well get used to it. So far, remotely done power and glory—as via government, big business, formal education, church—has succeeded to the point where gross obscure actual gains. In response to this dilemma and to these gains a realm of intimate, personal power is developing—power of the individual to conduct his own education, find his own inspiration, shape his own environment, and share his adventure with whoever is interested. Tools that aid this process are sought and promoted by the WHOLE EARTH CATALOG.

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The WHOLE EARTH CATALOG functions as an evaluation and access device. With it, the user should know better what is worth getting and where and how to do the getting.

An item is listed in the CATALOG if it is deemed:

1) Useful as a tool,
2) Relevant to independent education,
3) High quality or low cost,
4) Not already common knowledge,
5) Easily available by mail.

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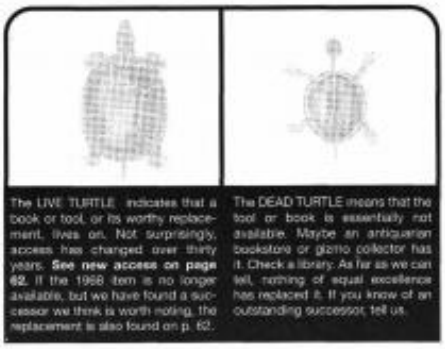
This striped ball appears next to book covers and tools to help you estimate the item's size.



The LIVE TURTLE indicates that a book or tool, or its worthy replacement, lives on. Not surprisingly, access has changed over thirty years. **See new access on page 62.** If the 1968 item is no longer available, but we have found a successor we think is worth noting, the replacement is also found on p. 62.

The DEAD TURTLE means that the tool or book is essentially not available. Maybe an antiquarian bookstore or gizmo collector has it. Check a library. As far as we can tell, nothing of equal excellence has replaced it. If you know of an outstanding successor, tell us.

Fig. 2. Sample page from *Whole Earth Catalog* (Fall 1968).

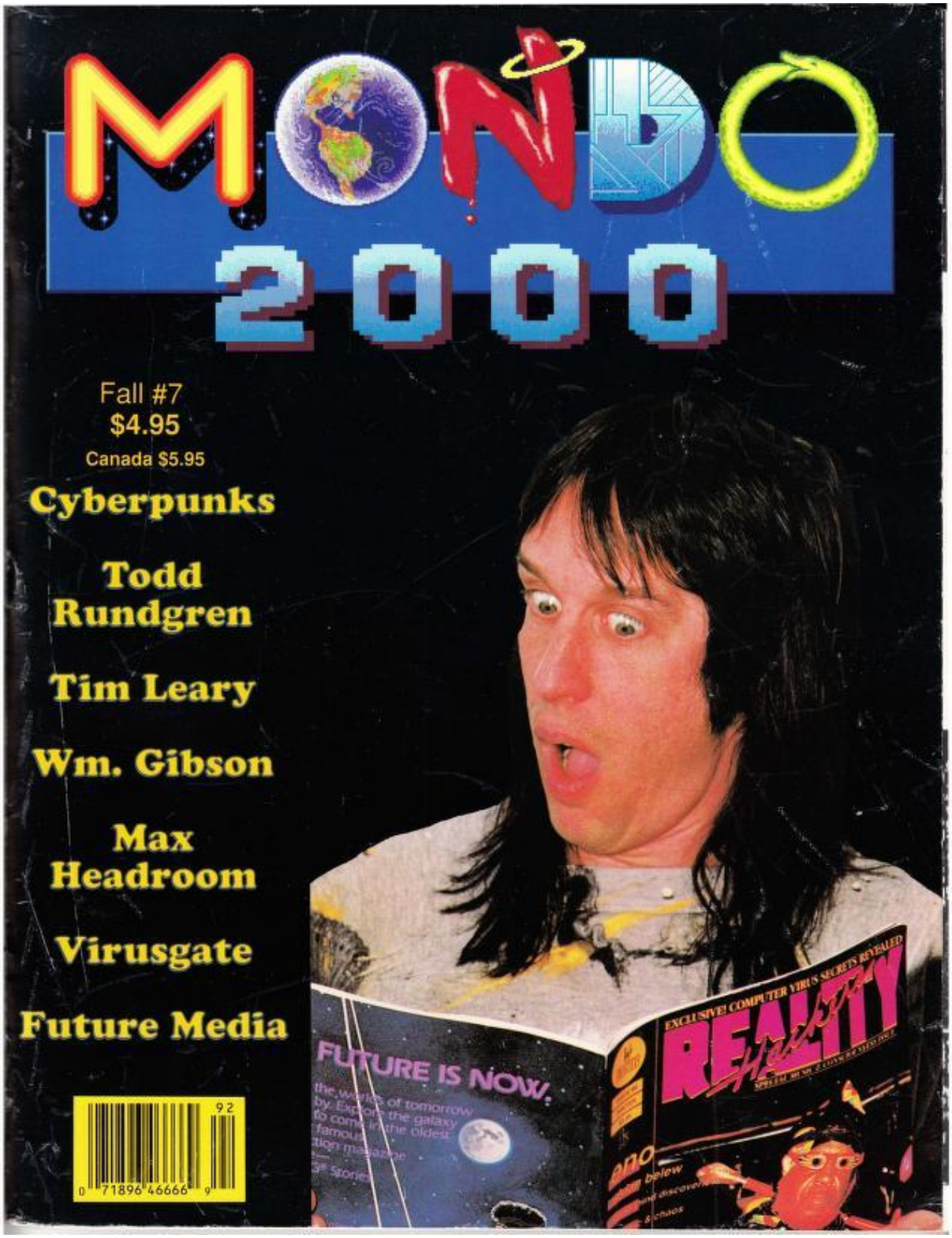


Fig. 3. Cover of the first issue of *Mondo 2000* (Fall 1989).

Fig. 4. Cover of *Wired* magazine (May 1997).

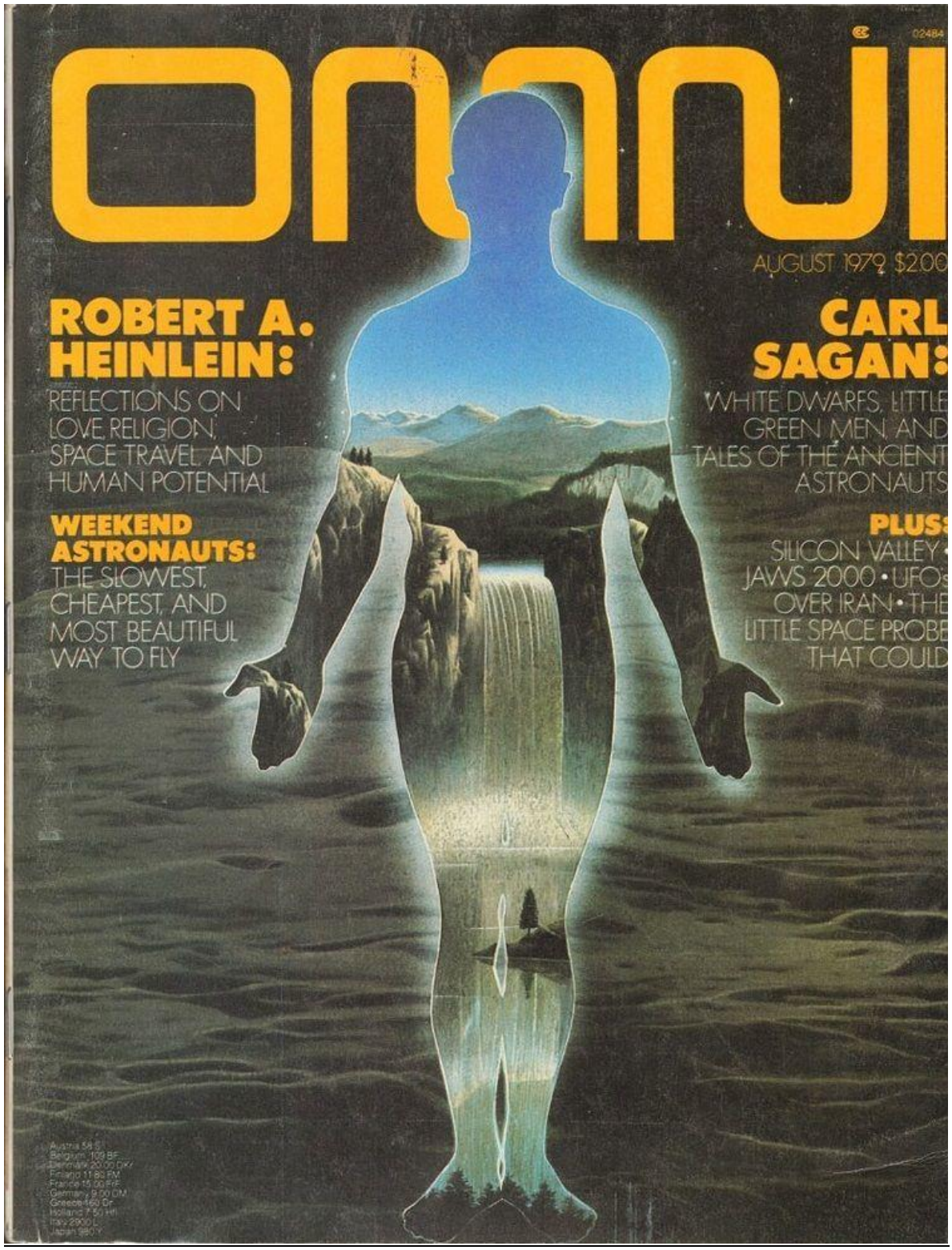


Fig. 5. Cover of *Omni* magazine (August 1979).

Conscious evolution and the global brain

In the second half of the twentieth century, the futurist Alvin Toffler became a popular proponent of a worldview centered on rapid evolutionary acceleration and conscious evolution. His book *Future Shock* (1970) advanced the thesis that society was changing faster than ever. Toffler delivered the urgent and unsettling message that, "unless man quickly learns to control the rate of change in his personal affairs as well as in society at large, we are doomed to a massive adaptational breakdown."[387]

In Toffler's view, more "conscious regulation of technological advance" would be needed to help steer the "self-reinforcing" process of technological evolution. He thought that rapid technological change was inevitable and many of the changes would be positive—so much so that "to turn our back on technology would be not only stupid but immoral." Yet he insisted that it was essential to integrate new technologies safely and at a rate that human societies and individuals could absorb and comprehend them.[388]

Toffler argued that humans would need help adjusting to a new social reality in which disruption and transience were mainstays of modern life. Nothing was fixed anymore in the age of what he called "the super-industrial revolution."[389] Relationships, family structures, power hierarchies, communities, and industrial and agricultural practices were all metamorphosing. So, too, was the human body. Optimistic about breakthroughs in genetics and molecular biology, Toffler opined that, "man will be able, within a reasonably short period, to redesign not merely individual bodies, but the entire human race."[390]

Future Shock was succeeded by *The Third Wave* (1980), in which Toffler focused more on the "important costs of not changing certain things rapidly enough." He focused heavily on what we today call the Information Age (the third major wave of change in human

[387] Alvin Toffler, *Future Shock* (London: The Bodley Head, 1970), 4.
[388] Toffler, *Future Shock*, 379-380.
[389] Toffler, *Future Shock*, 166.
[390] Toffler, *Future Shock*, 175.

history after the Agricultural and Industrial Revolutions) and explored scenarios involving the transformation of minds, the alteration of brain chemistry. He also highlighted the importance of the modern "infosphere," an emerging socio-technological realm in which, he argued, computers were generating a "newly expanded memory," allowing a more universal and external form of collective mind to emerge.[391]

Toffler is one of many thinkers of the period whose ideas foreshadow the strong emphasis on evolutionary acceleration and conscious evolution in modern transhumanist culture. His musings on computers also resonate with the global brain theme we explored through Teilhard's ideas in the previous chapter, to which we now cycle back.

Teilhard's concept of the noosphere directly influenced a number of other prominent twentieth century thinkers, who are not card-carrying transhumanists, but whose ideas overlap with major aspects of transhumanist thinking. Among them is the media theorist Marshall McLuhan, who became a major voice of the Information Age in the 60s, 70s and 80s.

In McLuhan's day, television was the most powerful and influential modern medium, but he saw television evolving and merging with computing. Eventually, McLuhan believed that modern technologies would become more cognified (a phenomenon now described by the popular term the Internet of Things) and individual minds would start to merge. In the 1960s, he argued that this process was already underway, declaring:

> This externalisation of our senses creates what Teilhard de Chardin calls the 'noosphere' or a technological brain for the world. Instead of tending towards a vast Alexandrian library, the world has become a computer, an electronic brain, exactly as in an infantile piece of science fiction.[392]

[391] Alvin Toffler, *The Third Wave* (London: William Collins & Co Ltd, 1980), 20; 188; 193.
[392] Marshall McLuhan, "The Gutenberg Galaxy," in *The Biosphere and Noosphere Reader*, 155.

As already noted, the idea of a global brain overlaps substantially with modern transhumanist visions of a Technological Singularity and the emergence of artificial superintelligence, coalescing into a hive mind. A related idea, developed by Kevin Kelly, who has spent his career interacting with and writing about transhumanists (though he does not wear the label himself), is the concept of the technium. Kelly describes the technium as:

> … an ecology comprised of co-evolving species of technology… a superorganism of technology. It has its own force that it exerts. That force is part cultural (influenced by and influencing of humans), but it's also partly non-human, partly indigenous to the physics of technology itself.

Kelly describes the technium as being "like a child of humanity," something born from us that we don't completely understand and can't completely control. As a species we try to guide its development as best we can, though we may eventually have to let go of the reins as it matures into a more independent and complex entity.[393]

In his book *Mind Children: The Future of Robot and Human Intelligence* (1988) the roboticist and early transhumanist, Hans Moravec, wrote about the rise of robotics and artificial intelligence. He argued that humans would either go on to create more intelligent minds in non-biological substrates, or download their minds onto computers, where they could be copied, backed up and even merged with other minds. Eventually, he thought this may result in the emergence of "a supercivilization… constantly improving and extending itself, spreading outward from the sun, converting non-life into mind."[394]

Finally, the biophysicist Gregory Stock coined the term "metaman" in 1993, to refer to the "dense net of activity that is spreading over the globe and consciously shaping large regions of its surface." Like the noosphere, this net can be described as a kind of global

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[393] Kevin Kelly, "The Technium and the 7th Kingdom of Life," *Edge*, July 18, 2007, https://www.edge.org/conversation/kevin_kelly-the-technium-and-the-7th-kingdom-of-life

[394] Hans Moravec, *Mind Children: The Future of Robot and Human Intelligence* (Cambridge, MA: Harvard University Press, 1988), 5; 116.

brain or "'super-organism.'" It is an extension of human activity that, although human in origin, is also "beyond, and transcending, humans."[395]

Space colonisation

R. U. Sirius and Jay Cornell have also noted that, "in many ways, the transhumanist meme harks back to a movement for space colonization and the L5 Society that formed around that cause during the 1970s."[396] Like the many converging currents of 1970s counterculture, the L5 society was made up of a diverse group of characters with overlapping, but also divergent sensibilities. In his book, *Great Mambo Chicken and the Transhuman Condition* (1990), the journalist Ed Regis captured the dual sensibilities of fringe kookiness and alternative lifestyles among the L5 crowd, mingling with profound intelligence, inventiveness and formidable academic prowess.

The L5 Society was formed in 1975 by the husband and wife duo, Keith and Carolyn Henson, whom Regis described as, "a couple of extremely intelligent engineering types… who spent their weekends setting off bombs in the desert."[397] Patrick McCray also mentions the Hensons "fondness for recreational explosives," noting that they sometimes re-enacted "scenes from Tolkien's *Lord of the Rings* with homemade pyrotechnic devices."[398] But what the Hensons really wanted was to build a better, more sustainable community off the Earth.

Carolyn was the daughter of two astronomers and Keith studied electrical engineering at the University of Arizona. The couple lived in Tucson, on a property with self-sufficient elements, including vegetable gardens and small livestock. They first learned about the ideas of the physicist, Gerard O'Neill in 1974. O'Neill had been thinking about space colonisation for a number of years in his spare time and hoped his designs for space

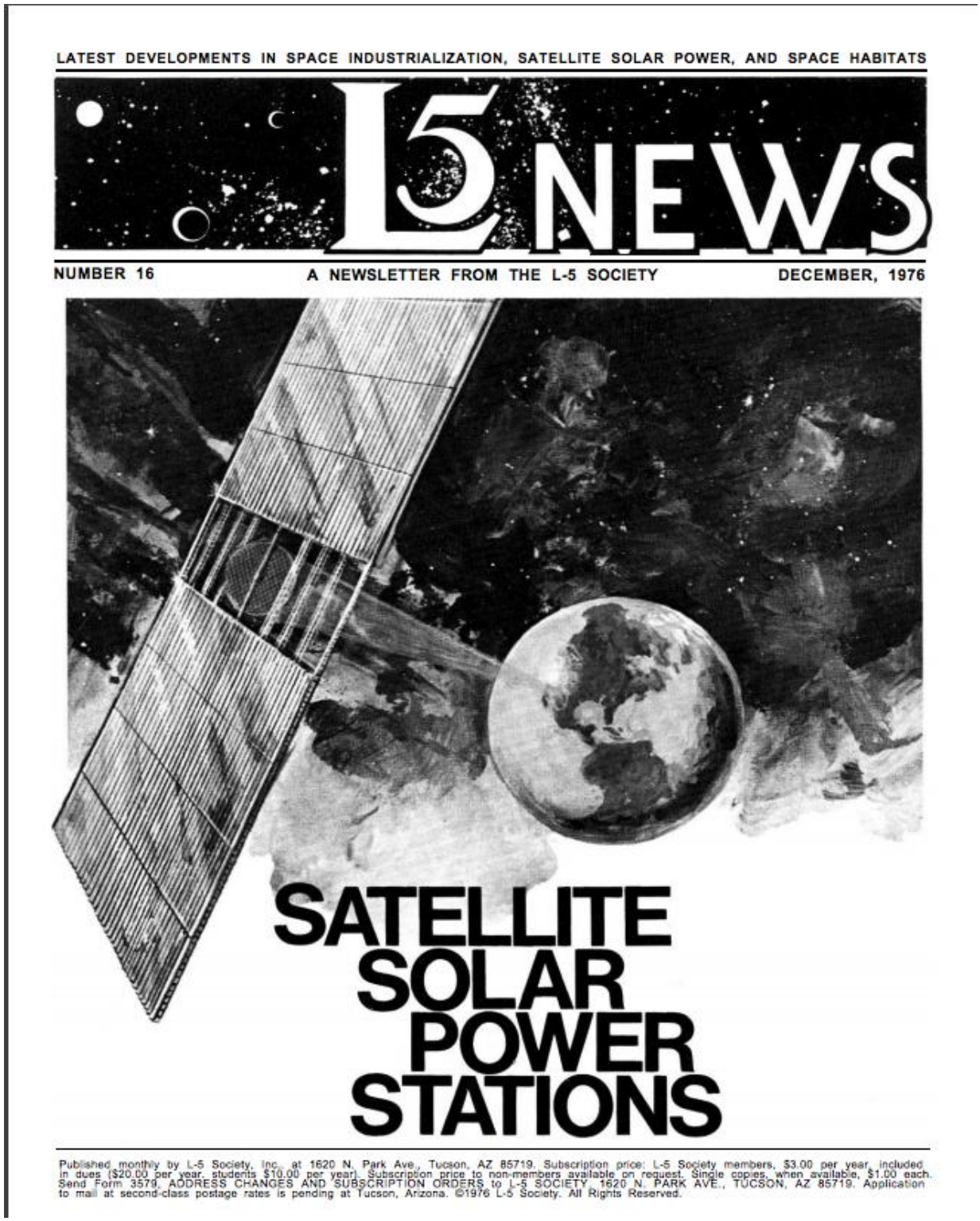
[395] Gregory Stock, "Metaman: The Merging of Humans and Machines Into A Global Super-Organism," in *The Biosphere and Noosphere Reader*, 176-177.
[396] Sirius and Cornell, *Transcendence*, see: 'space colonization.'
[397] Ed Regis, *Great Mambo Chicken and the Transhuman Condition: Science Slightly Over the Edge* (London: Viking, 1991), 62.
[398] McCray, *The Visioneers*, ch.3.

colonies could provide solutions to widely debated contemporary problems like resource scarcity and population growth.

In 1974, O'Neill's ideas finally gained some recognition after he published an article in *Physics Today*, titled, "The Colonisation of Space." In 1977, O'Neill's book, *The High Frontier: Human Colonies in Space*, became a bestseller. Unlike most speculative books on space-age futurism, *The High Frontier* offered more than "descriptive 'literary blueprints' for change," providing "engineering studies, detailed designs, machinery schematics and cost analyses."[399]

The Hensons got in touch with O'Neill, who invited them to a conference in Princeton in 1975. In August that year, the Hensons launched the L5 society, which takes its name from the five Lagrangian points in space, which are named after the eighteenth century mathematician, Joseph-Louis Lagrange. Two of these points, L4 and L5, were earmarked by O'Neill as potentially suitable areas for space colonies, as they are gravitationally stable in relation to the Earth and Moon and abundant enough in available solar energy.[400]

[399] McCray, *The Visioneers*, ch.2.
[400] McCray, *The Visioneers*, ch.2.



LATEST DEVELOPMENTS IN SPACE INDUSTRIALIZATION, SATELLITE SOLAR POWER, AND SPACE HABITATS

L5 NEWS

NUMBER 16 | A NEWSLETTER FROM THE L-5 SOCIETY | DECEMBER, 1976

SATELLITE SOLAR POWER STATIONS

Published monthly by L-5 Society, Inc., at 1620 N. Park Ave., Tucson, AZ 85719. Subscription price: L-5 Society members, $3.00 per year, included in dues ($20.00 per year, students $10.00 per year). Subscription price to non-members available on request. Single copies, when available, $1.00 each. Send Form 3579. ADDRESS CHANGES AND SUBSCRIPTION ORDERS to L-5 SOCIETY, 1620 N. PARK AVE., TUCSON, AZ 85719. Application to mail at second-class postage rates is pending at Tucson, Arizona. ©1976 L-5 Society. All Rights Reserved.

Fig. 6. Cover of *L5 News* (December 1976).

McCray notes that O'Neill's vision of a human future in space "defied easy categorization," embodying both "a certain 'counterculture libertarianism' and an emphasis on environmentalism and equal opportunities."[401] Similar dual sensibilities are apparent in L5's monthly newsletter *L5 News*, which promoted "a strong environmentalist theme" and "insisted that concern for the planet and 'big technology' could coexist and complement each other."[402]

Early members of L5 included Hans Moravec, Eric Drexler, the cryonicist Saul Kent, and the artificial intelligence pioneer, Marvin Minsky. Directors also included the science fiction luminaries Isaac Asimov, Robert Heinlein, and Jerry Pournelle, and the physicist Freeman Dyson. [403] *Omni* co-founder Kathy Keeton was also on the board of governors.[404] Although the Hensons liked to set off bombs in the desert for fun and cultivated a commune-like household where interested folks drifted in and out, they also managed to bring a core group of remarkable future-conscious intellectuals into their orbit. On the flipside, they also attracted full-blown kooks, which led to them creating their very own "nut file"—one particularly notable character contacted the Hensons and asked them to help turn his pool table into a starship.[405]

Somewhere in between the scientists and the kooks were the populist new age prophets like Timothy Leary. Leary learned about O'Neill through Brand's publication, *CoEvolution Quarterly*, which succeeded the *Whole Earth Catalog*. Leary began eagerly promoting the physicist's ideas in 1976, after being released from Folsom Prison where he was incarcerated for drug charges.[406] He then got involved with the L5 community, the leading members of which had mixed feelings about being associated with him. The Hensons were seemingly congenial, while O'Neill was more concerned for his academic

[401] McCray, *The Visioneers*, ch.3.
[402] McCray, *The Visioneers*, ch.3.
[403] Regis, *Great Mambo Chicken*, 62.
[404] McCray, *The Visioneers*, ch.4.
[405] Regis, *Great Mambo Chicken*, 65.
[406] McCray, *The Visioneers*, ch.3.

reputation and scientific credibility and reportedly "avoided direct associations with him."[407]

While still a student at MIT, a young Eric Drexler met O'Neill, for whom he worked as a research assistant at Princeton in the summer of 1974, funded by the wealthy patron and influential space colonisation spokeswoman, Barbara Marx Hubbard (another devotee of Teilhard's ideas).[408] Drexler "went on to develop plans for lunar factories, solar sails, and methods to mine asteroids for mineral resources" and "was one of the L5 Society's most articulate and vocal advocates for an expanded human presence in space." [409] But by the late 70s, Drexler began to turn his attention to a new concept, nanotechnology, which fed into the space colonisation dream, but also broadened the emphasis of the L5 space-age, human potential movement, into something that underpinned cryonics and life-extensionist ambitions, and other facets of what later became a distinctly transhumanist vision of the future.

Life-extension

Transhumanist attitudes towards life extension and death have interesting roots, both in twentieth century science and new age pseudo-science. The first transhumanists in the 1990s were greatly influenced by a number of life-extensionist theorists and movements that sprang up in the 1960s and 70s: from Sandy Shaw and Durk Pearson's promotion of vitamin supplements and human growth hormone in their bestselling book *Life Extension: A Practical Scientific Approach* (1982), to the ideas of the 'father of cryonics,' Robert Ettinger, who authored two books that many transhumanists eagerly devoured, *The Prospect of Immortality* (1962), and *Man into Superman* (1972).

In "The Transhumanist FAQ," Bostrom presents a succinct summary of Ettinger's significance as a proto-transhumanist and life-extension advocate, writing:

[407] McCray, *The Visioneers*, ch.3.
[408] McCray, *The Visioneers*, ch.3.
[409] McCray, *The Visioneers*, see: 'introduction.'

> Robert Ettinger played an important role in giving transhumanism its modern form. The publication of his book *The Prospect of Immortality* in 1964 led to the creation of the cryonics movement. Ettinger argued that since medical technology seems to be constantly progressing, and since chemical activity comes to a complete halt at low temperatures, it should be possible to freeze a person today and preserve the body until such a time when technology is advanced enough to repair the freezing damage and reverse the original cause of deanimation. In a later work, *Man into Superman* (1972), he discussed a number of conceivable improvements to the human being, continuing the tradition started by Haldane and Bernal.[410]

Alongside Ettinger and Drexler, a number of other prominent scientists conducted important research on nanotechnology and its potential to further the causes of cryonics and life-extension, including the computer scientist and co-inventor of public key cryptography, Ralph Merkle, and the physicist, Robert Freitas. Their research and books lent scientific credibility to the ambitions of many early transhumanist life-extensionists.[411]

Guccione and Keeton were also prolongevists who eagerly guzzled dietary supplements and dabbled in plastic surgery. In the 80s, the pair launched a magazine called *Longevity* in which they "promoted both healthy living and life extension."[412] Keeton went on to publish the book, *Woman of Tomorrow and Longevity: The Science of Staying Young* (1992), which was well researched and well received. Sadly, however, Keeton's life was cut short when she lost her battle with breast cancer in 1997.[413]

A new wave of youthful optimism also permeated biology departments in the second half of the century, as younger molecular biologists reportedly moved away from their naturalist seniors, "whom they see as old fogies obsequiously attentive to the world as it

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[410] Bostrom, "The Transhumanist FAQ v. 2.1," 41.
[411] Drexler's work has already been mentioned. Key publications of Merkle's are listed on his archived website, which is accessible at: "Papers by Ralph C. Merkle," archived Aug 4, 2017, https://web.archive.org/web/20170804020612/http://www.merkle.com:80/merkleDir/papers.html. A key work by Freitas' is *Nanomedicine*, *Volume I: Basic Capabilities* (Philadelpia: Landes Bioscience, 1999). Volume two of *Nannomedicine* was published by the same publisher in 2003.
[412] McCray, *The Visioneers*, ch.4.
[413] Bosworth, "The X-Rated Emperor."

is rather than bent upon turning it upside down."[414] William Haseltine was a notable figure in this new generation of optimistic scientists, who believed that "the future… belonged to molecular biology, which had the power to salve human desperation over disease and death."[415]

Although they often knew better than to advertise their grand ambitions to senior colleagues or employers, by the time the 90s rolled around, many biologists reportedly believed in, and pursued goals of human enhancement and life-extension— though, according to the journalist Brian Alexander, from whom these reports are derived, "most who did had a habit of reaching across desks to flick off tape recorders before using words like *life span extension, immortality,* or *human enhancement*."[416]

A wave of biomania also swept the stock market in the 1970s and 80s, after the company Genentech went public and made good. It was also common for wealthy socialite philanthropists, like Deeder Blair and Mary Lasker, to fund biomedical and anti-ageing research in this period, [417] a trend that has continued and escalated in the early twenty-first century, as we will see in chapters 10 and 11.

Finally, we must mention the Iranian-American science fiction author and futurist, Fereidoun M. Esfandiary,[418] whose writings serve as a direct bridge between the works of proto-transhumanist thinkers like Teilhard, and the fully fledged modern transhumanists whom we will meet in part 2. Esfandiary was an early pioneer of unconventional and forward-looking thinking about the future of human societies and evolution. A cryonicist and life-extension advocate, he changed his name in 1970 to FM-

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[414] Donald Fleming, "On Living in a Biological Revolution," *The Atlantic Monthly*, February 1969, https://www.theatlantic.com/past/docs/issues/69feb/fleming.htm.
[415] Alexander, *Rapture*, 70.
[416] Alexander, *Rapture*, 224.
[417] Alexander, *Rapture*, 75-5; 92-4.
[418] Although the description 'Iranian-American' reflects FM's background, Natasha Vita-More has argued that, "he would not be happy about revealing his age, birthplace and ethnic background." Her comment was made in an extremely interesting archive of the transhumanism *Wikipedia* page, which is also representative of an important effort to compile accurate historical information about transhumanism in the mid-2000s. See: *Wikipedia*, "Talk:Transhumanism/Archive 9," https://en.wikipedia.org/wiki/Talk:Transhumanism/Archive_9.

2030 (hereafter FM) to reflect his hope that he would live to be a hundred years old in the year 2030.

FM believed that twentieth-century societies were becoming increasingly divorced from Darwinian biodeterminism, traditional cultures, religion, and the segregating influences of national and community boundaries. He authored four notable texts: *Optimism One: The Emerging Radicalism* (1970), *Up-Wingers: A Futurist Manifesto* (1973), *Telespheres* (1977), and *Are You a Transhuman?: Monitoring and Stimulating Your Personal Growth Rate in a Rapidly Changing World* (1989). Like Toffler, FM argued that the rate of technological change in contemporary societies was unprecedented. He also believed that technological progress would serve as the catalyst for engendering more harmony, prosperity, life-extension, and greater collective intelligence and human progress in the future.

Like many of the thinkers of the period, FM's writings also fused communalist countercultural ideas with avid techno-optimism. He wrote extensively about the decline of nuclear families and monogamous relationships, as did Toffler, and imagined that most humans would soon become untethered global citizens, constantly reinventing themselves and never settling in one place too long. However, as Bostrom helpfully points out, FM's key themes were rather nebulous and "it was never satisfactorily explained why somebody who, say, rejects family values, has a nose job, and spends a lot of time on jet planes is in closer proximity to posthumanity than the rest of us."[419]

Transcendence and posthumanity

We have already met Timothy Leary, who was a space-age enthusiast, but whose name is not one that immediately springs to mind when you think of transhumanism. As Sirius and Cornell note, he "is best remembered as a leader of the 1960s counterculture and an advocate for the mind-expanding qualities of psychedelic drugs." Yet it is often forgotten

[419] Bostrom, "A History of Transhumanist Thought."

that "in the mid-1970s, Leary was one of the few well-known people in the world to preach a transhumanist message."[420] Of course, a cohesive transhumanist message did not exist in the 70s, nor was the term transhumanism widely circulated or synonymous with its current meanings (Sirius and Cornell apply it retrospectively). But Leary's ideas and slogans, which were usually cobbled together from other sources like Brand, O'Neill and Drexler, certainly overlapped with, and in some cases directly influenced, the first organised transhumanist movements and leaders.

In Davis' characterisation, the Timothy Leary of the 60s "was the archetypal egghead hippie, draping himself with guru flowers and delving into *The Tibetan Book of the Dead* for maps of the psychedelic funhouse." But there is a time to every season and Leary's interests shifted with the countercultural turning of the tides. As Davis notes, "by the mid-1970s, he had rejected the 'sweet custard mush' of Eastern mysticism and embraced a proto-Extropian worldview that he dubbed S.M.I^2.L.E."[421]

S.M.I^2.L.E. was an acronym for Space Migration, Intelligence Increase (or Intelligence Squared), and Life Extension, which he propagated in his books *Exo-Psychology: A Manual on the Use of the Human Nervous System According to the Instructions of the Manufacturers* (1977) and the updated version *Info-Psychology* (1987), which Davis aptly describes as "turgid if influential."[422]

The transhumanist author Mike Garfield has made the interesting observation that the scientifically minded aspects of psychedelic counterculture align fairly naturally with aspects of what later became transhumanist culture. Of Leary and other prominent psychedelics enthusiasts of the period, including Terence McKenna, and the early transhumanist David Pearce, he notes:

> Their common vision shares much with the rest of the transhumanist community, including an embrace of technology and science as both potent and inevitable; an evolutionary model of the

[420] Sirius and Cornell, *Transcendence*, see: 'Timothy Leary.'
[421] Davis, *TechGnosis*, 192.
[422] Davis, *TechGnosis*, 192-193.

> universe and humanity; a sense of the human organism as something that can be tinkered with and expanded; a recognition of drugs as a technology that can dramatically reinvent identity; and a participation in a playful challenging of fixed boundaries. In many ways, they demonstrate the seed of transhumanism in this moment by exemplifying self-revision and the reevaluation of assumptions as an open-ended and ongoing process. And along the way, they tatter the mechanistic control fantasies we have held onto in spite of our most sophisticated inquiries.[423]

It was not until the 1980s that Leary recognised that "the new digital devices [computers] were destined to reawaken the cybernetic freak dream of reprogramming one's states of consciousness."[424] He met and befriended FM-2030 in this period, as well as two early transhumanist thought leaders, Max More and Natasha Vita-More. Like FM, Leary was one of many figures who helped form the intellectual and cultural bridge that led to the emergence of organised modern transhumanism. He also had a healthy appetite for ambitious scientific ideas and self-promotion, which many early transhumanists shared. However, he did not live long enough to see modern transhumanist movements and memes flourish, or to shape and help build the culture from within.

Sirius and Cornell are right to view Leary as a forerunner of modern transhumanism, though of the many intellectual precursors of the late twentieth century he is not the most direct or influential. His interests, and the themes of his writings and speeches, certainly foreshadow a number of modern transhumanist themes. His sloganeering and fondness for bold rhetoric and neologisms also overlaps with the culture of extropian transhumanism, as we will see in the next two chapters. But the substance of his slogans and the fundamentals of his worldview don't quite match the dominant currents of modern transhumanist thinking. Leary's works also retain a much stronger emphasis on mysticism, yoga and drugs as a means of evolutionary transcendence, while the core of modern transhumanist philosophy is built upon the culture of Western Enlightenment humanism.

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[423] Mike Garfield, "The Psychedelic Transhumanists," *Humanity+ Magazine*, September 29, 2009, http://hplusmagazine.com/2009/09/29/psychedelic-transhumanists/.
[424] Davis, *TechGnosis*, 195.

Concluding remarks

Although I have not provided an exhaustive survey of every current of techno-optimism in the late twentieth century, the narrative in this chapter covers the key bases cited by leading transhumanist thinkers and expands on some that have been little considered. The story presented here helps to link our early proto-transhumanists with our first modern transhumanists, whom we are about to meet. The books by historians and journalists that I have cited are the key texts that explore the most relevant currents of proto-transhumanist thinking in this period. They can be consulted if the reader is interested in exploring late twentieth century proto-transhumanism further.

At this juncture, it should be clear that formative seeds of transhumanist culture were germinating in the final decades of the twentieth century. Bostrom has argued that:

> In the 1970s and 1980s, many organizations sprang up that focused on a particular topic such as life extension, cryonics, space colonization, science fiction, and futurism. These groups were often isolated from one another, and whatever shared views and values they had did not yet amount to any unified worldview.[425]

While I have demonstrated that there was a notable amount of cross-pollination between many subcultures and movements, Bostrom is right that a unified transhumanist philosophy had not yet emerged. However, many transhumanistic themes and ideas sprang up many times in the second half of the twentieth century, suggesting that culturally and technologically, the time was ripe for a movement akin to transhumanism to emerge in the 1990s.

[425] Bostrom, "A History of Transhumanist Thought."

PART 2

Modern Transhumanist Movements

Around the turn of the century, with the budding new realm of cyberculture unfolding, the first organised transhumanist movements, publications and philosophies emerged. Over the course of two decades, organised transhumanism evolved rapidly, morphing from a kooky fringe philosophy and lifestyle futurism project into a movement that gradually began to garner increasing academic and cultural credibility.

In the next four chapters, we discuss the emergence and core features of transhumanist philosophy and culture. We also explore the genesis and evolution of the first major transhumanist movements and organisations, which emerged in the 1990s and early 2000s. In addition, we meet a number of early transhumanist thinkers and thought leaders who developed the first explicitly transhumanist philosophies.

Although there were many cyberenthusiasts, futurists and overlapping pro-technology subcultures floating about at the time, I have deliberately framed the discussion in this section around the two most dominant organised transhumanist groups of these decades: the extropians, and the World Transhumanist Association, which later became Humanity+. Let's meet the thinkers who spearheaded this philosophy and find out how they came together to create an intellectual culture, oriented around a set of core themes and ideas, which are now becoming major subjects of interest in the modern world.

6. The Extropian Era

> *No more gods, no more faith, no more timid holding back. Let us blast out of our old forms, our ignorance, our weakness, and our mortality. The future is ours.*
>
> — Max More, "Transhumanism: Towards a Futurist Philosophy" (1990)

The extropian era marks the birth of modern transhumanism as an organised philosophy and movement. Extropianism was the brainchild of the Irish Ph.D. candidate in philosophy, Max More (born Max O'Connor), and the American law student, Tom W. Bell, who went on to temporarily adopt the extropian moniker, T. O. Morrow. As the AI scientist and transhumanist, Ben Goertzel, recounts, shortly after More moved from Oxford, England, to California in 1987, More and Morrow cofounded the first transhumanist magazine, *Extropy*, "way back in 1988, before the future was fashionable."[426]

Extropy began as a small zine with the subtitle, *Vaccine for Future Shock*—a reference to Alvin Toffler's 1970 bestseller, which warned of the rise of the pervasive modern feeling of "dizzying disorientation,"[427] engendered by the "accelerative thrust"[428] of rapid social and technological change. After the first few issues the zine was renamed with the more conservative title, *Extropy: The Journal of Transhumanist Thought*.

[426] Ben Goertzel, quoted in *Transcendence*, ed. Sirius and Cornell, see: 'Max More and Natasha Vita-More.'
[427] Toffler, *Future Shock*, 13.
[428] Toffler, *Future Shock*, 7.

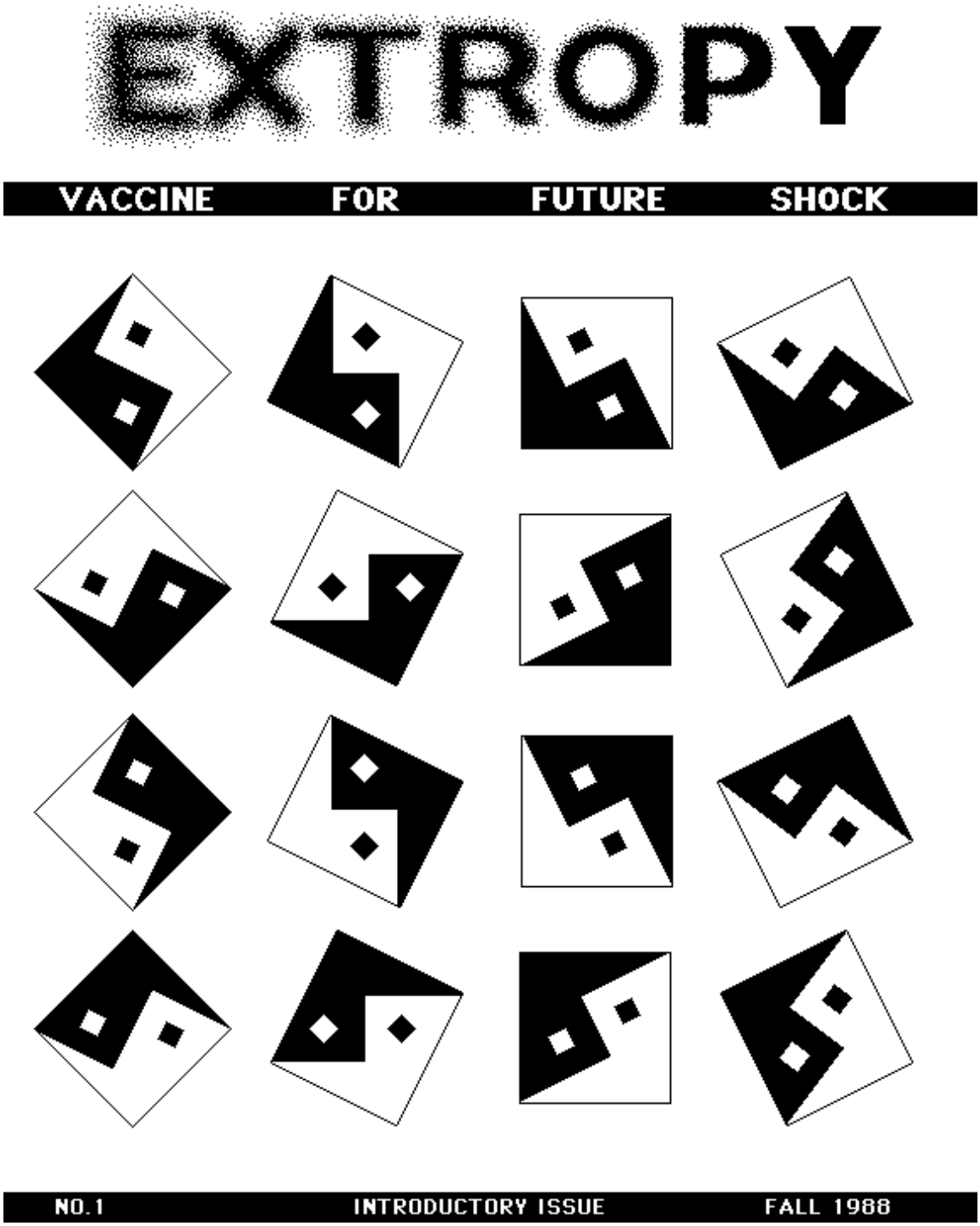

Fig. 7. Cover of *Extropy* magazine, issue #1 (Fall 1988).

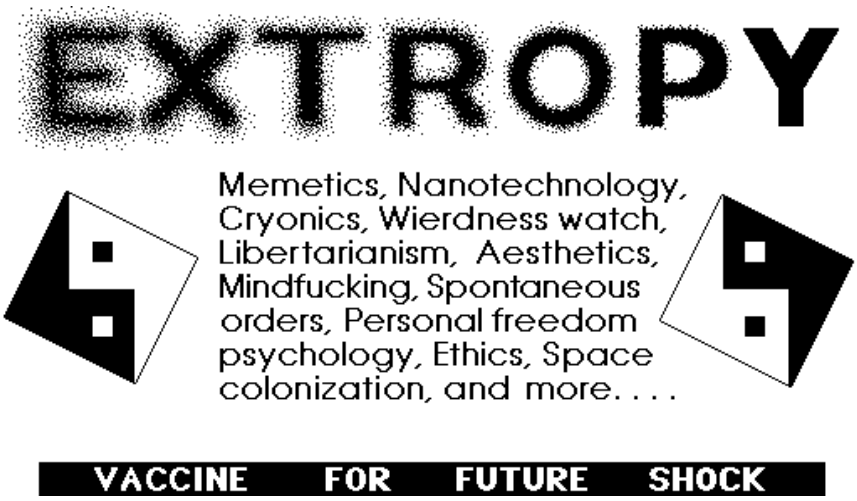

Fig. 8. First advertisement for *Extropy* magazine c.1988. Designed by Tom Bell.

The term 'extropy' had previously been deployed as an antonym to entropy in various academic publications.[429] It was also used once in Diane Duane's 1983 Star Trek novel *The Wounded Sky*,[430] in reference to the idea of a non-entropic universe (which a character muses would likely be quite homogenous and dull). But Tom Bell first coined the term in connection with an explicitly transhumanist philosophy,[431] and Max More was the first to comprehensively outline the major principles of extropianism.[432]

Unlike their predecessors, More and Morrow deployed the term 'extropy' as a metaphorical rather than a technical antonym to entropy.[433] More defined the word in *Extropy* as, "the process of increasing intelligence, information, usable energy, life, experience, and growth."[434] So, while the concept of entropy (beyond its purely technical usage) evokes the idea of a winding down, a dissipation of useful energy, and a diminution of potential, extropy (in the extropian sense) refers to the ability to generate

[429] Jose Cordeiro, "The Principles of Extropy: A Quarter Century Later," *The Futurist*, May 21, 2013, https://www.wfs.org/blogs/jose-cordeiro/principles-extropy-quarter-century-later.
[430] Diane Duane, *The Wounded Sky* (New York: Pocket Books, 1983), 181.
[431] Nikola Danaylov and Max More, "Question Everything: Max More on Singularity 1 on 1," *Singularity Weblog*, March 20, 2011, https://www.singularityweblog.com/question-everything-max-more-on-singularity-1-on-1/.; More, "The Philosophy of Transhumanism."
[432] More, "The Philosophy of Transhumanism."
[433] More, "The Philosophy of Transhumanism."
[434] Max More, "Editorial," *Extropy* 6 (Summer 1990): 5.

more complexity, dynamism, life and order. Extropianism, by extension, is "the philosophy that seeks to increase extropy."[435]

Extropianism emerges

More first outlined the core tenets of extropianism in 1990. In retrospect this seems a fitting time for the emergence of a new way of thinking about the world and humanity's place in it. 1990 was the year of the actual fall of the Berlin Wall. It was also the year that the Hubble Space Telescope was launched, the year that The Human Genome Project commenced, and the year that the Internet Protocol HTTP and the web language HTML were created by Tim Berners-Lee.

Acutely conscious of the transformative potential of the web, genomic sequencing and genetic engineering, the extropians saw themselves living in a world that, as More put it, "repeatedly electrifies us with the charge of change."[436] Extropians were adamant during the 1990s that "progress in both theory and practice [was] accelerating."[437] Not unlike Toffler and FM-2030, they often observed that gender roles and family dynamics were shifting, professions were metamorphosing, and new technologies were changing the way that humans interacted, at a much faster rate, and in more profound and novel ways, than at any other time in history.[438]

Extropians proudly exhibited strong libertarian political leanings, and an almost unfettered enthusiasm for growth and progress. Relative to twenty-first century transhumanists, they also spent comparatively little time worrying about existential risks and other negative potential consequences of technological development.[439] Aside from the known laws of physics, their enthusiasm for technological self-transformation

[435] Max More, "Extropian Principles 2.5," *Extropy* 11 (Summer/Fall 1993): 9.
[436] More, "Technological Self-Transformation," 16.
[437] More, "Technological Self-Transformation," 16.
[438] More, "Technological Self-Transformation," 16.
[439] James Hughes, "The Politics of Transhumanism v. 2.0," *ChangeSurfer*, March 2002, http://www.changesurfer.com/Acad/TranshumPolitics.htm.

knew no bounds. Meanwhile, their contempt for faith-based epistemologies was as liberal as their techno-optimism.

It is no coincidence that extropianism emerged at the dawn of the Internet Age. During this modern Information Revolution, many of the same hopes and fears that dominated mainstream discourse during the Industrial Revolution were being reignited. Prophecies of rapid and radical progress were spruiked,[440] while fears of unsustainability and hubris mounted.[441] Some, of course, doubted that any kind of revolution was afoot at all.

The American astronomer Clifford Stoll famously declared in a *Newsweek* article in 1995 (initially titled "The Internet? Bah!") that the Internet was "a wasteland of unfiltered data" and was too clunky to ever unseat established businesses, education systems, governments, or traditional means of communication. With a figurative roll of his eyes, he wrote, "Nicholas Negroponte, director of the MIT Media Lab, predicts that we'll soon buy books and newspapers straight over the Internet. Uh, sure."[442] Stoll wrote this only months before Amazon sold their first book online—a copy of Douglas Hofstadter's *Fluid Concepts and Creative Analogies: Computer Models of the Fundamental Mechanisms of Thought*.[443] It was purchased by the American computer scientist John Wainwright, four years before Amazon's founder and CEO, Jeff Bezos, was named *TIME* Person of the Year.

As debates raged in the 90s about the promise and peril of new technologies like the Internet, the extropians sat resolutely on the techno-optimistic side of the fence. They championed promise far beyond what many other tech-savvy individuals imagined, and thought that dramatic changes to society and humanity could happen in a much shorter time frame than most people believed. Extropians were passionately optimistic that the scientific and technological capabilities of the late twentieth century would prove to be

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[440] See: Moravec, *Mind Children*; Kurzweil, *The Age of Spiritual Machines*.
[441] See: Richard Barbrook and Andy Cameron, "The Californian Ideology," *Science as Culture* 6.1 (1996): 44-45, doi: 10.1080/09505439609526455; Paulina Borsook, *Cyberselfish: A Critical Romp Through the Terribly Libertarian Culture of High Tech*, (New York: PublicAffairs, 2000).
[442] Clifford Stoll, "Why the Web Won't Be Nirvana," *Newsweek*, February 26, 1995, http://www.newsweek.com/clifford-stoll-why-web-wont-be-nirvana-185306.
[443] Megan Garber, "Here is the First Book Ever Ordered on Amazon," *The Atlantic*, October 31, 2012, http://www.theatlantic.com/technology/archive/2012/10/here-is-the-first-book-ever-ordered-on-amazon/264344/.

mere harbingers of the radical transhumanist innovations to come. In their vision of the future, everything about humanity would eventually be different, from our DNA, to our lifespans, to the ways that we communicated, exchanged goods, dressed, thought, looked and loved.

Extropy mag was one of the two main mediums in which extropian ideas were circulated—the other was, of course, the Internet. The first issue of *Extropy* in 1988 had a print run of 50 and interest was scant. Speaking about the first editions, More recalls, "we basically forced them on people."[444] By 1992, the editors were churning out 750 copies,[445] and in the subsequent Winter/Spring edition of 1993, the output more than trebled to 2,500.[446] In 1992 a separate newsletter, *Exponent*, was launched and circulated bi-monthly, and in 1993 *Extropy* was printed in colour for the first time. By 1995, the print run per issue was 4,500.[447] Although these are ultimately small print numbers, every increase was seen by *Extropy's* founding editors as an important milestone in the pursuit of what More referred to as the "inexorable advance"[448] of extropianism.

The extropians received a smattering of media coverage throughout the final decade of the twentieth century, though it was often colourful and tongue in cheek. Many eyes of this era were captivated by the brave new world seemingly being generated by the dot-com boom,[449] and Bill Gates' prophecies of the coming Internet revolution,[450] which the US Vice President Al Gore famously characterised in 1994 as an "information

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[444] Regis, "Meet the Extropians."
[445] Max More, "Extropy Institute Launches," *Extropy* 9 (Summer 1992): 11.
[446] Max More, "Editorial," *Extropy* 10 (Winter/Spring, 1993): 4.
[447] Max More, ed., "Production Information," *Extropy* 14 (1995): 55.
[448] More, "Editorial," (1993): 4.
[449] See: David Chen, "Venture Capital Showing Faith in Internet's Future," *New York Times*, May 27, 1997, http://www.nytimes.com/1997/05/27/nyregion/venture-capital-showing-faith-in-internet-s-future.html; Amy Harmon, "Stocks Drive a Rush to Riches in Manhattan's Silicon Alley," *New York Times*, May 31, 1999, http://www.nytimes.com/1999/05/31/nyregion/stocks-drive-a-rush-to-riches-in-manhattan-s-silicon-alley.html; John Tierney, "The Big City; In E-World, Capital is Where It's @," *New York Times*, May 3, 2000, http://www.nytimes.com/2000/05/03/nyregion/the-big-city-in-e-world-capital-is-where-it-s.html.
[450] See: Bill Gates, *The Road Ahead* (New York: Penguin, 1996). 'Information superhighway' was a prominent term in the 1990s, however, Gates clarified mid-decade that "the highway metaphor isn't quite right" and stated that he preferred the analogy of a networked marketplace, pg. 6.

superhighway."[451] Microchips were already inside our pets and they could soon be inside us![452] Meanwhile, the "digerati"—a term used dozens of times by the *New York Times* throughout the decade[453]—were apparently the new 'it-crowd.' This it-crowd was epitomised by the new digital elite making good in Silicon Valley, and by the overnight success of publications like *Wired*, which brought information and debates about futuristic technologies into the homes of hundreds of thousands of eager subscribers.[454]

In 1997, More appeared in Iara Lee's documentary, *Synthetic Pleasures*, and he and other extropians were interviewed over the years by *Wired*, *GQ*, *L.A. Weekly*, and *The Observer*.[455] The extro-crowd enthusiastically embraced the recognition they garnered in traditional media, which they made much of on their personal websites. But when communicating among themselves they naturally favoured the cutting edge digital technology of electronic mail (or 'e-mail'), where their missives could be encrypted, instantaneously shared, and readily duplicated.

Suffice to say, transhumanism was not an intellectual movement born in coffee houses or in the corridors of a single university or institution. Bostrom notes that outside of publications and conferences, "an intense exploration of ideas also took place on various Internet mailing lists,"[456] which were "perhaps [the] most important"[457] contributors to the development of the movement. Natasha Vita-More lends further support to this

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[451] Al Gore, "Speech Delivered at the Information Superhighway Summit at UCLA, January 11, 1994," *University of Innsbruck*, https://www.uibk.ac.at/voeb/texte/vor9401.html.
[452] See: Anne Eisenberg, "WHAT'S NEXT; Blind People With Eye Damage May Someday Use Chips to See," *New York Times*, June 24, 1999, http://www.nytimes.com/1999/06/24/technology/what-s-next-blind-people-with-eye-damage-may-someday-use-chips-to-see.html.; Sam Howe Verhovek, "The Nation; Beyond the Trail of Breadcrumbs," *New York Times*, June 20, 1999, http://www.nytimes.com/1999/06/20/weekinreview/the-nation-beyond-the-trail-of-breadcrumbs.html.
[453] See: John Markoff, "THING; The Internet," *New York Times*, September 5, 1993, http://www.nytimes.com/1993/09/05/style/thing-the-internet.html.; Trip Gabriel, "Virtual Downtown," *New York Times*, January 22, 1995, http://www.nytimes.com/1995/01/22/style/virtual-downtown.html.; Stephen Manes, "PERSONAL COMPUTERS; Now Playing on Your Neighbourhood Laptop," *New York Times*, October 24, 1995, http://www.nytimes.com/1995/10/24/science/personal-computers-now-playing-on-your-neighborhood-laptop.html.
[454] Paul Keegan, "The Digerati!," *New York Times Magazine*, May 21, 1995.
[455] *Extropy Institute*, "Accomplishments of Extropy Institute," last updated November 2000, archived February 9, 2002, https://web.archive.org/web/20020209234040/http://extropy.org:80/about/accomp.html.
[456] Bostrom, "The Transhumanist FAQ v. 2.1," 42.
[457] Bostrom, "A History of Transhumanist Thought," 12.

assertion, noting that "cyberculture became the most fertile breeding ground"[458] for the development and dissemination of transhumanist ideas.

The first extropian email list was launched in 1991 by Harry Hawk and Perry Metzger.[459] The list was enormously popular and went on to become the longest running transhumanist mailing list in Internet history.[460] According to Jim McClellan, around 500 extropians subscribed to the list in 1995, which became a thriving digital world where extropians flocked to post "vast transhumanist tracts on a nightly basis."[461] In addition to *Extropy's* founders and editors, notable contributors to these online discussions included the economist Robin Hanson, and the neuroscientist and transhumanist academic, Anders Sandberg—then both Ph.D. candidates.[462] The American artificial intelligence researcher and prolific blogger and writer, Eliezer Yudkowsky, was also a significant extropy mailing list contributor in later years.

With extropian culture gathering steam online and off, the non-profit Extropy Institute (ExI) was launched in May 1992.[463] Although often short of money,[464] the Institute went on to organise a series of five EXTRO conferences that were held in California between 1994 and 2001. Keynote speakers included the futurist, engineer, inventor and entrepreneur, Ray Kurzweil, the roboticist and author, Hans Moravec, and the cognitive scientist and AI researcher, Marvin Minsky.

Of course, not all extropians were card-carrying, fee paying conference attendees. The movement attracted a nebulous group of futurists and tech enthusiasts, who were interested in all manner of alternative ideas and pursuits, from cryptography, to science fiction, space exploration, cryonic suspension, life extension, libertarian politics, smart

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[458] Natasha Vita-More, "An Introduction to Transhumanity," *Issues Magazine*, March 2012, http://www.issuesmagazine.com.au/article/issue-march-2012/introduction-transhumanity.html.
[459] *Extropy Institute*, "Frequently Asked Questions, v. 0.7," archived January 26, 2002, https://web.archive.org/web/20020126213146/http://www.extropy.org/faq/index.html#02.04.
[460] de Wolf, "Alcor Member Profile."
[461] McClellan, "The Tomorrow People."
[462] Bostrom, "The Transhumanist FAQ v. 2.1," 42.
[463] More, "Extropy Institute Launches," 9.
[464] McClellan, "The Tomorrow People."

drugs, nanotechnology, and genetic engineering. But within this broader milieu, a distinctive transhumanist culture and worldview was beginning to take shape.

Importantly, it was in *Extropy* #6, published in the summer of 1990, that More included two formative pieces of his own composition: the essay "Transhumanism: Towards a Futurist Philosophy," and "The Extropian Principles." Together, these works constitute the first formal outlines of a modern transhumanist philosophy.[465] Extropians referred to and promoted these principles throughout the 1990s, and, for the first time, an explicitly transhumanist social, philosophical, and cultural movement coalesced and gathered momentum.

The Extropian Principles

More developed four original extropian principles in 1990: *boundless expansion*, *self-transformation*, *dynamic optimism* and *intelligent technology*.[466] In keeping with the extropian reverence for "continual improvement,"[467] the principles went through a number of iterations, culminating in the final 2003 version, "The Principles of Extropy 3.11." This final version is often quoted in contemporary publications on transhumanism.[468] However, as the 1990 version presents the first incarnation of this budding philosophy, and offers genuine insight into the optimistic sensibilities, and corresponding literary style, of the first extropians, I include More's original short form definitions here.

1. BOUNDLESS EXPANSION - seeking more intelligence, wisdom, and personal power, an unlimited lifespan, and removal of natural, social, biological, and physiological limits to self-actualization

[465] This claim that modern transhumanist philosophy originated in the 1990s and was spearheaded by More is supported by the following transhumanists: Bostrom, "A History of Transhumanist Thought," 12; Ben Goertzel, "The Extropian Creed: Can High Technology and Libertarian Politics Lead us to a Transhuman Golden Age?" *goertzel.org*, September 2000, http://www.goertzel.org/benzine/extropians.htm; Max More, "H+: The True Transhumanism," *Metanexus*, February 5, 2009, http://www.metanexus.net/essay/h-true-transhumanism; Martine Rothblatt, *From Transgender to Transhuman: A Manifesto on the Freedom of Form* (2011), kindle, ch.8.
[466] Max More, "The Extropian Principles," *Extropy* 6 (Summer 1990): 17.
[467] Max More, "Editorial," *Extropy* 8 (Winter 1991/92): 6.
[468] See: More, "The Philosophy of Transhumanism."

and self-realization. No limits on our personal and social progress and possibilities.

2. SELF-TRANSFORMATION - both moral and cognitive: critical examination of all assumptions and models. Taking charge of one's own life. Biological and neurological augmentation. Social conditions for self-transformation include spontaneous order: rejection of central control and maximum sustainable freedom. Fostering of diversity and exploration of possibilities.

3. DYNAMIC OPTIMISM - promotion of a positive, empowering attitude towards our individual future and that of all intelligent beings.

4. INTELLIGENT TECHNOLOGY - affirmation of the role of science and its offspring, technology, guided by extropian values, in realizing the optimistic, dynamic value-perspective of extropianism.[469]

More also included extended explanations of each principle. He emphasised that ***boundless expansion*** was a fundamentally evolutionary principle. From "mindless matter," ever more complex phenomena emerged in parts of the universe, including "progressively more powerful brains." In turn, greater intelligence was seeding faster innovations and better technologies. Championing "the rational use of science and technology," extropians aimed to further accelerate evolutionary 'progress' and to steer evolution in desirable ways. The boundlessly optimistic extropian sought "to promote the continuation and guidance of this [evolutionary] process, transcending biological and psychological limits into posthumanity."[470]

In More's vision, the ideal of boundless expansion would be helped into being by those who consciously adopted the principle of ***self-transformation***. A radical extension of the Enlightenment humanist ethos, taken to its most extreme (transhuman) end, this principle was fundamentally about "self-responsibility and self-determination." Gods, religions and dogmatic and tribal systems were all rejected, and Reason was held aloft.

[469] More, "The Extropian Principles," 17.
[470] More, "The Extropian Principles," 17.

Being open to self-transformation meant questioning one's most deeply held "values, beliefs, and natures."[471]

An overtly libertarian caveat was also present in the first few versions of the extropian principles. It stated that the full realisation of self-transformation was incompatible with the State and other forms of central organization. For an extropian to access the complete range of self-transformative possibilities, "the fewest restrictions compatible with maintaining the conditions of freedom"[472] were deemed essential. But in a world that was powerfully influenced by states, religions, and other forms of centralised power, extropians also emphasised that one needed a 'can-do' attitude in order to work within, and eventually transgress, the limitations of existing systems.

For the courage to make big changes, one needed the third principle: ***dynamic optimism*!** Optimism was integral to extropian culture and extropians channeled this sensibility with gusto. Unperturbed by criticism, they eagerly challenged many normative and deeply entrenched human assumptions—from the inevitability of ageing and death; to the environmentalist position that there are hard and imminent physical limits to growth; the belief that government regulation of science and technology is for 'the greater good'; and the relatively static view of the human condition, where radical alterations and improvements are viewed as hubristic and untenable.

To all this, the extropians said no. There is more to come, and better things lie on the horizon. Evolution mandates change, and "in the long run the positive potentials for intelligent beings are virtually limitless." Believing that they were the agents of their own destiny, extropians aimed to be catalysts for progressive change, adopting "a positive, dynamic, empowering attitude," while rejecting, "gloom, defeatism, and the typical focus on the negatives."[473]

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[471] More, "The Extropian Principles," 17.
[472] More, "The Extropian Principles," 17.
[473] More, "The Extropian Principles," 18.

Finally, extropians honed in on the practical means of realising their ambitious transhumanist aims. As self-described rational thinkers, they did not expect their futuristic visions to come to fruition through magic, osmosis, or wishful thinking. They needed ***intelligent technology***—the evolutionary extension of intelligent brains. Science and technology were the means of achieving the core extropian ends of practical "immortality, expanding intelligence, and increasing power."[474] By power, however, they did not mean wielding centralised control over others; rather, they aimed to achieve maximum autonomy and power over the natural forces that confine human agency.

All the trappings of a secular, science-based, libertarian-leaning philosophy are evident in this foundational document. Even the frequent revisions of the document affirmed some of the principles that the text promoted. Shortly after the original principles were composed, More reflected that, "The Extropian Principles are not now, and never shall be, in final, perfected form." They were designed to embody the principles of *self-transformation* and *dynamic optimism*, forever changing in accordance with contemporary knowledge and needs.

In 1993, the journalist Dave Gale remarked that, "the principles seem harmless enough, even a little dull, until the *Extropy* reader grasps the full implications of Transhumanism."[475] The overarching message of the extropian principles, in every version, is that humanity does not represent an ideal, fixed, or finished state. In More's words, "humanity is a temporary stage along the evolutionary pathway. We are not the zenith of nature's development."[476] The evolutionarily minded extropians believed that humans should strive to use science and technology to overcome biological, social and cognitive limitations, and that they should actively embrace the pursuit of becoming more, or other than human.

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[474] More, "The Extropian Principles," 18.
[475] David Gale, "Meet the Extropians," *GQ* 48 (June, 1993), http://www.cryonet.org/cgi-bin/dsp.cgi?msg=2354.
[476] Max More, "Transhumanism: Towards a Futurist Philosophy," *Extropy* 6 (Summer 1990): 11.

On this point, modern transhumanism has evolved very little from the early days. However, a number of other characteristics render the extropian movement distinctive—at least by degrees—from other brands of transhumanism. We explore these characteristics below.

Imagine no religion

To most extropians in the 90s religion was anathema. Theism was repeatedly derided in *Extropy* for "its blind faith, debasement of human worth, and systematic irrationality."[477] Long before Richard Dawkins became the poster-child for New Atheism, his books, *The Selfish Gene* (1976) and *The Blind Watchmaker* (1986) appeared frequently on extropian reading lists. The latter book was glowingly reviewed in *Extropy* by Simon! D. Levy, who praised Dawkins' "refreshingly audacious prose" and the fact that he "pulls no punches in demolishing the creationists."[478]

Like Dawkins, the extropians did not hold back in their criticism of faith and organised religion. Their primary objection to religion was epistemological: faith, in their view, was a paltry and inadequate method of deriving meaningful knowledge about the world and guiding thought and action. As such, they consciously developed extropianism as a rational alternative worldview that could help make sense of the modern world, not only as it was in the present, but as it could be in the future.

In the 1990s, More wrote frequently, and at length, about the "entropic force"[479] of religion. He began his first full-length essay on transhumanist philosophy with the powerful declaration:

[477] More, "Extropian Principles v. 2.5," 10.
[478] Simon! D. Levy, "*The Blind Watchmaker* by Richard Dawkins, Reviewed by Simon! D. Levy," *Extropy* 9 (Summer 1992): 36-37.
[479] More, "Transhumanism," 6.

> Humanity is in the early stages of a period of explosive expansion in knowledge, freedom, intelligence, lifespan, and control over experience. Yet the race persists in old conceptual structures which hold us back. One of the worst of these is religion.[480]

For More, "God was a primitive notion invented by primitive people" who were "only just beginning to step out of ignorance and unconsciousness." He affirmed that, historically, "God was an oppressive concept, a more powerful being than we, but made in the image of our crude self-conceptions."[481] Yet, while More viewed religion as a negative force in the modern world, he was cautious not to denigrate, or dispense with, the human need to forge myths and origin stories.

Religions and states had a virtual monopoly on these kinds of narratives in the past, and the veracity of many such stories has often been called into question retrospectively. But More also took the view that the role these stories played in fostering social cohesion and providing existential orientation was essential. Consequently, he affirmed that "the alternative to religion is not a despairing nihilism,"[482] and was adamant that "a narrow scientism will not succeed in replacing [religion]."[483] In his view, "a deeply value-laden, yet open and critical system (or systems) will be necessary to dislodge virulent religious memes."[484] Throwing out humanity's need for existential orientation, along with the religious bathwater, would not wash well with human nature.

Reflecting on the enduring human urge for myth-making in 1994, More mused that there exists a:

> … need for transcendence deeply built into humanity… That's why we have all these religious myths. It seems to be something inherent in us that we want to move beyond what we see as our limits.[485]

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[480] More, "Tranhumanism," 6.
[481] More, "Transhumanism," 11.
[482] More, "Transhumanism," 6.
[483] More, "Transhumanism," 10.
[484] More, "Transhumanism," 10.
[485] Ed Regis, "Meet the Extropians" *Wired*, October 1, 1994, https://www.wired.com/1994/10/extropians/.

The problem, for More, was that he believed religions were no longer capable of fulfilling this enduring role with integrity. Modern humans had better stories, built on scientific foundations, which are testable and subject to the rigorous scrutinies of the scientific method. Evolution is, of course, a cornerstone of any scientifically based modern worldview, and one of More's biggest gripes with religion and faith centered on their inability to get to grips with evolution, including cultural and technological evolution, and its potential implications for the future of humanity.

Encoded in the three dominant global monotheisms—Christianity, Judaism, and Islam—are static ideals of a higher good and a deterministic cosmic plan. For More, these visions were entropic because they encouraged, "an attitude of resignation" to one's hardships and limitations. As he put it: "Why bother to try to improve one's lot if it's 'God's Will' or 'The Cosmic Plan'?"[486] The future the extropians craved would not be built on inertia, which they believed religion encouraged by demanding, "unquestioning belief, a surrender of probing reason, [and] an abdication of cognitive responsibility."[487]

In proposing "the replacement of religion by a rational and extropic transhumanism,"[488] More emphasised that his transhumanist philosophy was dynamic and fruitful because it focused on "our evolutionary future."[489] The extropians saw no evidence for a traditional religious heaven or afterlife, and believed that striving to ascend to such a place by living for tomorrow was absurd. As More wrote, "rather than enduring an unfulfilling life, sustained by a desperate longing for an illusory heaven, we direct our energies enthusiastically into moving toward our ever-evolving vision."[490]

Yet despite such bold anti-theism, quasi-religious overtones have often been detected in extropian and transhumanist declarations—not uncommonly, by transhumanists themselves. In his 2001 article for *L. A. Weekly* titled, "The Transhumanists," the

[486] More, "Transhumanism," 9.
[487] Max More, "Dynamic Optimism: Epistemological Psychology for Extropians," *Extropy* 8 (1991/92), 22.
[488] More, "Editorial," (1990): 5.
[489] More, "Transhumanism," 6.
[490] More, "The Extropian Principles v. 2.5.," 11.

journalist Brendan Bernhard remarked, "When you listen to Max [More] and [his wife] Natasha [Vita-More] for a while, it occurs to you that transhumanism is as much a religion as a philosophy, however 'rational' its adherents may wish to appear."[491]

In 1998, the journalist Erik Davis wrote an entire book, *TechGnosis*, linking modern information age ideas and technologies with the historically omnipresent urges for "myth, magic and mysticism." Davis branded the extropians, "perhaps the most zealous shock troops for for this new brand of Homo Cyber," and noted that "they resurrect patterns of identity and desire that resemble the most transcendental of mysticisms."[492] In his 2002 book, *Flesh and Machines*, the roboticist Rodney Brooks also detected spectres of age-old religious impulses in extropianism and transhumanism, which he viewed as ideas that were designed to perpetuate the myth than humanity is 'special.'[493]

It is certainly true that modern transhumanist ideas often encroach on domains that religion has historically monopolised. The archetypal transhumanist meme that mirrors many religious visions of transformation and rapture is the the Singularity, a concept that has roots in the writings of the mathematician I. J. Good and the science fiction writer Vernor Vinge, though it is most famously associated with the transhumanist Ray Kurzweil.[494] Kurzweil was a friend of the extropians and presented at several EXTRO conferences. He also served on the Council of Advisors of the Extropy Institute (ExI).[495]

There are many different variations of the Singularity hypothesis, but fundamentally, it encompasses the idea of extremely rapid technological development and an 'intelligence explosion.' An important implication of Singularity hypotheses for transhumanists is that, if humans could bootstrap themselves to this intelligence explosion, we could effectively become omnipotent, omniscient and omnipresent (though there's the lingering philosophical conundrum of whether a radically augmented posthuman

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[491] Brendan Bernhard, "The Transhumanists," *L.A. Weekly*, January 17, 2001, https://www.laweekly.com/news/the-transhumanists-2132903.
[492] Erik Davis, *TechGnosis* (New York: Harmony Books, 2004 [1998]), 140-141.
[493] Rodney Brooks, *Flesh and Machines: How Robots Will Change Us* (New York: Vintage Books, 2003), 160.
[494] See footnote 274 on page 97.
[495] *Extropy Institute*, "Frequently Asked Questions,"; *Extropy Institute*, "Accomplishments of Extropy Institute."

version of yourself would still be you). Parallels can also be drawn between transhumanists' life-extensionist values and traditional religious aspirations of divine immortality. Yet More clearly distinguished extropianism from religion in the 1990s by rejecting religious teleology and static views of human nature, purpose and potential.[496]

It is also worth noting that most transhumanists, from the extropian era to the present day, disassociate themselves from organised religions. Leading transhumanist thinkers have remained overwhelmingly secular over the past three decades, though a small number identify as Buddhist, spiritual or religious.[497] From the 2000s onwards, however, greater religious tolerance has crept into transhumanist movements, and since 2010, a number of explicitly religious transhumanist organisations and subgroups have arisen. Yet in its early extropian days, organised transhumanism was overwhelmingly secular, with a strong anti-religious bent.

Extropianism can be chiefly distinguished from the largely secular culture of twenty-first century transhumanism by the extreme vehemence with which its adherents opposed religion. In the 1990s, the rejection of religion was specifically encoded in "The Extropian Principles," a perspective that has subsequently been abandoned in other dominant, twenty-first century transhumanist movements. In extropian culture, anti-theism became almost a dogma in itself. In one issue of *Extropy*, the extropian Dave Krieger interviewed Dave Ross, a man who, according to More's editorial, "astounds and

[496] Notably, however, in late 1997, Max More and Nick Bostrom were engaged in a debate on the Extropian mailing list over whether transhumanism and religion could be compatible, and whether religious transhumanist organisations were likely to emerge in the future. Bostrom was staunchly against the idea, writing: "I don't think that christians, muslims or mormons could be transhumanists. I think we should rule that out in our definition of 'transhumanism'; otherwise the concept of transhumanism denigrates into: transhumanism = extropianism – balls&brains which I strongly object to!" More correctly predicted (in two out of the three cases) that Christian, Islamic and Mormon versions of transhumanism would emerge in the future (Islamic transhumanism is yet to emerge). He was also open to the idea that some people with spiritual and religious beliefs could also be transhumanists, but by the end of the chat with Bostrom he had changed his mind about "Standard Christianity and Islam," which "cannot be compatible." See: Max More (maxmore@primenet.com), "Re: History of Transhumanism and Extropy," Sunday November 2, 1997, 14:44:37, http://extropians.weidai.com/extropians.4Q97/1045.html; Nicholas Bostrom (bostrom@mail.ndirect.co.uk), "Re: History of Transhumanism and Extropy," Saturday November 1, 1997, 00:31:03, http://extropians.weidai.com/extropians.4Q97/1002.html.

[497] Hughes, "The Politics of Transhumanism," 768

intrigues many of us by claiming to be both Extropian and Christian." More followed with the skeptical remark, "judge for yourself whether this is really possible."[498]

Humanism and beyond

In the 1990s, More viewed humanism as a "step in the right direction"[499] on the ladder of human intellectual progress. But he viewed both religion and humanism as products of their time, and strongly emphasised that the evolving philosophical buck should not stop with humanism, which "contains too many outdated values and ideas."[500] Consequently, he argued that it was time to develop a new philosophy befitting the needs and capabilities of modern humans. The best candidate, as he saw it, was extropianism.

As early as 1992, More reflected on extropianism's relationship with humanism, writing, "like humanism it [extropianism] values reason and sees no ground for believing in supernatural external forces controlling our destiny."[501] Although many humanists have historically believed in supernatural forces, a core tenet of humanism has always held that the individual can, and should, control their own destiny. But, as More emphasised, "transhumanism goes further [than humanism] in calling us to push beyond the simply human stage of evolution."[502]

The extension of normative humanist philosophy, in pursuit of becoming more than human, is common to all modern brands of transhumanism. Although extropianism's relationship with humanism does not demarcate the movement from later transhumanist brands, it is worth noting that the extropians were the first to identify the historical linkages between the two philosophies, consciously extending humanism for the first time into its more extreme modern offshoot, transhumanism.[503]

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[498] Max More, "Editorial," *Extropy* 12 (1994): 4.
[499] More, "Transhumanism," 6.
[500] More, "Transhumanism," 6.
[501] Max More, "The Extropian Principles v. 2.0," *Extropy* 9 (Summer 1992): 7.
[502] More, "The Extropian Principles v. 2.0," 7.
[503] The extropian Reilly Jones was the first to make a link between transhumanist worldviews and the writings of the Italian humanist philosopher Pico della Mirandola, who wrote in his *Oration on the Dignity of Man* in 1486:

Longevity and death

Extropians had no time or reverence for death. They had a derisive word for those who did: "deathists."[504] As one journalist quipped in 1993, entropy and the heat death of the universe was "a source of serious irritation for serious immortalists"[505] like the extropians. As lifestyle futurists, extropians were not content to simply theorise about the travesty of death; they eagerly took every opportunity to stave it off, from vitamin supplementation, to caloric restriction, exercise, and specialised diets, to the final backup plan: cryonic suspension.

Extropians had a saying, "Freeze your head to save your ass."[506] They often repeated the phrase, coined by the cryonicist Saul Kent, "being frozen is the second-worst thing that can happen to you."[507] As the extropian Romana Machado quipped in an interview in 1995, "It's not clear to a lot of people that cryonics is the second-worst thing that could happen to you… Death is the *worst* thing."[508]

In "The Philosophy of Transhumanism," More referred to death as "the greatest evil." He dubbed extropianism inherently "optimistic" and declared that extropians "seek to void

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"Thou, constrained by no limits, in accordance with thine own free will, in whose hand We have placed thee, shalt ordain for thyself the limits of thy nature… We have made thee neither of heaven nor of earth, neither mortal nor immortal, so that with freedom of choice and with honor, as the maker and molder of thyself, thou mayst fashion thyself in whatever shape thou shalt prefer." See: Reilly Jones, "A History of Extropic Thought: Parallel Conceptual Development of Technicism and Humanism," Presented at *EXTRO 2* Conference in Santa Monica, California, June 18, 1995, https://www.reillyjones.com/history-of-extropic-thought.html. The link between Mirandola's humanism and modern transhumanism has subsequently been reiterated by both More in "The Philosophy of Transhumanism," and Bostrom in "A History of Transhumanist Thought."

[504] More, "Dynamic Optimism," 24.

[505] Gale, "Meet the Extropians."

[506] John Whalen, "She Rides a Trojan Horse," *SPIN* (May 1995): 104, accessed October 10, 2016, https://books.google.com.au/books?id=bkSKIhZnTyEC&pg=PA104&lpg=PA104&dq=romana+machado+very+extropian+person&source=bl&ots=j56Q_ArEB8&sig=d5PrWE99hhivdnsGVC60iNySIh8&hl=en&sa=X&ved=0ahUKEwjz3squurHPAhXHk5QKHfxnCUMQ6AEILzAF#v=onepage&q=romana%20machado%20very%20extropian%20person&f=false.

[507] Alex Head, "Technology Makes Us Optimistic; They Want To Live," *New York Times Magazine*, September 20, 1997, http://www.nytimes.com/1997/09/28/magazine/technology-makes-us-optimistic-they-want-to-live.html?pagewanted=all&_r=0.

[508] Whalen, "She Rides a Trojan Horse."

all limits to life, intelligence, freedom, knowledge and happiness."[509] Death is, of course, the ultimate limit on all these forms of possibility—for the individual at least. As such, More affirmed that "the abolition of aging and, finally, all causes of death, is essential to any philosophy of optimism."[510]

Dying never sat well with More. As Bernhard reported:

> … at the age of 12, he was already gobbling vitamins and working out with weights. When he was 18, he read Durk Pearson and Sandy Shaw's best-selling book, *Life Extension: A Practical Scientific Approach.*"[511] More has stated that as a young undergraduate, 'I was pissed off at death and people who were aging and dying and no one seemed to be doing anything about it.'[512]

Ed Regis also reported that, as a student at Oxford, More "kept a heart-lung resuscitator in his dorm room, just in case."[513] More has also noted that his undergraduate dorm room was a source of fascination to many of his peers as it housed "several shelves of bottles and pills, and people would come to my room and goggle-eye at them."[514]

Since his days as an undergraduate, More has put his money where his mouth is on the issue of life-extension. He began reading *Cryonics* magazine in his early twenties and, in 1985, at the age of twenty-one, he responded to an appeal for donations by the American cryonics non-profit, Alcor, "by sending a little money out of my tiny student bank account from England to California."[515]

While still at Oxford, More recalls that Alcor's then-president, Mike Darwin, wrote to him, "challenging me both to sign up [for cryopreservation] and to start a real cryonics

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[509] More, "Transhumanism," 10.
[510] More, "Transhumanism," 10.
[511] Bernhard, "The Transhumanists."
[512] Max More et al., "Extropy Institute: Frequently Asked Questions," *Extropy Institute*, archived June 2, 2003, https://web.archive.org/web/20030602112830/http://extropy.org/faq/index.html#03.03.
[513] Regis, "Meet the Extropians."
[514] Bernhard, "The Transhumanists."
[515] Chana de Wolf, "Max More: Alcor Member Profile," *Cryonics*, January-February, 2012, http://www.alcor.org/profiles/more.html.

organization in England."[516] More did both in 1986, after travelling to the US for six weeks to train at Alcor. Back in the UK, he founded Mizar Ltd., which later became Alcor UK.[517] Along with the English cryonicists Garrett Smyth and Michael Price, he also produced the magazine *Biostasis*,[518] which was described by the Extropy Institute as a kind of "proto-*Extropy*."[519] More has been an avid cryonics advocate ever since, and went on to become the CEO and President of Alcor in 2011.

When interviewed by Bernhard in 2001, More expressed concern that so few people then worried about taking steps to extend their lives. He remarked, "I think people will look back on the 20th century and think, 'Why didn't more people see that there was a possibility now of actually doing something about aging and death, and why didn't people do something.'"[520] In the same interview, More's wife and fellow extropian, Natasha Vita-More, seconded her husband's views on death, declaring, "I have no tolerance for it, no time for it. It just makes me angry. It's the cruelest thing to happen to any human being."[521]

Recalling her friend Timothy Leary's funeral, held at Santa Monica airport in 1996, Vita-More stated, "It was almost unbearable. It was a sanctimonious display of death—as if dying were an honour." Her chagrin stemmed in part from Leary's last minute decision to opt out of cryonic suspension. He was cremated instead, and a portion of his ashes was sent into space. Vita-More lamented, "Perhaps if more cryonicists hung around his house and camped out in his living room he would be suspended now."[522]

More and Vita-More were far from outliers among extropians in objecting to death and believing that one should take steps to prevent it. Cryopreservation and life-extension were big themes in *Extropy* mag. In one issue, under the helpful heading "Extropian

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[516] de Wolf, "Max More."
[517] Mizar and Alcor are companion stars located on the handle of the Big Dipper.
[518] de Wolf, "Max More."
[519] *Extropy Institute*, "Accomplishments of Extropy Institute."
[520] Bernhard, "The Transhumanists."
[521] Bernhard, "The Transhumanists."
[522] Laurent Courau, "Natasha Vita-More: Transhuman Manifesto," *La Spirale* (archives 1996-2005), https://laspirale.org/texte-33-natasha-vita-more-transhuman-manifesto.html.

Resources," the contact information for ten biostasis organisations was listed, including the Alcor Life Extension Foundation, while thirteen other life-extension resources were included, from "Durk Pearson and Sandy Shaw's Life Extension Newsletter," to the bluntly titled newsletter, "Offshore Medical Therapies."[523]

In the same issue of *Extropy*, the computer programmer and Director of Alcor-UK, Michael Price, contributed the article, "The Thermodynamics of Death," which opened with the unabashed declaration: "As an immortalist I want to live forever. Not just for a thousand or a googolplex of years but forever." [524] It is worth remarking here that Price wrote his essay in 1990, at the dawn of the extropian era, which partly explains his use of the word "immortalist," a term extropians and other transhumanists later eschewed. At some point in the 90s, the caveat crept in to transhumanist culture that their real goal was practical immortality, or functional life extension. Transhumanists want the option to extend their lives indefinitely, but fixed immortality is now widely rejected as a kind of determinist hell. Their goal is not living forever, but increasing their healthy life-span, reversing the ageing process, and choosing when and if to die, and under what circumstances.[525]

Libertarian politics

From the very "first issue of *Extropy* in 1988, More and Morrow included libertarian politics as one of the topics the magazine would promote."[526] And promote it they did, with gusto! It is rare to come across an edition of *Extropy* in which Ayn Rand is not mentioned with approval at least once.[527] Meanwhile, general "statist meddling"[528] and

[523] Max More, "Extropian Resources," *Extropy* 6 (Summer 1990): 36.
[524] M. C. Price, "The Thermodynamics of Death," *Extropy* 6 (Summer 1990): 19.
[525] As Nick Bostrom affirmed in "Transhumanist Values," "the goal, of course, is to radically extend people's active health-spans, not to add a few extra years on a ventilator at the end of life," p. 13. This more temperate stance on life-extension found an official voice in the transhumanist culture that eclipsed extropianism in the early 2000s, spearheaded by the World Transhumanist Association (WTA). See chapter 8 for more on the WTA.
[526] Hughes, *Citizen Cyborg*, ch.10.
[527] See: More, "Technological Self-Transformation," 15; More, "Dynamic Optimism," 18, 20; Mark Plus, "Beyond the Poor Man's Extropianism: A Review of Two Books About Ayn Rand and Objectivism," *Extropy* 10 (Winter/Spring 1993): 40; Simon! D. Levy, "A vision of Extropia, or what if Ayn Rand had been a cyberpunk?" *Extropy* 8 (Winter 1991/92): 44.

specific regulatory bodies like the FDA were constantly decried for their "authoritarian tactics" and their "paternalism and epistemological fascism."[529] Essays like Tom Bell's "Extropia: A Home for Our Hopes," were published, in which the now well-worn idea of setting up "a free and sovereign community on Earth's high seas"[530] was floated.

In the mid-1990s, the burgeoning realm of cyberspace was also being hailed as a new frontier that could be developed free from government intervention. In 1996, John Perry Barlow penned the manifesto, "One Man's Declaration of the Independence of Cyberspace," which transposed some of the communal ideals of the 60s and 70s—of individual freedom, shared communities, and egalitarianism—onto the more techno-centric libertarian canvas of the cyber-world. Barlow's opening declaration read:

> Governments of the Industrial World, you weary giants of flesh and steel, I come from Cyberspace, the new home of Mind. On behalf of the future, I ask you of the past to leave us alone. You are not welcome among us. You have no sovereignty where we gather.[531]

In the 90s, extropians, and their cyber-punk contemporaries, were reflecting seriously on how long nation states would persist, and how readily humans of the future would consent to their continued exertions of power. They also reflected at length on the role that technology might play in destabilising and undermining the power of the State, an idea that has become topical in the late 2010s, with rising automation destabilising and threatening to eliminate many traditional jobs, and a rise in political disaffection in Western countries being widely reported.[532]

In the extropian era, More and his compatriots believed that the best way to achieve the transhumanist goals of morphological freedom, and technological liberation and transcendence, was by arguing for maximum individual autonomy and liberty from the

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[528] Tom W. Bell, "Extropia: A Home for Our Hopes," *Extropy* 8 (Winter 1991/92): 36.
[529] Max More, ed., "News and Zine Reviews," *Extropy* 8 (Winter 1991/92): 48.
[530] Bell, "Extropia," 36.
[531] John Perry Barlow, "A Declaration of the Independence of Cyberspace," *Electronic Frontier Foundation*, February 8, 1996, https://www.eff.org/cyberspace-independence.
[532] See: Andrew Yang, *The War on Normal People: The Truth About America's Disappearing Jobs and Why Universal Basic Income Is Our Future* (New York: Hachette Books, 2018), kindle.

State, and favouring the self-regulating mechanism of the free market. As More wrote in *Extropy*, "Extropians are almost always highly libertarian,"[533] a fact that renders the political demographics of extropianism distinct from the more inclusive and democratic strains of transhumanist culture that succeeded it. However, More clarified in an online chat with Nick Bostrom in 1997 that extropianism was never *defined* as a libertarian philosophy and noted that "while most of us call ourselves libertarian," it is "perfectly possible" for someone to be an extropian "yet not count as a libertarian."[534]

Yet the culture of extropianism notably included the frequent bandying about of lots of libertarian-leaning ideas. Just flip back and have a look at *Fig. 8*, the first *Extropy* magazine ad from 1988, which lists libertarianism as one of the publication's major topics. In 1995, the extropian Russell E. Whitaker also stated that, "'most Extropians start out with an interest in computers and science fiction, but politically we are anarcho-capitalist."[535] Ben Goertzel also affirms that a dominant current of dedicated libertarianism is, "what is unique about the Extropian movement." Goertzel summed up the movement as "the fusion of radical technological optimism with libertarian political philosophy" and mused about extropianism, "one might call it *libertarian transhumanism*."[536] The leading transhumanist, James Hughes, has made a similar observation, remarking:

> One way in which the extropians distinguished themselves from the broader transhumanist milieu was by making libertarianism and anarcho-capitalism central to their worldview.[537]

Alongside the novelist and philosopher Ayn Rand, and the libertarian science fiction writer Robert Heinlein, the works of the liberal economists Friedrich Hayek, Milton Friedman, and Ludwig von Mises were widely read and cited with approval by extropians. More also encoded a strongly libertarian-leaning ideal into official extropian philosophy in 1992, when the principal of *spontaneous order* was added to the "The

[533] More, "Dynamic Optimism," 20.
[534] More, "Re: A History of Transhumanism and Extropy."
[535] Gale, "Meet the Extropians."
[536] Goertzel, "The Extropian Creed."
[537] Hughes, *Citizen Cyborg*, ch.10.

Extropian Principles v. 2.0." This principle explicitly affirmed that self-regulating orderly systems like the free market should be embraced, as they are more likely to intelligently engender extropian goals than human regulatory bodies. As More wrote in 1993:

> 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. We have no use for the technocratic idea of central control by self-proclaimed experts. No group of experts can understand and control the endless complexity of an economy and society. Expert knowledge is best harnessed and transmitted through the superbly efficient mediation of the free market's price signals -- signals that embody more information than any person or organization could ever gather.[538]

Extropians had an unusual level of comfort, and even reverence for, non-human systems and beings. Ideas that are widely considered to be radical, such as privatising the air and the oceans, were often discussed and endorsed by extropians in the 90s, from More, to the USSR-born software engineer and frequent contributor to online extropian mailing list, Alexander 'Sasha' Chislenko.[539] In his 1995 EXTRO 2 conference paper, Reilly Jones also described the Americans with Disabilities Act (ADA), as "that statist spoils system for preferred parking spaces."[540]

These kinds of remarks seem to have had a broadly alienating effect on non-extropians, including other transhumanists. In 2000, Goertzel expressed concern that issues of human welfare were too readily brushed aside in extropian culture with glib *Übermenschean* and libertarian maxims. He praised the extropians', "courage in going against conventional ways of thinking," and their foresight on many issues regarding social and technological development. But he also wrote that they "are very unlikely to acquire the power to impose their ideas on the rest of us. And this is a very good

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[538] More, "Extropian Principles v. 2.5," 12.
[539] Jim McClellan, "The Tomorrow People," *The Observer*, March 26, 1995, (posted by Terry W. Colvin on an extropian mailing list, text keyed in from a fax of the article by Romana Machado), http://extropians.weidai.com/extropians/0307/11046.html, also available here: https://mason.gmu.edu/~rhanson/press/UKObserver-3-26-95.htm.; Goertzel, "The Extropian Creed."
[540] Jones, "A History of Extropic Thought."

thing."[541]

Digital currency, online privacy and future's markets

Digital currency was often written about in *Extropy*, a concept that libertarians and extropians were keenly interested in, as they viewed it as a tool to maintain their autonomy and privacy online away from the government's prying eyes. The extropian Hal Finney penned the essay, "Protecting Privacy with Electronic Cash," published in *Extropy* in 1993. Finney observed that massive electronic databases of personal information were being generated in the digital age, and thought deeply about the best ways to store this information ethically. While noting that "most people concerned with this problem have looked to paternalistic government solutions," Finney expressed concern that "the government also has a tendency to exempt itself from its own laws."[542] Consequently, he believed a more open, anonymous, individually empowered system would be needed.

Finney advocated the adoption of a three-tiered system to protect the privacy of messaging and transactions in the digital world: 1. public-key cryptography to protect individual messages; 2. anonymous messages with untraceable sources and destinations; 3. anonymous electronic currency. Enthusiasm about digital and virtual anonymity was pervasive in the 90s, before digital marketplaces became locked into a system based on the verification of one's real identity, and before so much information was willingly given up on social media sites, which are now widely used as verification tools.

The ideal of launching an anonymous digital currency inspired the libertarian leaning Silicon Valley entrepreneurs, Elon Musk, and Peter Thiel, when they formed their respective companies X.com and Confinity in the late 1990s. These companies soon amalgamated into what is now known as PayPal. The initial goal of PayPal was to disrupt and undercut the banking sector. But although PayPal was a monumentally successful

[541] Goertzel, "The Extropian Creed."
[542] Hal Finney, "Protecting Privacy With Electronic Cash," *Extropy* 10 (Winter/Spring 1993): 8.

venture (it was bought by eBay for in 2002 for $1.5 billion), it is now a tool of the digital financial sector, which effectively plugs-in to the existing system, in which banks retain a monopoly.

Nevertheless, this ethos of decentralisation and the interest in digital privacy and currency are currently experiencing a major resurgence with the rise of virtual private networks (VPN's), Bitcoin, and other cryptocurrencies and blockchain networks. Some speculators have even mused that the 90s era *Extropy* contributor, Nick Szabo, is the elusive, anonymous inventor of Bitcoin, Satoshi Nakamoto.[543] Whether or not this is true, digital currency was certainly discussed in *Extropy* and championed by leading extropians long before most people had heard of the concept, and long before the cryptomania phenomenon of the 2010s launched the phenomenon into mainstream cultural prominence.

Extropy #15 was particularly focused on digital currency, featuring three separate essays on the subject. The cover of the issue was also emblazoned with an imaginary currency note, which replaced the typical American elder statesman with the classical liberal economist Milton Friedman. The notes were a visual representation of a form of digital currency, distributed by a privately run bank in the imagined community the "Distributed Networks of Extropia." The note on the back cover of the issue is stamped with the parodic creed: "In reason we trust."

[543] Rob Price, "The man everything thinks is the creator of bitcoin gave a speech discussing the history of technology," *Business Insider*, November 13, 2015, http://www.businessinsider.com.au/nick-szabo-ethereum-bitcoin-blockchain-history-satoshi-nakamoto-2015-11.

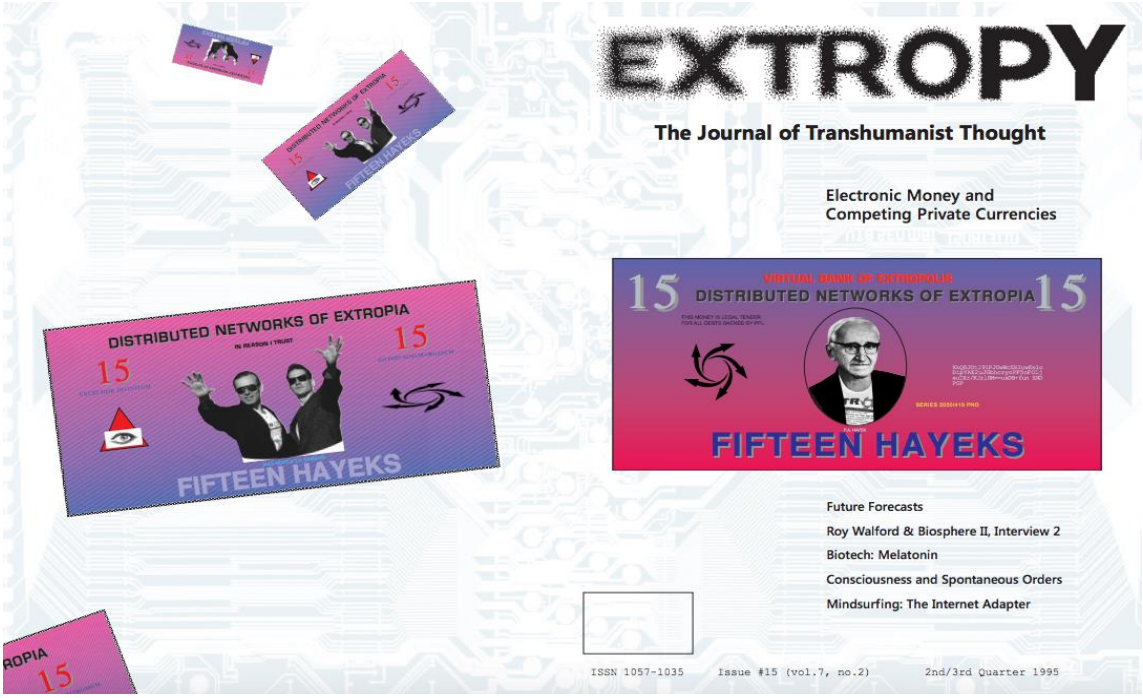

Fig. 9. Cover of *Extropy* magazine, issue #15 (1995).

In another issue of *Extropy*, the young economist Robin Hanson developed the now profoundly influential concept of idea futures, which is basically a market-based mechanism of future prediction. Hanson extended the idea of a conventional market, which sets a price on goods based on a consensus about their value, as indicated by supply and demand, and suggested that futures markets could provide "a way to create an immediate consensus about future consensus."[544] The concept of an ideas market dovetails with, and implicitly supports, the extropian principle of spontaneous order, which promotes free markets and evolutionary, self-regulating systems.

The only transhumanist brand?

Throughout the decade More and Morrow readily acknowledged that extropianism was "a transhumanism" and not the only brand of transhumanist thought.[545] Another

[544] Robin Hanson, "Idea Futures: Encouraging an Honest Consensus," *Extropy* 8 (Winter 1991/92): 8.
[545] More, "The Extropian Principles," 18.

futuristic movement that More considered to be broadly transhumanist at the time, and in effect a smaller outgrowth of extropianism, was Venturism.[546] Venturism "was the brainchild of David S. Pizer, an Arizona businessman and futurist."[547] Venturist ideals focused on human potential, life-extension and the importance of cryonics. These ideals were first promoted by The Church of Venturism, which was founded in 1986. However, the 'Church,' which promoted rational thinking and decried mysticism, soon changed its name to the Society for Venturism.[548]

The main focus of the Venturist movement was life-extension. Venturists believed in "the enlightened self-interest of the individual," which, as life-extensionists, they thought "must be expanded literally to the scale of eternity." They considered the pursuit of immortality to be a rational imperative and declared that "it is incumbent upon every Venturist to advocate cryonic suspension and to have arrangements made for his/her suspension in the event of death." They also advocated "the application of reason, science and technology for the benefit of mankind" and aimed to realise "human potential by, in the end, becoming *more than* human, or transhuman."[549] A life extensionist thinker who directly influenced the Venturists was the Russian cosmist Nikolai Fedorovich Fedorov (1829-1903).[550]

The Venturists and the extropians notably cross-promoted each other during the extropian era, both in print and online. However, I have never seen a single reference to any archived material from the early years of the Society for Venturism, or read about the history of this organisation in any academic publication. The Society produced many issues of a newsletter called *The Venturist*, the digital archives of which I have tracked

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[546] More, "Editorial" (1990), 4-5.
[547] Mike Perry, ed., "Introducing Venturism," 6th edition, May 1994, *Society for Venturism*, archived August 19, 2000, https://web.archive.org/web/20000819130609/http://www.syspac.com:80/~cryoweb/venturism/12.
[548] See: *Society for Venturism*, archived January 29, 2011, https://web.archive.org/web/20110129001103/http://www.venturist.info:80/.
[549] Perry, "Introducing Venturism."
[550] See: Ed Tandy, "N.F. Fedorov, Russian Come-Upist," originally published in *Venturist Voice*, 1986, revised by R. Michael Perry, 2003, archived April 24, 2006, https://web.archive.org/web/20060424074530/http://www.quantium.plus.com:80/venturist/fyodorov.htm.

down. Although I do not discuss them in detail, the reader can find them using the links supplied in the following footnote.[551]

In *The Transhumanist Reader*, More also retrospectively acknowledged that other transhumanist groups sprang up in the 1990s, such as "Aleph in Sweden, De:Trans in Germany, and Transcedo in the Netherlands."[552] However, he did not describe or discuss any of these groups. As far as I am aware, no English-language academic publication ever has. I will provide some brief context on Aleph below, and mention one or two other groups and publications of the extropian era that have seemingly been long forgotten.

Anders Sandberg's website, Aleph, which is still active, was a major transhumanist resource in the 1990s. With a nod to the Aleph numbers in mathematics, the term has connotations of infinity. The Aleph Transhumanist Association "was founded in 1996 by the members of the Omega mailing list, a local [S]wedish transhumanist mailing list active since 1995." Sandberg was the Chairman of the organisation, which aimed "to actively interact with the rest of society, representing transhumanist views and raising interest for transhumanism."[553] In 1998, the group only had twenty or thirty members, who lived primarily in Stockholm and surrounding areas.[554]

Importantly, however, Sandberg was active on extropian mailing lists and was a significant contributor to discussions about early transhumanist FAQ's and statements of purpose. Sandberg was also involved in a number of other early transhumanist projects, acting as Vice Chief Editor of the online publication, *Homo Excelsior: The Transhumanist's Magazine*, which he co-founded in 1996 with Erik Möller. This magazine is another transhumanist venture that has never been mentioned in academic publications.

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[551] See: *Society for Venturism*, "Newsletter – *The Venturist*," archived April 30, 2006, https://web.archive.org/web/20060430103617/http://www.quantium.plus.com/venturist/newsletter.htm.
[552] More, "The Philosophy of Transhumanism." I have tracked down the defunct websites of De: Trans and Transcedo. They can be accessed at: https://web.archive.org/web/20001018193544/http://www.transhumanismus.de:80/; and https://web.archive.org/web/20000829095357/http://www.educa.com:80/transcedo/.
[553] Anders Sandberg, "Transhumanistiska Föreningen Aleph - The Aleph Transhumanist Association," *Aleph*, accessed November 5, 2018, http://www.aleph.se/Nada/Hx/Extro3/alephpresentation.
[554] Sandberg, "Transhumanistiska Föreningen Aleph."

Homo Excelsior linked to the Extropy Institute on their website and listed it as a key transhumanist organisation that they cooperated and shared values with.[555] Another of *Homo Excelsior's* editors, Sarah K. Marr, was also active on extropian mailing lists.[556] The surviving archives of *Homo Excelsior* indicate that it was a relatively short-lived project that didn't gain much momentum, but it was one of many budding projects involved in the digital exchange and cross-pollination of transhumanist ideas and subcultures in the 1990s.

While there was a great deal of interaction and overlap between many futurist groups and subcultures in this decade, I have periodised this moment in transhumanist history as the extropian era because extropianism proved to be the fittest transhumanist meme of the 1990s and became the umbrella movement under which most emerging transhumanist thinkers gathered, even if they did not identify with every aspect of extropian philosophy.[557] In the next chapter we will meet some of the main figures who spearheaded the extropian movement and learn more about the playful, witty, sometimes silly, yet also highly intellectual culture of extropian transhumanism.

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[555] See: *Homo Excelsior: The Transhumanist's Magazine*, "Homo Excelsior," archived July 11, 1998, accessed November 5, 2018, https://web.archive.org/web/19980711003015/http://excelsior.org:80/hx.phtml.
[556] For a list of the editorial team c. 1997, see: *Homo Excelsior: The Transhumanist's Magazine*, "Contacting Homo Excelsior Editors," archived July 11, 1998, accessed November 5, 2018, https://web.archive.org/web/19980711002933/http://excelsior.org:80/about.phtml.
[557] See: Anders Sandberg, "The Memetics of Transhumanism, Or: How is the Memetic Health of Transhumanism?" (based on a post to the Extropian mailing list November 24, 1994), *Aleph*, accessed November 10, 2016, http://www.aleph.se/Trans/Cultural/Memetics/trans_meme.html.; Sirius and Cornell, *Transcendence*, see: 'Extropians were the early organised transhumanists.'

7. Meet The Extropians

> *Forward! Upward!*
> *Outward! Onward!*
> *Together we soar*
> *Into the future!*
>
> *Best do it so (oh)!*
>
> — T. O. Morrow, "Extropian Anthem v. 1.314159… (Sung to the tune of Wagner's 'Flight of the Valkyries')" (1998)

By the mid-1990s, the extropians were making a name for themselves. *Extropy* magazine was mentioned by name in Peter James' 1993 novel, *Host*, the plot of which centers around cryonic suspension and brain uploading. The book's main character, Joe Messenger, looks over reviews of his work in *The Guardian* and *New Scientist* and among them he finds "what looked like a rave write-up in a small Californian magazine he much admired, called *Extropy*, which pleased him more than anything."[558] This pleased the extropians in turn, who mentioned it in their post, "Accomplishments of Extropy Institute."[559] Greg Bear also wrote about a futuristic world in his novel *Slant* (1997), in which a character muses, "the Extropians saw it first, bless them."[560]

In 1994, the editors of *Extropy* were the subjects of an article in *Wired* magazine by Ed Regis, titled, "Meet the Extropians." The photograph accompanying Regis' article is included below.

[558] Peter James, *Host* (London: Orion Books, 1993), kindle, ch.6.
[559] *Extropy Institute*, "Accomplishments of Extropy Insitute."
[560] Greg Bear, *Slant* (New York: Open Road Integrated Media, 1997), kindle, ch. 4.

Fig. 10. Photograph of *Extropy* editors in *Wired* magazine, October 1994. From left to right: Simon D! Levy, Hans Moravec, Max More, Dave Krieger, Ralph Merkle, T. O. Morrow.

The image above could easily be of a boy band or a rock group in *NME* or *Rolling Stone*. Young, all male, featuring two prominent characters in a group of six, one of them, the front man, Max More, sporting a commanding, forward-looking gaze. A number of different 'types' are also discernible within the more homogenous collective vision—Tom Morrow is the obvious jester on the right. Like images of so many new bands who find themselves suddenly in the limelight, the photograph simultaneously captures an image of youthful assertiveness and youthful uncertainty.

Like most transhumanists today, extropians were pervasively white, highly educated, and, as the photograph emphasises, male.[561] But what did the *Extropy* editors do in the 1990s when they weren't busy writing transhumanist tracts and debating the viability of future enhancement technologies on the extropy mailing list? Let's work through the group from left to right as they appear in *Fig. 10.*

Simon D! Levy was a student of linguistics and computer science and worked as a programmer throughout the 1990s. Hans Moravec was a roboticist who earned a Ph.D. from Stanford in 1980, and published the influential nonfiction books, *Mind Children* (1988), and *Robot: Mere Machine to Transcendent Mind* (1998). Arthur C. Clarke described *Robot* as "the most awesome work of controlled imagination I have ever encountered."[562] In his 2002 book, *Flesh and Machines*, Moravec's long-time MIT colleague, Rodney Brooks, described him as "a true eccentric. Brilliant, innovative, and nuts."[563]

Extropy's co-founder and Editor in Chief, Max More, earned a B.A. in philosophy, economics and politics from Oxford University in 1987. He was awarded a Ph.D. from The University of Southern California in 1995, for his thesis titled, "The Diachronic Self: Identity, Continuity, Transformation." Influenced by the work of the philosopher Derek Parfit, More's thesis explored the nature of human identity and the continuity of the self.[564] According to More's personal website, Marvin Minsky once commented:

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[561] For contemporary demographics c.2012 see: Hank Pellissier, "Transhumanists: Who Are They? What Do They Want, Believe, and Predict? (Terasem Survey, Part 5)," *IEET*, September 9, 2012, http://ieet.org/index.php/IEET/more/pellissier20120909. For 90s era demographics see p. 191.
[562] *Oxford University Press*, "Reviews," http://www.oupcanada.com/catalog/9780195116304.html.
[563] Rodney A. Brooks, *Flesh and Machines: How Robots Will Change Us*, (New York: Vintage Books, 2003), 27.
[564] Max More, *The Diachronic Self: Identity, Continuity, Transformation* (University of Southern California: ProQuest Dissertations Publishing, 1995).

> We have a dreadful shortage of people who know so much, can both think boldly and clearly, and can express themselves so articulately. Carl Sagan was another such one… But Sagan is gone and has not been replaced. I see Max as my candidate for that post.[565]

Dave Krieger earned a B.A. in mathematics and physics from Drake University in 1987, and a Masters in Library Science (focusing on information systems design and user interfaces) from UCLA in 1990. Between 1989 and 1991 he was a technical consultant for the Paramount Pictures film *Star Trek: The Next Generation*, and worked for The RAND Corporation, Amix, and Apple at various stages throughout the decade. Ralph Merkle was an early pioneer of public key cryptography, and was already a successful computer scientist when *Extropy* was launched. He earned a B.A. and M.A. in computer science from UoC Berkeley in 1974 and 1977 respectively, and received a Ph.D. in electrical engineering from Stanford in 1979.

Extropy's other founding editor, Tom Bell, earned a B.A. in philosophy from the University of Kansas in 1987, and an M.A. in philosophy from The University of Southern California in 1989. He was a law student at The University of Chicago when *Extropy* kicked off, and received his J.D. in 1993. Shortly after graduating, Bell began practising as an attorney at the Silicon Valley law firm of Wilson Sonsini Goodrich & Rosati. Perhaps not your typical boyband after all.

The extropians had a deep interest in all things science and tech related and they shared a passion not only for the marvels of the present, but for the possibilities of the future. Fans of futuristic symbolism, they developed a distinctive culture of techno-optimism. The extropian crowd often gathered together for social 'extropaganzas,' changed their names to signal their desire to transcend the current limits of society and self, and (at least in one instance) signed their names in similarly extropian fashion (see *Fig.11*.). They even had an extropian handshake, which Regis reported on in his colourful *Wired* piece:

[565] See: https://web.archive.org/web/20180408235547/http://www.maxmore.com/bio.htm. Max More has deployed this quote many times in self-promotion and it appears on many iterations of his personal website. However, I have been unable to trace the original source.

> Right hand out in front of you, fingers spread and pointing at the sky. Grasp the other person's right hand, intertwine fingers, and close. Then zoom your hand up, straight up, all the way up! Upward! Outward! Reach for the stars![566]

In name, theory, word and deed, the extropians were perennially aiming for the beyond.

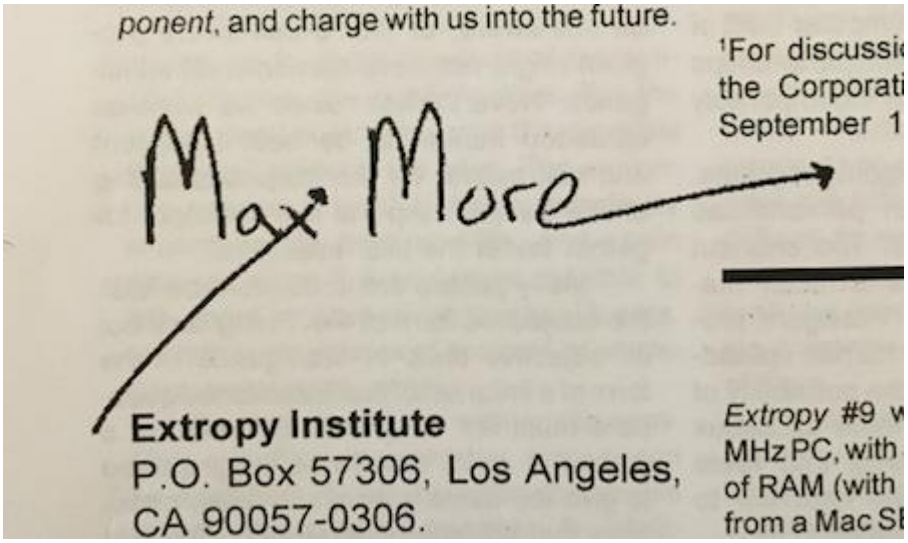

Fig. 11. Max More's signature at the close of a 1992 article in *Extropy* announcing the launch of the Extropy Institute, of which he was the founding Executive Director.

One doesn't have to strain too hard to see why some contemporaries accused the extropians of kookery, or quasi-religious cultishness.[567] Even partially sympathetic journalists like Jim McClellan made quips like, "back on Planet Earth, it may be hard not to dismiss the Extropians as techno-nuts."[568] On the basis of signatures and handshakes alone, such suppositions do not seem entirely baseless. But these rituals did not last long, and were only ever the window dressing adorning a far more complex and enduring transhumanist philosophy and movement.

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[566] Regis, "Meet the Extropians."
[567] In 1995, Richard Barbrook and Andy Cameron wrote critically of the emergence of The Californian Ideology: a "new faith" comprised of "a bizarre fusion of the cultural bohemianism of San Francisco with the hi-tech industries of Silicon Valley." Their essay refers critically to "the West Coast's Extropian cult." It was later published in *Science as Culture* in 1996, pp. 44-45.
[568] McClellan, "The Tomorrow People."

As the journalists Brian Alexander and Ed Regis have intimated, along with Ben Goertzel, it would be rash to dismiss the extropians out of hand.[569] Marvin Minsky said of the extropians, with whom he often associated, "they're extremists… but that's the way you get good ideas."[570] Eric Drexler also remarked:

> I agree with most of the Extropian ideas… Overall it's a forward-looking, adventurous group that is thinking about important issues of technology and human life and trying to be ethical about it. That's a good thing, and shockingly rare.[571]

A read through the back issues of *Extropy* further emphasises that, for the most part, extropians were not simply a bunch of deluded techno-mystics or intellectual lightweights. Although peppered with playful lists of neologisms, and advertisements for T-shirts and vitamin pills, the magazine was one of the earliest forums in which major scientific and philosophical ideas, like molecular nanomanufacturing, digital currency, and brain uploading, were seriously discussed by people who are now, in several cases, considered to be pioneering thinkers on these subjects.

<u>All the young dudes?</u>

Extropians were mostly men, but there were exceptions. The most notable among them is Natasha Vita-More, who was a keen futurist and artist in the 1980s and a friend and lover of FM-2030. She later married Max More in 1996,[572] four years after the pair met at one of Timothy Leary's parties in Beverly Hills.[573] In a 2014 interview, Vita-More revealed that the experience of an ectopic pregnancy years earlier, which resulted in the loss of the pregnancy and her own near death, fuelled her thinking about the

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[569] Alexander, *Rapture*, 60; Regis, "Meet the Extropians."; Goertzel, "The Extropian Creed."
[570] Regis, "Meet the Extropians."
[571] Regis, "Meet the Extropians."
[572] More, "About."
[573] See: Alexander, *Rapture*, 59; de Wolf, "Max More: Alcor Member Profile."

vulnerability of the human condition and "how defenceless we are when we do not know what [is] occurring inside our bodies."[574]

In addition to her four degrees (B.F.A. 1973; M.Sc. 2006; M.Phil. 2008; Ph.D. 2012), Vita-More is also a bodybuilder, and a sports nutritionist and personal trainer, certified by the American Muscle and Fitness Institute in Los Angeles. For her, bodybuilding is not just a hobby, it is an extension and enactment of her transhumanist aspirations. It is also a form of art, in which the body serves as the canvas. Sculpting one's flesh into optimal forms and staving off the symptoms of ageing and decline, which are often helped along by an unhealthy lifestyle, is a thoroughly extropian thing to do. In fact, bodybuilding is both a symbolic, and a literal embodiment of the principle of *dynamic optimism*—to consciously change in pursuit of improved states of being.

Fig. 12. Photograph of Natasha Vita-More from the "Bodybuilding" section of her now defunct personal website. Image archived February 3, 2001.

[574] Aleksandra Przegalinska, "Design to Expand Human Potential - Interview with Natasha Vita-More," *The Creativity Post*, June 4, 2014, http://www.creativitypost.com/technology/expanding_human_potential_an_interview_with_natasha_vita_more.

Vita-More actively embraced the extropian principle of *self-transformation*—not just as a bodybuilder, but as someone with a diverse and ever-evolving CV. In the late 1970's she was a teacher's assistant at the Academia Di Belle Arti in Ravenna, Italy. Between 1980-82 she taught at Telluride High School and Elementary School in Colorado. But, unlike your average high school teacher, she also appeared in an episode of the TV show *Murphy's Law* (1986) and in Francis Ford Coppola's experimental short film *Six Shots* (1981). In the overlapping years she exhibited as a performance artist in Brazil (1979), Kyoto (1980), Maui (1981) and Colorado (1982). In her early life, though she does not specify when, she "was in the merchant marines… and sailed on merchant sea vessels" and at one time was employed as "a construction worker in Vail, Colorado."[575]

Vita-More also spearheaded the transhumanist art movement and a revised version of one of her early manifestos, the "Extropic Art Manifesto," was placed onboard the Cassini-Huygens spacecraft in 1997, which was bound for Saturn.[576] The Manifesto begins with declaration, "*We are transhumans*,"[577] and is the first document containing the word 'transhumans' to have left the Earth. Vita-More reflected on this achievement with pride in a 2012 interview, describing the event as "something I am very pleased with" despite the fact that it remains an "accomplishment that has never really been written about or publicized."[578]

From 1986-1994, she produced and hosted the LA Cable TV series "Transcentury Update," on which she interviewed futurist thinkers such as FM-2030, Max More and Timothy Leary. For a long time, Vita-More skirted around the fringes of the Hollywood scene, and the artistic and intellectual A-List. She once dated the film director Volker

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[575] Courau, "Natasha Vita-More: Transhuman Manifesto."
[576] See: Natasha Vita-More, "Extropic Art Manifesto," *TransHumanist Arts & Culture*, January 1, 1997, revised May 27, 2001, archived August 3, 2001, https://web.archive.org/web/20010803094227/http://www.extropic-art.com:80/extropic.htm. To view the 2003 version of the "Transhumanist Art Statement," accompanied by the "Transhumanist Art FAQ," see: Natasha Vita-More, "Transhumanist Art Statement," 1982, revised 2003, https://web.archive.org/web/20031218210529/http://www.transhumanist.biz/transhumanistartsmanifesto.htm.
[577] Vita-More, "Extropic Art Manifesto."
[578] Natasha Vita-More and Adam Ford, "Interview with Natasha Vita-More," *Humanity+*, June 22, 2012, http://hplusmagazine.com/2012/06/22/interview-with-natasha-vita-more/.

Schlöndorff, and counted Susan Sontag and Bill Viola among her friends. She interviewed the inventor and polymath Buckminster Fuller in the 1980s and spent much of that decade cultivating a passion for futurist ideas. Never idle, she was also elected as a councillor and Director of Public Relations and Media for the Los Angeles County in 1992. She ran under a Green Party ticket and attempted to advocate for progressive transhumanist ideas. However, she resigned after a year because the party was "too far left and too neurotically geared toward environmentalism."[579]

It was not until Vita-More met Max More and immersed herself in extropian culture that she became a card-carrying transhumanist with consistent and explicitly transhumanist ideas. From then on, she became one half of extropianism's leading power-couple and a self-styled poster-girl for transhumanism. In 1998, the journalist Matthew DeBoard referred to Vita-More as "a transhumanist self-promoter extraordinaire" who "has set herself up as the movement's buffed-up femme fatale, a superhuman object of desire combining Madonna, Schwarzenegger, and Marcel Duchamp."[580]

A common error made in publications that make offhand references to transhumanist history is the statement that together, More and Vita-More invented extropianism.[581] Vita-More explicitly emphasises that this is not the case. She notes, "my own viewpoint of transhumanism developed in [the] 1980s as a cultural movement—a new aesthetics for the future."[582] She was exploring prototypically transhumanist themes in her art in the 80s and using the term 'transhuman' in the same rather nebulous way that FM-2030 did. However, she did not become aware of a transhumanist philosophy until the 1990's,

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[579] Natasha Vita-More, Wednesday September 1, 1999 (08:33:48), reply to transhuman@logrus.org, "Re: >H Political Agendas," *Transhuman Mailing List*, https://web.archive.org/web/20020123020718/http://www.homoexcelsior.com/archive/transhuman/msg03942.html.

[580] Matthew DeBoard, "Biotech at the Barricades," *Atlantic Unbound*, November 11, 1998, http://www.theatlantic.com/past/docs/unbound/citation/wc981111.htm.

[581] See: Melanie Grundmann, "Transhumanist Arts. Aesthetics of the Future? Parallels to 19th Century Dandyism," in *Tensions and Convergences: Technological and Aesthetic Transformations of Society*, ed. Reinhard Heil et al. (Bielefeld: Transaction Publishers, 2007), 86.

[582] Natasha Vita-More, "The Transhumanist Culture," *natasha.cc*, archived March 18, 2018, accessed October 27, 2018, https://web.archive.org/web/20180318093717/http://natasha.cc:80/transhumanistculture.htm.

and credits Max More as the first to establish transhumanism "as a philosophy and movement."[583] In a succinct clarification, she states:

> In short: I did not create or help to create Extropy Institute. I was a Transhuman before I learned of the philosophy of transhumanism. I met Max More in 1992 and later became a member of Extropy Institute because it was the most intelligent, advanced and high-profile international group of people who were thinking about the future and far out ideas such as nanotechnology, human-brain interface, multiple selves, uploading, radical life extension, ethics of emerging technologies.[584]

Further reflecting on her place in transhumanist history, Vita-More has mused, "I have been called the first female transhumanist, both as an artist and a theorist/philosopher," but she remarks that, "I feel no loss by admitting that I am probably not the first, but the first within a timeframe where the media turned its cameras on and the presses started rolling."[585]

Either way, Vita-More remains the only high-profile female transhumanist, and the only woman who is consistently discussed in the brief, existing histories of transhumanism. This fact appears not to be due to any patriarchal bias in the existing histories. In 1993, the journalist Dave Gale reported anecdotally on a "general indifference of women to the Extropian project,"[586] which is perhaps related to the strong libertarian political sentiments embedded in extropian culture (women are dramatically underrepresented among libertarians).[587]

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[583] Vita-More, "The Transhumanist Culture."
[584] Wildcat and Natasha Vita-More, "The Audacious Beauty of Our Future: Natasha Vita-More, an Interview," *Wildcat Personal Cargo*, February 4, 2010, http://spacecollective.org/Wildcat/5527/The-Audacious-beauty-of-our-future-Natasha-VitaMore-an-interview.
[585] Wildcat and Vita-More, "The Audacious Beauty of Our Future."
[586] Gale, "Meet the Extropians."
[587] The 2013 American Value Survey reported that 94% of American libertarians are non-Hispanic whites, and 68% are men. See: Robert P. Jones et.al., "The 2013 American Values Survey: In Search of Libertarians in America," *Public Religion Research Institute*, October 29, 2013, http://www.prri.org/wp-content/uploads/2013/10/2013.AVS_WEB-1.pdf. In 2014, the Pew Research Center found that 11% of Americans describe themselves as libertarian, and also know what the term means. Men were about twice as likely to identify as libertarian (15%) than women (7%). See: Jocelyn Kiley, "In search of libertarians," *Pew Research Center*, August 25, 2014, http://www.pewresearch.org/fact-tank/2014/08/25/in-search-of-libertarians/.

In a 1995 interview with John Whalen, Max More estimated that around 20 percent of extropians at the time were female.[588] The non-extropian transhumanist James Hughes made a similar observation in his 2004 book, *Citizen Cyborg*, noting that in the early twenty-first century, "men outnumber women by at least four to one in extropian culture."[589] If these estimates are in the right ballpark, and ~20 percent of extropians were female, most are now forgotten. This is likely because they were among the many marginal figures of the movement who never attained the profile of the almost exclusively male leaders.

Alongside Vita-More, I have only identified a handful of other women who were linked with the extropian movement. These include the cryonics advocate and Alcor readiness coordinator, Regina Pancake; the Executive Editor of *Extropy: The Journal of Transhumanist Solutions* c.2002, and webmaster of the Extropy Institute's website, Ziana Astralos;[590] the contact person listed for extropian meetups, who is also a mathematician, chaos theorist, author, and electronic musician, Elaine Walker; the extropian mailing list contributor, feminist and disability rights activist, Katherine Aegis, who notably contributed significant text to the "Transhumanist FAQ";[591] the Extropy Institute PR Communications Officer, Sabine Atkins; the novelist and extropian mailing list contributor, Sarah K. Marr; the board member of the Extropy Institute, Tanya Jones; and the multi-talented enigma Romana Machado.

Little evidence of their contributions to extropian culture survives outside the memories and personal archives of those who lived through and created the extropian scene. It falls beyond the scope of this thesis to interview living extropians in order to discover

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[588] John Whalen, "Freeze Head, Save Ass," *MetroActive*, 1995, accessed October 27, 2018, http://www.metroactive.com/archives/cyber/extro.html.
[589] Hughes, *Citizen Cyborg*, ch.10.
[590] Archived versions of Astralos' website contain a treasure trove of links to other transhumanist sites and chat logs from the 1990s and early 2000s. See: *Extrotech: Transhumanist/Extropian Central Home*, archived December 13, 2000, https://web.archive.org/web/20001213105400/http://www.anzwers.org:80/free/tech/index.html.
[591] This contribution is acknowledged by Nick Bostrom in: "Introduction—The Transhumanist FAQ: A General Introduction," in *Transhumanism and the Body: The World Religions Speak*, eds. Calvin Mercer and Derek F. Maher (New York: Palgrave-Macmillan, 2014), 16.

who all of the extropian women were. But there is one woman who embodied a particularly extreme version of the bold, self-promotional style of early extropianism. This is a side of the extropian culture that should not be expunged from histories-by-transhumanists, who may understandably prefer to emphasise the most credible, academic roots of their movements.

The extropian Madonna

Romana Machado was a positively extropagazmic woman. A libertarian software engineer and "cypherpunk pinup"[592] called Cypherella by day, and a leather wearing lingerie model and amateur-soft porn Internet entrepreneur, called Mistress Romana by night. She was described by the journalist John Whalen in 1995 as "an unapologetic cyberspace libertarian" who notably "favors black leather."[593] In a web interview for *Sex, Lies, and Websites*, Machado described herself as a "software engineer, author, cryptoprivatist, professional model, and hot-blooded capitalist."[594]

[592] Whalen, "She Rides A Trojan Horse."
[593] Whalen, "She Rides A Trojan Horse."
[594] *Sex, Lies, and Websites*, "Erotica Without Guilt," archived October 8, 1999, accessed September 29, 2016, https://web.archive.org/web/19991008151213/http://www.cyber24.com:80/htm2/6_10.htm.

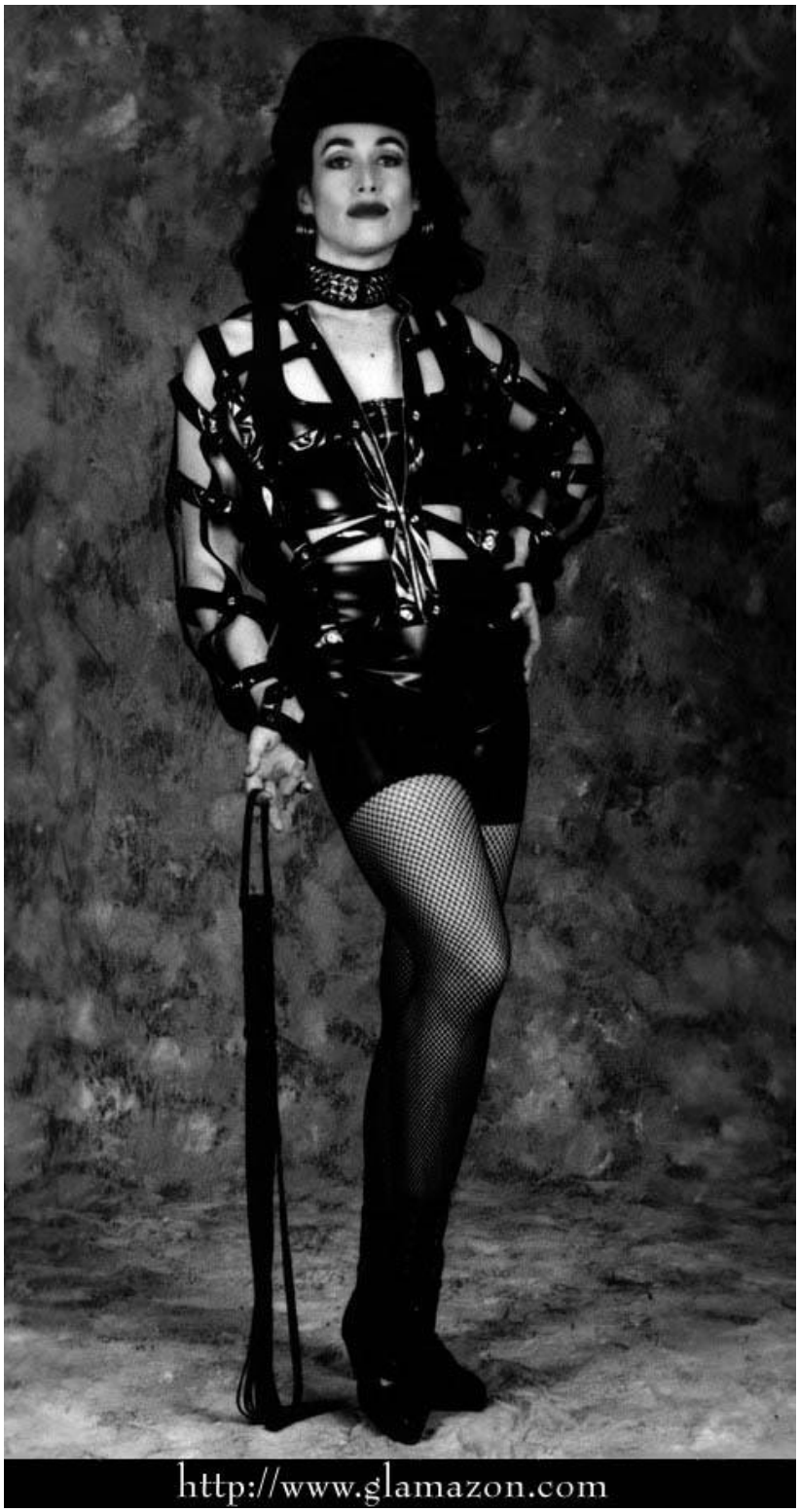

Fig. 13. Portrait photograph of "Mistress" Romana Machado. Photograph appeared on Machado's now defunct website *glamzon.com*. Image archived June 18, 2001.

In the mid-1990s, Machado lived with fellow extropians Geoff Dale and Dave Krieger, in a house that they called the "Exclave."[595] Jim McClellan described this domestic arrangement wryly, noting that Machado lives at "an Extropian base camp in Sunnyvale, California, where she and two Extropian partners… have decided to shack up together in order to 'increase each other's productivity.'" Machado was openly and enthusiastically bisexual and non-monogamous, preferences which, in conjunction with other alternative lifestyle choices (such as signing up for cryonic suspension, body building, and experimentation with vitamin supplements, nootropics and mind altering drugs), were not uncommon in extropian culture.[596]

On paper, Machado was every bit as clever, successful and staunchly libertarian as her male extropian counterparts. She graduated from San Jose State University in 1986 with a B.A. in mathematics, computer science, and literature, and developed the steganography ('stego') method of digital encryption while working at Apple in the 1990s. While still in college, Machado appeared in *Playboy* in October 1985 as one of the "Pac 10's Sexiest Coeds."[597] She took her first name from the *Doctor Who* companion Romanadvoratrelundar (played, in her most prominent incarnation, by Richard Dawkins' third wife Lalla Ward) but did so before becoming an extropian. The epithet 'Mistress Romana' came from the extropy mailing list and was used, in Machado's words, "because of my rather dominant attitude in argument."[598]

Machado is one of the many characters who embodied the more histrionic side of extropian culture. Jim McClellan aptly noted in *The Observer* in 1995 that "Extropianism isn't just a philosophical programme… It is also a kind of lifestyle futurism."[599] If anyone lived this 'extro' lifestyle to the full it was Mistress Romana. She signed up for cryonic

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[595] Whalen, "She Rides A Trojan Horse."
[596] McClellan, "The Tomorrow People."
[597] Ramona Machado, "My Playboy Pictures as a Very Young College Girl," *glamazon.com*, archived November 28, 1999, accessed September 28, 2016, https://web.archive.org/web/19991128010341/http://www.glamazon.com/cgi/adtrack/pager.cgi?site=glamazon&template=playboy.html.
[598] Jim McClellan, "The Tomorrow People."
[599] Jim McClellan, "The Tomorrow People."

suspension as a last resort, and while she waited for more advanced transhumanist technologies to eventuate, she worked on encryption projects, and used her body and unconventional lifestyle preferences to symbolise an extension of the freedom that she believed technology could generate.

Technology allowed Machado to model and sell online subscriptions of her semi-nude portrait photographs via her website *glamazon.com*. Perhaps not quite the epitome of the techno-rapture, but still very in keeping with the extropian reverence for self-determination and anarcho-capitalism. Machado liked to pose and provoke, but she was also an active extropian in the 1990s. She often contributed to online extropian discussions, and wrote extropianised parodies of Max Ehrmann's poem "Desiderata," and Shakespeare's canonical "Sonnet 18" ('Shall I compare thee to a summer's day?' — which became, "I could compare you to a summer day" and ended with, "You will shine, as a constant star, / When this poem is forgotten; most poems are").[600]

At the 1994 Alcor Life Extension Foundation meeting, Machado presented a paper titled, "Self-Transformation and Extreme Longevity," in which she explained that she, "became interested in the Extropians because I share their enthusiasm for the future of technology and society, and their distaste for irrationality and mysticism."[601] Along with Anders Sandberg, Sasha Chislenko and others, she also collaborated on an early transhumanist statement of values, called, "Transhuman Principles 1.0." These principles overlap with More's extropian principles and anticipated the development of "The Transhumanist Declaration" and "The Transhumanist FAQ" (described in the next chapter) by attempting:

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[600] Romana Machado, "Summer Sonnet," June 28, 1995, archived, January 17, 2001, accessed October 17, 2016, https://web.archive.org/web/20010117001400/http://www.fqa.com/romana/romanaworx/summer.html.
[601] Romana Machado, "Self-Transformation and Extreme Longevity," paper presented May 8, 1994, transcript accessed September 28, 2016, https://web.archive.org/web/20001204113000/http://www.fqa.com/romana/romanaworx/self.html.

> …to define a 'consensus platform' of Transhumanism that would allow us to see what ideas and goals we have in common as a group, and to present them to people trying to understand what this transhumanism is all about.[602]

The drafting of the "Transhuman Principles" was initiated by Alex Bokov in 1995 and began though an online chat between several members of the Transhuman mailing list, which continued into 1996. Natasha Vita-More joined as a collaborator in early 1996.[603]

Yet although she was involved in extropian culture in its formative years, Machado's place in transhumanist history is precarious. Her 90s era personal website *fqa.com* is now defunct, as is her repository of amateur soft-porn selfies housed at *glamazon.com*, rendering the character of Mistress Romana invisible to the casual Googler.[604] The one Machado meme that has survived is Regis' memorable portrait of her in his *Wired* article, "Meet the Extropians." Regis describes attending an 'extropaganza' party and makes note of Machado's playfully symbolic attire:

> Romana Machado—aka 'Mistress Romana'—software engineer, author, and hot-blooded capitalist, showed up dressed as the State, in a black vinyl bustier and mini, with a chain harness top, custom-made for her at Leather Masters in San Jose, California, for whom she does modelling work. She was in all that garb, carrying a light riding crop, plus a leash, at the other end of which, finally, her Extropian companion Geoff Dale, the Taxpayer, crawled along in mock subjugation. The couple embodied Extropian symbolism, the State being regarded as one of the major restrictive forces in the Milky Way galaxy. These people hate government, particularly 'entropic deathworkers like the Clinton administration.'[605]

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[602] Alexander Chislenko et al, "Transhuman Principles 1.0a – DRAFT 1.0," *Aleph*, accessed July 30, 2018, http://www.aleph.se/Trans/Cultural/Philosophy/Transhumanist_Principles.html.
[603] The archived transcripts of the discussions over drafting and editing the "Transhuman Principles" can be viewed here: *Lucifer*, accessed July 30, 2018, http://www.lucifer.com/~sasha/refs/Principles_Archive.html.
[604] Archived versions of Machado's websites can be viewed at: *Romana Machado World Headquarters*, archived February 22, 1997, https://web.archive.org/web/19970222085954/http://www.fqa.com:80/romana/; Glamazon.com, archived December 23, 1996, https://web.archive.org/web/19961223020244/http://www.glamazon.com:80/.
[605] Regis, "Meet the Extropians."

Fig. 14. Photograph of "Mistress" Romana Machado flanked by fellow partygoers at a Halloween party at the Exclave in 1996 (not the same party described in Regis' article). Photo appeared on *glamazon.com*. Image archived February 22, 1997.

In retrospect, such a meme, then all in fun, now seems to pose a significant PR problem for transhumanists. Despite their youthfully optimistic parties and wordplay, extropianism always had a serious and strongly academic side and, over time, in keeping with its principle of self-transformation, the handshakes and the outfits fell away. This is perhaps part of the reason that some former extropians and early transhumanists, who remain active transhumanists today, rarely mention Machado and her antics when reflecting on the early days of transhumanism.

As early as 1995, More disassociated himself with Machado and her image. McClellan, who interviewed both More and Machado for *The Observer* noted that, "when her name comes up, Max says he'd rather I didn't interview her, that she's more into self-promotion than Extropy."[606] In More's own words, "I think she thinks she's the Madonna

[606] McClellan, "The Tomorrow People."

of Extropianism."[607] On hearing this remark, an unphased Machado suggested, "How about the Camille Paglia of Extropy? I like that too. Maybe I'm a cross between Ayn Rand and Betty Page."[608]

What's in a name?

The extropians loved wordplay. Over the years, they amassed a growing list of neologisms that were printed in *Extropy* and shared enthusiastically online. Some of the more colourful terms of extropian invention include Mark Plus' "atheosis," defined as, "the process of recovering from belief in God,"[609] and "cryocrastinate,"[610] a term that described those who procrastinated over whether to make arrangements for cryonic suspension. Another lively term was Dave Krieger's "disasterbation,"[611] which was used to deride those who got off on spruiking the limits to growth and the inevitability of ecological collapse—a view famously expounded by the authors of the controversial 1972 book *The Limits to Growth*. Other terms that actually stuck include Max More's "morphological freedom"[612] and Mark Plus' "singularitarian."[613]

It is also no accident that together, More's extropian principles spell out the acronym BEST DO IT! (which became BEST DO IT SO! when the principle of *spontaneous order* was added in 1992).[614]

[607] McClellan, "The Tomorrow People."
[608] McClellan, "The Tomorrow People."
[609] Max More, ed., "Futique Neologisms 2," *Extropy* 8 (Winter 1991/92): 33.
[610] More, "Futique Neologisms 2," 33.
[611] Regis, "Meet the Extropians."
[612] Max More, ed., "Futique Neologisms 3," *Extropy* 9 (Summer 1992): 29.
[613] More "Futique Neologisms 2," 34.
[614] See: More, "The Extropian Principles v. 2.0," 5.

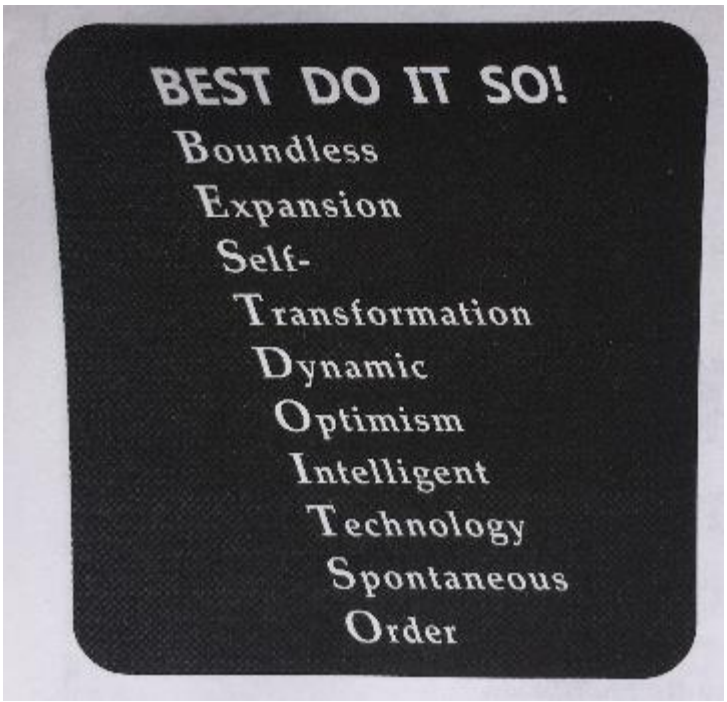

Fig. 15. Graphic of the extropian acronym BEST DO IT SO! in *Extropy* magazine, issue #11 (Summer/Fall 1993).

However, in keeping with the principle of *self-transformation*, extropians were particularly enthusiastic about creating new names for themselves—ones that symbolised their ultimate desire to use science and technology to redesign themselves from the inside out. As already noted, Max O'Connor became Max More, and Tom W. Bell became T. O. Morrow (sometimes spelled Tom Morrow). Announcing his name change in *Extropy* in 1990, More declared:

> I am no longer 'Max O'Connor.' I've changed my name to 'Max More' in order to remove the cultural links to Ireland (which connotes backwardness rather than future-orientation) and to reflect the extropian desire for MORE LIFE, MORE INTELLIGENCE, MORE FREEDOM.[615]

As More told Regis in 1994, his new name encapsulated his goal, to "always improve, never be static. I was going to get better at everything, becoming smarter, fitter, and

[615] More, "Editorial," (1990): 4.

healthier. It would be a constant reminder to keep moving forward."[616] As luck would have it, More only had to change half his name as he already had an ideal given name, bestowed by his mother as a symbol of greatness—literally. As he told Regis, "according to my mother I was named Max because I was the heaviest baby in the hospital ward where I was born."[617]

Regis went on to note that, "More's name change was the start of a trend among Extropians: Mark Potts became Mark Plus (sometimes Mark A. Plus, or Mark Aristos Plus); Harry Shapiro became Harry Hawk."[618] Two other extropians cited by More in a 1990 editorial went by MP-Infinity (original name unknown—possibly Mark Potts, Michael Price, or Mike Perry, most likely the latter) and Transinfinity Plus (Walter Vannini).[619]

Other notable transhumanists who have changed their names, in the tradition of FM-2030 and More, include: R. U. Sirius (born Ken Goffman); the male to female transgender transhumanists, Martine Rothblatt (formerly Martin Rothblatt) and Valkyrie Ice (formerly Lance McGill); the extropian Jay Prime Positive (born Jay Skeer); and Natasha Vita-More (born Nancie Clark).

In an *Extropy* essay from 1993, More commented at length on the extropian penchant for name changing, noting that, historically, changing names "has been a method for redefining and committing oneself to specific values." He cited the example of women adopting their husband's surname when they married to affirm the value of marriage and male primacy. He then noted that, in other instances, the adoption of a new name signals an explicit rejection of a culture, background, community or belief system. For the extropians, new names were both a rejection of old world ideals and an embrace of a

[616] Regis, "Meet the Extropians."
[617] Regis, "Meet the Extropians."
[618] Regis, "Meet the Extropians."
[619] More, "Editorial," (1990): 4.

new vision. In More's words, "Extropians have adopted new names, to project what *they value*, rather than retaining a label connecting them to an unchosen background."[620]

In the same essay, More also reflected that online usernames and alter-egos were becoming increasingly common, and honed in on the virtues of acting in a sphere where you were not immediately judged by your appearance or your name. He observed that women often choose male alter egos online to see if they will be treated differently, while adolescents can espouse their views without fear of being dismissed for their age, lack of experience, or pimply visage. In short, the web allows everyone to shed the subliminal signals generated by their external shells, which relegate humans into tribes. The online world, in its ideal form, creates a space where people can interact "free of sexist, racist or nationalist prejudice."[621]

As global and cosmically minded humans who abhorred nationalism, tribalism, and all constraints on human freedom, even those imposed by biology, extropians were thoroughly enthusiastic about the potential for self-transformation offered by digital and virtual worlds. Choosing a new name was simply the first big step *en route* to a more dynamic future of maximum freedom and radical self-transformation!

Experiments in applied silliness

In 1998, Tom Morrow wrote a post in which he suggested that extropians engage in some "experiments in applied silliness." He wrote that "laughter jiggles our faithful assumptions, shaking dogmas loose," and mused that humour could perhaps help protect extropianism from mutating into a dangerous ideology, for, "no truly dangerous ideology tolerates, much less encourages, its carriers to laugh about it." Morrow wisely mused that, "given our apparently extravagant (if ultimately justified) statements, we

[620] More, "Technological Self-transformation," 18.
[621] More, "Technological Self-transformation," 18.

will come off as mad if we do not see the humor (as well as potential tragedy) in the the Extropian condition."[622]

Eliezer Yudkowsky had a similar view, writing:

> A sense of humor, especially a sense of humor as pertains to your own cause, is the number one way to distinguish between the good fanatics and the bad fanatics. Once you lose the ability to laugh at yourself, it's all over.[623]

But when it came to the mission of keeping their sense of humour alive, the extropians had little to worry about. Ziana Astralos collated some of the best of their experiments in applied silliness on her website, *extrotech*. The extropians eagerly attempted to outdo each other with "how many extropians does it take to change a lightbulb?" jokes. Some of the best responses were Dave Krieger's, "Two: one to install a perpetu-bulb, and the other to blame the State for the crappy design of the first bulb;" and Mark Desilets', "One to come Forward, reach Upward, and pull the old bulb Outward." Yudkowsky's response to "how many Singularitarians does it take to change a lightbulb" is also worth quoting, as it is quite poignant, "None! The lightbulbs are brighter than we are."[624]

Several extropianised re-writes of Monty Python sketches were also penned, including a "Singularity Skit" by Martin Ling, based on Monty Pythons' Spanish Inquisition skits. It's quite good, so I include it below:

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[622] T. O. Morrow, "On the Importance of Silliness," February 1998, archived February 4, 1999, https://web.archive.org/web/19990204023706/http://members.aol.com:80/t0morrow/Silly.html.
[623] Eliezer Yudkowsky, quoted in, "Humor," by Ziana Astralos, *extrotech: Transhumanist/Extropian Central Home*, archived February 3, 2001, https://web.archive.org/web/20010203152800/http://www.anzwers.org:80/free/tech/humor.html/.
[624] See: Astralos, "Humor."

Reg: "*I* don't know! - Mr Wentworth just told me to come in here and say that there was trouble at the nanomill, that's all - I didn't expect a kind of Singularity!"

(JARRING CHORD. The door flies open. In come three Extropians.)

Extropian 1: "NOBODY expects the Singularity!"

Extropian 2: "Except us, that is. Our chief principle is perpetual progress."

Extropian 3: "...perpetual progress ...boundless expansion.... Our two principles are perpetual progress...and self-transformation.... Our *three* weapons are perpetual progress, and self-transformation, and intelligent technology...and open society.... Our *four*...no..."

(Reg and Lady Mountback look boredly at these loonies. They have obviously blown any chance at a dramatic entrance.)

Extropian 3: "*Amongst* our philos.... Hmf... Amongst our principles... are such elements as progress, self.... I'll come in again."

(They turn back and escape out into the hall, waiting again for their cue.)

Reg: "I didn't expect a kind of Singularity..."

(JARRING CHORD - They burst in again)

Extropian 1: "NOBODY expects the Singularity!"

...etc.[625]

Self-historicisation

Extropians and other early transhumanists also had a longstanding interest in self-historicisation. They seemed to have a feeling that what they were doing at the time was important and that one day people would want to know about it. The Extropy Institute included a brief history of extropian transhumanism on their "Frequently Asked

[625] See: Astralos, "Humor."

Questions" page (c.2002).[626] Natasha Vita-More also outlined some of the roots of transhumanism in *Create/Recreate* (1999), and shared a short excerpt from this text online in 1998, which was revised several times over the years.[627] She also wrote about the history of transhumanist arts in the extropian era.[628] Meanwhile, the roots of transhumanist thinking and short explanations and definitions of transhumanism and transhumanist subcultures were frequently discussed on transhumanist mailing lists. Considerable effort also went into compiling and editing the transhumanism *Wikipedia* page in the mid-2000s.[629]

However, transhumanists' aspirations to historicise their movements and cultures have at times exceeded their progress in these endeavours. In 2006, the Extropy Institute published their Strategic Plan for 2006-2009. One of their objectives was to build an online "'Library of Transhumanism, Extropy, and the Future.'" They planned to hire a researcher to "develop the library from ExI's fifteen year collection of materials," and house them on the ExI's website, which would become, "a meaningful place for people to go to learn about extropy and transhumanism."[630] The website is still live, but has not been updated for many years and contains little archival material.

In 1998, plans were also made to compile a Transhumanist Reader to be edited by Thom Quinn and Nick Bostrom. The plan was for the reader to present "a selection of central transhumanist texts… aimed at an academic/well-educated audience."[631] The proposed title in the call for papers was *The Philosophy of Transhumanism: A Reader*. Quinn and Bostrom kindly informed potential contributors that, "if this volume makes a profit and

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[626] Extropy Institute, "Frequently Asked Questions, v. 0.7."
[627] Natasha Vita-More, "Transhuman History," archived February 19, 2001, https://web.archive.org/web/20010219002108/http://www.transhuman.org:80/transhistory.htm.
[628] Natasha Vita-More, "Arts/Design of the Future: The History," archived June 21, 2016, https://web.archive.org/web/20060621181740/http://www.transhumanist.biz:80/history.htm.
[629] There are seventeen pages of archived discussions that can all be accessed from this main page. See: *Wikipedia*, "Talk:Transhumanism," last edited August 8, 2018, https://en.wikipedia.org/wiki/Talk:Transhumanism.
[630] Natasha Vita-More, "Strategic Plan 2006," *Extropy Institute*, January 1, 2006 – July 1, 2006, archived August 10, 2007, https://web.archive.org/web/20070810033652/http://www.extropy.org/ExI%20Strategic%20Plan.pdf.
[631] Nick Bostrom and David Pearce, "Updates," *World Transhumanist Association*, October 10, 1998, archived April 16, 2000, https://web.archive.org/web/20000416054327/http://www.transhumanism.com:80/updates/update2.htm.

we are very certain it will, the total sum will be evenly distributed among all contributors."[632] But this reader never materialised. The first project of its kind was spearheaded by Max More and Natasha Vita-More and was not released until 2013.

As major archival efforts like the Library of Transhumanism never got off the ground, there are currently no accessible sources that readers can turn to to learn about the history of extropianism, or to find references to major primary sources from the period. Sadly, the many shades of extropian culture are not easily gleaned from a quick Google search and print issues of *Extropy* float nebulously around in private collections where they are not readily accessible. Some digital archives of *Extropy* magazine do exist, though the collection is not complete.[633] In the last year or two, however, some sources from this period have been more widely shared.

In 2017, links to digital copies of *Extropy* were added to *H+Pedia* by the transhumanist Chris Monteiro (posting as Deku-shrub).[634] Monteiro also posted about the revival of the *Extropy* archives on the popular *Less Wrong* community blog, founded by Eliezer Yudkowsky, which grew out of Robin Hanson's blog *Overcoming Bias* (which was principally contributed to in former years by Yudkowsky and Hanson). Both Yudkowsky and Hanson are now extremely popular figures in the overlapping rationalist, effective altruist and transhumanist communities and, as Monteiro suggests, fans may be interested in looking up the *Extropy* archives to read what we might call their 'juvenilia.'[635]

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[632] Thom Quinn and Nick Bostrom, "Call for Papers, The Philosopy of Transhumanism: A Reader," *World Transhumanist Association*, archived December 5, 1998, https://web.archive.org/web/19981205092827/http://www.transhumanist.com:80/call.htm.
[633] Partial *Extropy* archives were uploaded by Giulio Prisco to GitHub and can be viewed at: "Extropians/Extropy," June 23, 2017, https://github.com/Extropians/Extropy/. They have also been archived by Ben Lipkowitz at the following location: "Index of/irc/extropy," accessed November 13, 2018, http://fennetic.net/irc/extropy/.
[634] *H+Pedia*, "Extropy Magazines," last edited March 31, 2018, https://hpluspedia.org/wiki/Extropy_Magazines.
[635] Chris Monteiro (Deku-shrub), "Rescuing the Extropy Magazine archives," *Less Wrong*, July 2, 2017, https://www.lesswrong.com/posts/gxouYfj9jJLTzhmkM/rescuing-the-extropy-magazine-archives.

In a few still extant corners of the web, a number of former extropians have also discussed the possibility that their 90s era chat logs may be retrospectively considered to be important historical documents. They have mused that these archives may have particular value, as they chronicle part of the genesis and evolution of what may eventually be seen as part of a game-changing philosophical and social revolution in human history.

Giulio Prisco credits fellow transhumanist Michael La Torra with the remark, "the Extropy archives will indeed be a goldmine for future historians."[636] The cryptographer, game developer, and extropian, Hal Finney, also wrote in 2006 that the extropian chat logs should be preserved, as "it's possible that someday this material will be seen as representing the birth of ideas which turn out to be key to the further development of humanity."[637] Prisco, Bryan Bishop and Wei Dai have all been involved in compiling and preserving the old extropy mailing list archives so that future generations may continue to access them.[638]

The extropians are definitely right about the historical value of the archives. Historians other than myself will eventually start to mine these sources to help bring more aspects of this vibrant moment in history back to life. Whether extropianism will one day be seen as key to the further development of humanity remains to be seen. For now, I have begun the task of gathering and collating many lost extropian materials in the hope of showing that, in the history of transhumanist thought, there is more to the story than has so far been brought to light.

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[636] Guilio Prisco, "The Extropian Roots of Bitcoin," *Cryptocoins News*, accessed October 5, 2016, https://www.cryptocoinsnews.com/extropian-roots-bitcoin/.

[637] Hal Finney, May 4, 2006 (03:20:53 UTC), comment on announcement of Extropy Institute's closure, "ANNCOUCE: Extropy Institute's Future," *extropy-chat*, October 5, 2016, http://lists.extropy.org/pipermail/extropy-chat/2006-May/026658.html.

[638] Some of the archives can be viewed at: Wei Dai, "Index of /exi-lists," accessed November 13, 2018, http://extropians.weidai.com/. See also: Bryan Bishop, "Index of /~bryan/irc/extropians," accessed November 13, 2018, http://diyhpl.us/~bryan/irc/extropians/.

Extropianism evolves

In order to handle growing subscription numbers and increasing print costs, *Extropy* migrated online in 1997, where it became *Extropy Online* for the next three years. The magazine was then put on hold for a year, before returning online in February 2002 as *Extropy: Journal of Transhumanist Solutions*.[639]

Although the momentum generated by the extropian movement increased throughout the 1990s, it began to wane in the new millennium. By 2006, the last vestiges of a formally extropian era came to an end when the Extropy Institute shut up shop, declaring that their mission had been "essentially completed."[640] Meanwhile, as the extro-brand dissolved, the transhumanist ideas and the publicity that the extropians garnered helped pave the way for what followed. As transhumanist pioneers, the extropians did what no one else had done before them: they organised themselves into an official transhumanist movement with a central philosophy that they spread as a cultural meme.

A major extropian intention, as Regis reported in 1994, was to challenge "culturally entrenched notions about the inherent limitations of humankind," which, as Regis remarks, "they did."[641] Though he also mused that, "it cannot be said that the Extropians are taking the world by storm."[642] And they never did. The influence of extropianism grew, but it was always a marginal movement with its largest member base localised in California and the US. While a few prominent extro-affiliates, like Moravec, Minsky, and Kurzweil, may have exerted disproportional influence on the world and helped shape the public perception of transhumanism and transhumanist technologies, the official extropian movement never managed to garner the political clout to match its leaders' transcendent aspirations.

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[639] *Extropy: Journal of Transhumanist Solutions*, "Home," archived August 3, 2003, accessed October 8, 2016, https://web.archive.org/web/20030803040633/http://www.extropy.org/ideas/journal/index.html.
[640] Natasha Vita-More, "Next Steps: Extropy institute is closing its doors and opening a window for a proactive future," *Extropy Institute*, accessed November 3, 2016, http://www.extropy.org/future.htm.
[641] Regis, "Meet the Extropians."
[642] Regis, "Meet the Extropians."

But extropianism didn't die, it evolved, and many of its "crucial elements [are] shared by all extant forms of transhumanism."[643] Ultimately, extropianism laid the groundwork for subsequent transhumanist organisations and philosophies to emerge, the most prominent being more politically savvy, influential, and democratically oriented, though they retain the same basic philosophy, which affirms the desirability of continued human and transhuman evolution and technological self-betterment.

Although a new cadre of rising transhumanist-leaning academics and spokespeople has emerged from the ashes of the extro-era, including Nick Bostrom, Anders Sandberg, Robin Hanson and Eliezer Yudkowsky, leading extropians like More and Vita-More are still active in business, the arts, academia, and in the public dissemination of transhumanist ideas. Yet the extropian power couple's uniquely extropian ideas have been gradually tempered and are now more aligned with the more moderate, democratic branches of transhumanist culture that succeeded it. These days, Max More is most likely to be seen promoting generally accepted transhumanist ideals, like life-extension, rather than arguing publicly for a transhumanist future that encompasses liberation from the State—a scenario that few non-extropians take seriously.

The exception is Tom Bell, who is now a professor at Chapman University School of Law in California. Bell does not appear to be particularly active in modern transhumanist movements and has long since ditched the extropian moniker T. O. Morrow. However, his libertarian political leanings remain as overt as ever. He has written extensively as an academic about copyright, free speech, and prediction markets, and has been a public advocate of seasteading—the idea of setting up sovereign communities on the ocean, which he championed in *Extropy* in the early 90s. The idea attracted a new wave of support in 2008, when Peter Thiel invested $500,000 in the initiative, though the momentum of the project has since waned.[644]

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[643] More, "The Philosophy of Transhumanism."
[644] Kyle Denuccio, "Silicon Valley is Letting Go of its Techie Island Fantasies," *Wired*, May 16, 2015, https://www.wired.com/2015/05/silicon-valley-letting-go-techie-island-fantasies/.

Romana Machado is a developer and glamazon no longer. She has since turned her hand to working as a real estate agent in the San Francisco Bay area and has web-blogged her post-facelift recovery on YouTube.[645] None of the extropians have thus far avoided ageing. Natasha Vita-More has had cancer twice,[646] and at least three significant extro-era humans have died. Sasha Chislenko committed suicide in 2000, Hal Finney died from ALS in 2014 and was cryopreserved, and Marvin Minsky passed away from a cerebral hemorrhage in 2016. It is not known if he was cryonically suspended.[647] The rest of the main extros are alive and all roughly three decades older than they were when they began their transhumanist journeys. They remain mortal—for now.

[645] See: Romana Machado, "Capture 20130522," *Youtube*, May 29, 2013, https://www.youtube.com/watch?v=DIdB8hSGRkQ.

[646] Natasha Vita-More, "Life Expansion: Toward and Artistic, Design-Based Theory of the Transhuman/Posthuman," PhD Dissertation, University of Plymouth, 2012, 242.

[647] It is known that Minsky made arrangements for cryonic suspension in 1997. However, in an official statement that referred to their privacy policy, the Alcor Life Extension Foundation declared: "Alcor neither confirms nor denies whether Prof. Minsky had such arrangements [for cryopreservation]." See: Admin, "Official Alcor Statement Concerning Marvin Minsky," *Alcor News*, January 27, 2016, http://www.alcor.org/blog/official-alcor-statement-concerning-marvin-minsky/.

8. The Democratic Turn

> *Becoming more than human can improve all our lives, but only new forms of transhuman citizenship and democracy will make us freer, more equal and more united.*
>
> — James Hughes, *Citizen Cyborg* (2004)

As the momentum of the extropian movement declined, a new and more inclusive branch of organised transhumanism emerged and began to flourish. This branch has been associated with the ideology of *democratic transhumanism*, a retrospective classification that is often used to describe a transhumanist worldview that promotes the embrace of "transhuman technologies while proposing democratic ways to manage them and reduce their risks."[648] The historical periodisation of an extropian era, followed by a democratic turn, is my own, though it broadly reflects the way that others like Hughes have characterised these periods in transhumanist history.

Libertarian ideals have remained very strong in transhumanist culture in the twenty-first century, however, a subtle shift in emphasis took place around the turn of the century as many leading transhumanists moved away from its most extreme and anarchic forms. They began to consider how the State might play important roles in funding and promoting transhumanist technologies, while regulating them to the minimum extent necessary to prevent global catastrophic risks.

As with most evolutionary transitions, the changes described in this chapter are gradual and mark a cumulative shift in emphasis rather than an immediate metamorphosis of kind. Almost all of the core ideals developed by More in "The Principles of Extropy" continued to be cited as prominent transhumanist concerns in the new millennium. However, the explicit libertarian sentiments of extropianism were dropped from the new formal principles, and More's original principles were developed further and

[648] Hughes, *Citizen Cyborg*, introduction.

imbued with a greater focus on regulation, human rights, equal access and risk mitigation.

Throughout this chapter, we see how the slow decline of extropianism overlapped with the gradual rise of a new transhumanist culture at the dawn of the new millennium. Two rising transhumanist figures, Nick Bostrom, and James Hughes, had a particularly profound impact on the development of transhumanist culture in this period. Both thinkers were instrumental in helping to democratise and promote the new transhumanist brand.

The World Transhumanist Association (WTA)

Throughout the first decade of the twenty-first century, organised transhumanism became an increasingly international movement. While extropianism had its roots in California and its largest member base in the US, the next major transhumanist organisation, The World Transhumanist Association (WTA), was founded in the UK in 1998, by the English philosopher David Pearce, and the Swedish philosopher Nick Bostrom.[649] The WTA was incorporated as a non-profit in 2002,[650] and by mid-decade the organisation had > 3,000 members and had spawned chapters with regular meetings in: Italy, the Netherlands, Germany, Sweden, the UK, Belgium, Hungary, Greece, Russia, China, Israel, Nigeria, Somalia, Argentina, Mexico, and Venezuela, as well as Canada and the USA.[651]

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[649] 1998 is widely cited as the year that the WTA was founded, including by Bostrom in "A History of Transhumanist Thought." The WTA website also cites 1998 as the year the organization was founded. See: *World Transhumanist Association*, "Where Did the WTA Come From?" archived Feb 07, 2007, https://web.archive.org/web/20070207102218/http://transhumanism.org:80/index.php/WTA/about/. However, in an essay from 1997, titled, "Predictions from Philosophy?: How philosophers could make themselves useful," Bostrom stated: "The World Transhumanist Association was founded in 1997." See: https://web.archive.org/web/20000817094452/https://www.hedweb.com/nickb/predict.htm. Bostrom likely wrote the above quote in anticipation of officially founding the WTA later in 1997, though by most other accounts the organisation was officially founded in 1998.
[650] *World Transhumanist Association*, "Where Did the WTA Come From?"
[651] *World Transhumanist Association*, "WTA Chapters Around The World," archived June 20, 2006, http://web.archive.org/web/20060620034312/http://transhumanism.org/index.php/WTA/groups/.

The rising group of European, democratically oriented transhumanist leaders emerged in part from within the existing pockets of online extropian culture. They "remained on good terms"[652] with extropians like Max More and Natasha Vita-More, who retained their status as leading transhumanist thinkers during this period. However, with new blood, and new transhumanist collaborations afoot, the collective philosophy of transhumanism became more nuanced, politically savvy, and influential.

As Bostrom relays, the WTA was created "to provide a general organizational basis for all transhumanist groups and interests, across the political spectrum."[653] It was also designed to help develop "transhumanism as a serious academic discipline" and aimed to promote the "public awareness of transhumanist thinking."[654] While other transhumanist groups like Aleph also emerged in the 1990s, the WTA slowly picked up where extropianism tapered off, becoming the most prominent transhumanist brand and institution of the 2000s.

Pearce meets Bostrom

Nick Bostrom was still a graduate student at the London School of Economics (LSE) when he first encountered David Pearce in the mid-1990s. Pearce recalls that the pair first corresponded when Bostrom emailed him, "some astute objections to the abolitionist manifesto [Pearce had] uploaded" to his personal website.[655] Bostrom went on to convince Pearce that he was really a transhumanist (a label he had not yet donned), while Pearce encouraged Bostrom to create a website of his own, and predicted that his new friend "would be the world's first professor of Transhumanism."[656]

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[652] Hughes, *Citizen Cyborg*, ch.10.
[653] Bostrom, "A History of Transhumanist Thought," 12.
[654] Bostrom, "The Transhumanist FAQ v. 2.1," 42.
[655] Pearce's concept of abolitionism has nothing to do with slavery. It is a philosophical position outlined in "The Hedonistic Imperative," which has utilitarian foundations. The hedonistic imperative advocates the long-term, technologically driven project of eliminating all forms of pain and suffering. See: Pearce, "The Hedonistic Imperative."
[656] Andrés Lomeña, "Interview With Nick Bostrom and David Pearce," December 2007, https://www.hedweb.com/transhumanism/index.html.

Bostrom recalls that when they met, "Dave had formed the impression that I was some kind of big shot professor, and he was probably disappointed when it turned out I was just a lowly grad student." But if Pearce was disappointed, the feeling was likely fleeting, as he promptly went on to include Bostrom in his online diary with the approving tagline, "a truth-hound in search of epistemic truffles."[657] The two swiftly became friends and colleagues, and together they founded an organisation that went on to change the face of the transhumanist movement in the new millennium.

Who is this Nick Bostrom anyway?

Nick Bostrom is a man of many talents. In the biographical section of his website (c. 2000), he introduced himself by responding to the question above, "Who is this Nick Bostrom anyway?" His own words best exemplify who he was at this time: a young, earnest, exceptionally high achieving polymath and Ph.D. candidate at LSE. As he noted on his website:

> My academic background is in physics, computational neuroscience, mathematical logic, philosophy, AI and some psychology. In my undergraduate days I was doing three full-time programs and one half-time program simultaneously, being concurrently enrolled at two universities. To the best of my knowledge this is a Swedish record. (My home page obeys the aesthetic of *understated modesty*.)[658]

Modesty aside, Bostrom's undertakings were impressive. In his CV of 2000, he remarked that his rigorous studies in the fields cited above were undertaken as part of his "aspiration to become a leading intellectual figure."[659] This proved to be a realistic goal. Bostrom has since become a bestselling author and renowned intellectual authority on

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[657] Lomeña, "Interview With Nick Bostrom and David Pearce."
[658] Nick Bostrom, "Nick Bostrom's Home Page," *hedweb*, archived August 17, 2000, http://web.archive.org/web/20000817094410/http://www.hedweb.com/nickb/welcome.htm.
[659] Nick Bostrom, "Curriculum Vitae," *hedweb*, archived August 29, 2000, http://web.archive.org/web/20000829134840/http://www.hedweb.com/nickb/nick/cv.htm.

transhumanism, artificial intelligence and existential risks. In 2009, he was listed as one of *Foreign Policy's* Top 100 Global Thinkers.[660]

But before becoming a leading academic, the Bostrom of the early twenty-first century had other, more modest milestones on his mind. On his website (c. 2000) he announced with a sigh of relief, "I submitted my doctoral dissertation on June 15th. Phew!"[661] He also noted that he had secured a job lecturing at Yale for the coming semester, and reflected on his side projects and interests at the time, writing:

> I'm becoming slightly interested in stock investing again, something I haven't been doing since primary school... Return to childhood could signal the onslaught of old age. I had my 27th birthday in March. (How old did you say Mozart was when he died?) I'm keeping a weary lookout for the signs of approaching decrepitude. Meanwhile, I shall eat my vitamins and try to make sure I stay cool.[662]

There is certainly an echo of extropian irreverence in this self-characterisation. While the passages above exhibit a mode of expression that few would associate with Bostrom today, much of the text on his original website was deliberately playful. Meanwhile, he was clearly thinking about the evolution of his image from the beginning of his career, noting as an aside, "one day I should try to make this introduction less egomaniac and less mad-scientist. More personal and humane."[663]

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[660] Slate Group, LLC, "Introducing FP's 100 Top Global Thinkers," *Foreign Policy Special Issue* 176 (December 2009): 71, https://www-jstor-org.simsrad.net.ocs.mq.edu.au/stable/20684954.
[661] Bostrom, "Nick Bostrom's Home Page," August 17, 2000.
[662] Bostrom, "Nick Bostrom's Home Page," August 17, 2000.
[663] Bostrom, "Nick Bostrom's Home Page," August 17, 2000.

Fig. 16. Photograph of Nick Bostrom on a beach holding a ball. Image appeared on Bostrom's personal website c.2000 alongside the caption "the ball is in our hands."

To help us contextualise this young and little known Bostrom in his twenties, let's wind the clock back to his earlier years. Niklas Boström was born on March 10, 1973, "in Helsingborg, Sweden, and grew up by the seashore." Of his youth, he notes:

> I was bored in school. At age fifteen or sixteen I had an intellectual awakening, and feeling that I had wasted the first one and a half decades of my life, I resolved to focus on what was important. Since I did not know what was important, and I did not know how to find out, I decided to start by trying to place myself in a better position to find out. So I began a project of intellectual self-development, which I pursued with great intensity for the next one and a half decades.[664]

Bostrom's self-development project took some different turns to Max More's, beginning with a very broad and rigorous study program. However, Bostrom's intense interest in self-development is a notable preoccupation of many transhumanists and it is worth highlighting. His studies and self-development pursuits also extended far beyond the realms of his formal education; he also dabbled in painting, poetry, playwriting and standup comedy.

[664] Nick Bostrom, "Nick Bostrom's Home Page: Background," last updated October 2018, http://www.nickbostrom.com/.

The young Bostrom reportedly "hated school, and as a teenager he developed a listless, romantic persona." In *The New Yorker*, Raffi Khatchadourian describes a formative moment in Bostrom's intellectual awakening, writing:

> In 1989, he wandered into a library and stumbled onto an anthology of nineteenth-century German philosophy, containing works by Nietzsche and Schopenhauer. He read it in a nearby forest, in a clearing that he often visited to think and to write poetry, and experienced a euphoric insight into the possibilities of learning and achievement.

Bostrom went on to pursue learning with zeal, driven "not only by curiosity but also by a desire for actionable knowledge about how to live."[665] Yet, with a drive far exceeding institutional expectations, not everyone was impressed. During his undergraduate years at Umeå University in 1992, Bostrom was actually "expelled for studying too much." This occurred, as Bostrom recalls:

> … [after the head of the] psychology department discovered that I was concurrently following several other full-time programs of study (physics, philosophy, and mathematical logic), which he believed to be psychologically impossible.[666]

Impossible it was not. Between 1992 and 1994, Bostrom completed a B.A. from the University of Gothenburg, Sweden, in philosophy, mathematics, mathematical logic and artificial intelligence, while taking other courses at Umeå. While completing his doctoral dissertation at LSE, Bostrom simultaneously took classes at King's College, University of London, in astrophysics and general relativity. In 1996, he discovered extropianism and became an active extro-chat contributor.[667]

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[665] Raffi Khatchadourian, "The Doomsday Invention: Will artificial intelligence bring us utopia or destruction?" *The New Yorker*, November 23, 2015, https://www.newyorker.com/magazine/2015/11/23/doomsday-invention-artificial-intelligence-nick-bostrom.
[666] Bostrom, "Nick Bostrom's Home Page: Background."
[667] Khatchadourian, "The Doomsday Invention."

In 1998, Bostrom remarked, "I am spending most of my time thinking or building up my arsenal of knowledge and understanding in several fields. I want to be cutting-edge."[668] But he was not only thinking, Bostrom was also doing—again, acting in accordance with the common transhumanist belief that the future will not simply unfold in a satisfactory manner, it is up to individuals and groups to take the reins and bring the most desirable outcomes into being.

Fig. 17. Portrait photograph of Nick Bostrom. Image appeared on Bostrom's personal website c.2002 alongside the caption "looking very serious now… Welcome!"

In a move reminiscent of More and Morrow's founding of *Extropy* mag as postgrads, Bostrom co-founded a major new transhumanist organisation while still a Ph.D. candidate. The WTA soon took on a leading role in transhumanist research, networking, and the dissemination of transhumanist ideas.

[668] Nick Bostrom, "Nick Bostrom's Home Page," archived December 2, 1998, accessed December 1, 2016, http://web.archive.org/web/19981202180055/http://www.hedweb.com/nickb/welcome.htm.

The early days of the WTA

From the first, the WTA's founders aimed to garner broader public appeal and stronger academic credibility than the extropians had managed to achieve. As Bostrom wrote, a major objective of the WTA was:

> … to develop a more mature and academically respectable form of transhumanism, freed from the 'cultishness' which, at least in the eyes of some critics, had afflicted some of its earlier convocations.[669]

Yet in its earliest days, the WTA was a less than slick experiment: basically a website, lots of links, and more than a few borrowed ideas from the extropians. According to Bostrom, the WTA was "a very loosely and informally organized structure"[670] until James Hughes came on board as Secretary in 2001, at which point the group became more organised and began to expand. David Pearce has confirmed that Hughes' involvement was transformative, noting that "the WTA entered its period of explosive growth only after the formidable bioethicist James Hughes agreed to become Secretary."[671]

After Hughes joined the organisation, the WTA's internal political procedures began to model their developing ideal of a more open-minded and democratically oriented transhumanist culture. The group composed a constitution in 2001 and was run thereafter, "by an executive board that is democratically elected by its full membership."[672]

Hughes' democratic vision

James Hughes is the most prominent advocate of what he calls *democratic transhumanism*. Hughes' personal vision of this ideal is more detailed and explicitly left-

[669] Bostrom, "A History of Transhumanist Thought," 12.
[670] Bostrom, "A History of Transhumanist Thought," 13.
[671] Lomeña, "Interview With Nick Bostrom and David Pearce."
[672] Bostrom, "The Transhumanist FAQ v. 2.1," 42.

leaning than the general definition offered at the beginning of this chapter, which many transhumanists broadly support. As outlined in his 2004 book, *Citizen Cyborg*, Hughes' vision adds a socialist gloss to a more broadly civil libertarian transhumanist ethos, combining an emphasis on morphological freedom and the right to human enhancement, with the belief that the State should regulate and ensure equal access to transhumanist technologies.

Hughes believes that "technologies that push the boundaries of humanness, can radically improve our quality of life and that we have a fundamental right to use them to control our bodies and minds." This position is basically congruent with the values of civil libertarians, who accept the existence of some form of government, but argue for the minimum intervention necessary regarding their civil rights. However, Hughes adds the caveat that, "to ensure these benefits we need to democratically regulate these technologies and make them equally available in free societies."[673] On this point, many libertarian thinkers disagree.

Hughes' emphasis on the importance of *some* government regulation overlaps with the core sentiments of Bostrom and many others, who believe that governments can, and should, play a role in helping to mitigate the global catastrophic risks posed by emerging technologies. However, Hughes' emphasis on the equal distribution of the benefits of emerging technologies runs counter to the grain of many transhumanists' sensibilities. A number of transhumanists (including those willing to give democratic governments the time of day) believe that the free market generally does a *better* job of 'naturally selecting' the best technologies, which are initially adopted by the wealthy, and as they are refined, become cheaper and more readily available.[674]

Transhumanists tend to acknowledge that richer people might very well have access to lifesaving medicines or coveted enhancement technologies before the poor, and that

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[673] Hughes, *Citizen Cyborg*, introduction.
[674] See: Simon Young, *Designer Evolution: A Transhumanist Manifesto* (New York: Prometheus Books, 2006), kindle, ch.4; Brin, "Comment by David Brin: Singularities,"; Sasha Chislenko, "Comment by Alexander Chislenko: Singularity as a Process, and the Future Beyond," in *The Transhumanist Reader*, ch.37.

more wealthy lives might ultimately be saved. However, they generally consider this initial degree of inequality to be acceptable on utilitarian grounds. Transhumanists tend to bet that more lives will be saved in the long run than if governments ban, or stringently regulate, technologies, and hamper their natural development process—in which the rich, and the early adopters are often the guinea pigs of an innovation that initially doesn't work all that well.[675]

Hughes acknowledges that this divergence of opinion does not stem from fundamentally different attitudes about human wellbeing, but from differing political ideals about how to achieve a similar outcome. He notes that democratic and libertarian transhumanists basically agree "that everyone should have an 'equal opportunity' in life, but disagree that redistribution or social services are required in order to guarantee equal opportunity." While egalitarians believe "that democracy is required to control for the tendency of power and resources to accumulate to people with advantages," libertarians think "that markets level out advantages more effectively than governments."[676]

Unlike many of his transhumanist colleagues, Hughes also argues that transhumanist technologies should be integrated into society at a pace with which its citizens can cope, even if that means waiting much longer for their benefits. With a nod to Alvin Toffler, he expressed the view that the development of many technologies should be actively *slowed* by government regulation in order to avoid widespread 'future shock'—a situation in which a large mass of citizens are displaced and react in hostile ways to a revolution that hits faster than society can recalibrate. In Hughes' view, the State should play a leading role in ensuring that its citizens do not "feel they are being steamrolled by the future."[677]

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[675] A version of this position is posited in the collective document, "The Transhumanist FAQ v. 2.1," 20-21. See also: Kurzweil, *The Singularity is Near*, ch.9; Sandberg, "Morphological Freedom."
[676] Hughes, *Citizen Cyborg*, ch.11.
[677] Hughes, *Citizen Cyborg*, ch.6.

Meet James Hughes

James J. Hughes was born in Columbus, Chicago on May 27th, 1961. He has a B.A. in Sociology and Anthropology from Oberlin College, Ohio (1983), and an M.A. (1988) and Ph.D. (1994) in Sociology from the University of Chicago. Hughes' undergraduate thesis had a religious focus and investigated, "Prayer and Power: Altered States of Consciousness and Social Structure in the Pentecostal Church." However, his postgraduate research took a turn into the realm of medical ethics, as he investigated approaches to obstetrics, pediatrics, geriatrics and the division of labour in hospitals.

Figs. 18 & 19. Portrait photograph of James Hughes, and transhumanist artist Lilia Morales' "Fractalization of Dr. J." Both images appear on an archived version of Hughes' personal website. Archived February 5, 2005.

Between 1980-82, Hughes taught Buddhist Meditation and Philosophy at Oberlin College. He also tutored in introductory Sociology, and worked as a research design assistant and statistical consultant. Hughes' principal "ambition in his early twenties was

to become a scholar of Buddhist political thought." However, he notes that, "after a stint as a Buddhist monk and exegete of Buddhist scriptures... this ambition was thwarted by a lack of talent in Sanskrit, Pali and Japanese."[678] Describing his intellectual development in his student years, Hughes wrote:

> In the 1980s, like a lot of Progressive Buddhists, I was drawn to the alleged pagan-Buddhist syncretism of deep ecology and I was excited by the emergence of the European Green parties as the vehicle of this new spiritual politics.[679]

However, his formative enthusiasm for a kind of ecological spiritualism was gradually tempered as he, "came to realize that deep ecology was profoundly un-Buddhist and anti-humanist." Taking cues from the contemporary Buddhist philosopher, John McClellan, Hughes' outlook evolved over the years into one that:

> … doesn't partition the world into natural (ecosystems) and unnatural (technology), but embraces both nature and technology as expressions of the evolutionary process.[680]

By the mid-1990s, Hughes had garnered extensive experience as a lecturer and researcher in Sociology, with particular emphasis on medical ethics. Throughout the 90s, his Buddhist and transhumanist interests were jointly informing his research, as evidenced by his papers: "Brain Death and Technological Change: Personal Identity, Neural Prostheses and Uploading"; "Buddhism and Abortion"; "Buddhism and BioEthics: A Bibliographical Introduction"; and "Embracing Change With All Four Arms: A Post-Humanist Defence of Genetic Engineering." His book, *Citizen Cyborg*, was also one of the first major book length publications by a transhumanist, and was one of the first texts to accessibly explain the core philosophical outlooks and formal evolution of transhumanism up to 2004.

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[678] James J. Hughes, "Homepage: The Long Version," archived Feb 5, 2005, http://web.archive.org/web/20050205174234/http://www.changesurfer.com/Hughes.html.
[679] Hughes, *Citizen Cyborg*, ch.8.
[680] Hughes, *Citizen Cyborg*, ch.8.

The rise of James Hughes as a prominent twenty-first century transhumanist occurred at the beginning of an era of greater democratic engagement in the transhumanist community—an ethos that Hughes played a major role in cultivating. His rise also signalled the beginning of an era in which transhumanist thought leaders could be overtly spiritual, a concept that had not sat well with extropians to date.

Divergences from extropianism

Hughes has characterised the WTA and the extropians in contrasting terms, noting that, "while the Extropians took new names and believed that technology was advancing so quickly that a total break with the social order was imminent," the WTA sought to advance transhumanist agendas by more conventional means. They did so by focusing "on mainstreaming the transhumanist project, [and] connecting it to the scientific and intellectual debates of the day."[681]

In the early twenty-first century, many of the most prominent debates of the day were bioethical. The potential of embryonic stem cell research and human reproductive and therapeutic cloning polarised society, especially in America, and transhumanists became particularly politically engaged in the public and political fight for proactive research and morphological freedom.

In this climate of heated political controversy, Hughes was often critical of the less pragmatic and politically savvy extropians. He took umbrage with statements made by the extropian Greg Burch, who proclaimed that extropians', "basic values of individual autonomy are fundamentally incompatible with the kinds of limitations desired by Guardians of both culturally conservative and 'progressive' tendencies." Hughes interpreted this statement as Burch declaring that, "transhumanists were politically encircled by religious fundamentalists, Greens and socialists."[682] He worried that this

[681] Hughes, "The Politics of Transhumanism and the Techno-Millennial Imagination," 763.
[682] Hughes, *Citizen Cyborg*, ch.10.

was true, largely because Burch and others insisted on promoting such exclusive and polarising rhetoric.

In Hughes' view, divisive rhetoric was not the way forward. Honing in on the cleavages between democratic and libertarian values, he commented:

> While Burch and the extropians argue that they are fighting to save the Enlightenment, in fact they are fighting to extol only one-third of the Enlightenment—liberty—to the exclusion of the other two-thirds of equality and solidarity. In the process they have crippled their ability to defend all three values. Insisting that reason can only be expressed in market relations and not in rational civic debate and democratic self-governance leaves the anarcho-capitalist transhumanists self-absorbed and alienated from serious political engagement, unable to respond to either the public's legitimate or illegitimate anxieties about the future.[683]

Unlike most extropians, Hughes believed that technology and democracy were intrinsically self-reinforcing. More democracy generates more and safer technologies, which beget more collective intelligence, better decisions, and improved democratic governance. In his view, technology would never supplant democracy as the chief means of global improvement, as many extropians hoped. Meanwhile, he affirmed that dismissing the concerns of large proportions of citizens, whether or not their concerns were legitimate, could be very dangerous. Hughes was profoundly concerned that rhetoric like Burch's could ultimately condemn transhumanism to the political and philosophical fringe in perpetuity.

More's dynamic transformation

As the WTA blossomed to become the dominant transhumanist culture of the new millennium, the positions of some leading extropians shifted closer to the more pragmatic and inclusive ethos promoted by leaders of the WTA. Max More is a notable example. As an academic philosopher, More shared Bostrom's and Hughes' desire to legitimise transhumanist research projects within academia. In the first decade of the

[683] Hughes, *Citizen Cyborg*, ch.10.

new millennium, More appeared to recognise that greater political pragmatism could help further the growth of the transhumanist movement; a goal he had always desired.

This evolution in More's sensibilities has been observed several times. In 2005, Bostrom noted that, "originally, extropianism had a clear libertarian flavor, but in later years More has distanced himself from this ingredient."[684] Sirius and Cornell also note that More, "lent his strong libertarian and actualist influences to the early days of the [transhumanist] movement, but seems to have moderated those views somewhat since then."[685] Hughes has chronicled this shift in greater detail in *Citizen Cyborg*, where he writes:

> Responding to these various trends, and presumably to his own philosophical maturation, More revamped his [extropian] principles in 2000 to a less libertarian Version 3.0. In this latest version More sets aside his earlier, anarcho-capitalist 'Spontaneous Order' for the much more moderately libertarian 'Open Society'... More now insists that extropianism is not libertarian and is compatible with a number of different types of liberal 'open societies,' just not with theocratic, authoritarian or totalitarian societies. In the extensive accompanying commentary on his new principles More even more explicitly departs from the elitist, Randian position of enlightened selfishness and argues for both a consistent rule of law and civic responsibility.[686]

Hughes supports this final point with a direct quote from More, taken from "The Extropian Principles, Version 3.0: A Transhumanist Declaration," (2000) which reads:

> For individuals and societies to flourish, liberty must come with personal responsibility. The demand for freedom without responsibility is an adolescent's demand for license.[687]

As he began to distance himself from anarchic libertarianism, More also followed the WTA's lead by focusing more on the risks posed by emerging technologies. On his personal website (c.2010), he stated in his bio that he "is concerned that our rapidly developing technological capabilities are racing far ahead of our standard ways of

[684] Bostrom, "A History of Transhumanist Thought," 12.
[685] Sirius and Cornell, *Transcendence*, see: 'Max More and Natasha Vita-More.'
[686] Hughes, *Citizen Cyborg*, ch.10.
[687] Hughes, *Citizen Cyborg*, ch.10.

thinking about future possibilities." In response to this problem, More stated that he was aiming to develop "solutions and strategies for minimizing the dangers of progress and maximizing the benefits."[688]

More is not the only thinker associated with the early transhumanist milieu to have moved gradually towards the centre. Kevin Kelly, who attended some extropian events in the 90s (though he was not an extropian himself) has also relinquished his more extreme 90s era "libertarian leanings." In his 2016 book, *The Inevitable: Understanding The 12 Technological Forces That Will Shape Our Future*, he wrote that he is "now much more interested in both the power of the collective and the new obligations stemming from individuals toward the collective."[689]

Extropian overlaps

With leading extropians like More now serving as a bridge between early transhumanism and its dominant new incarnation, there were ample opportunities for collaboration between the two transhumanist cultures. As Hughes has acknowledged, extropians and the WTA shared many core values, which centered around "techno-liberatory concerns."[690]

Both groups identified as rationalists, both claimed that transhumanism was non-dogmatic, open-minded, and committed to the perpetual re-evaluation of its aims and values, both groups questioned the idea of a fixed view of human nature, and challenged the necessity of ageing, suffering, cognitive biases, and death. Many of the core differences between the two cultures were of degree, not kind, and many were rooted in the language and presentation of what were, at the end of the day, fundamentally contiguous ideas.

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[688] More, "About."
[689] Kevin Kelly, *The Inevitable: Understanding the 12 Technological Forces That Will Shape Our Future* (New York: Viking, 2016), kindle, ch.11.
[690] Hughes, *Citizen Cyborg*, ch.10.

With so many overlapping sensibilities in play, the WTA, "attracted several of the academics in the extropian milieu,"[691] who helped to establish the new organisation's peer-reviewed electronic publication, *The Journal of Transhumanism*. This journal was founded in 1998, under the editorial leadership of Nick Bostrom, who was succeeded as editor in chief in 1999 by Robin Hanson. Max More also served as a member of the editorial committee for many years from the journal's inception. The original mandate of *The Journal of Transhumanism* was to publish "the best of contemporary research into the science and philosophy of the future."[692] In late 2001, the publication was rebranded *The Journal of Evolution and Technology* (JET). It remains active under this title today.

The overlaps between the two transhumanist cultures around the turn of the century are further evidenced by the archived webpages of the Extropy Institute and the WTA. In a section of the WTA's website under the heading, "What is Transhumanism?" (c. 1998), Bostrom praised the Extropy Institute and Max More's efforts in building a transhumanist community and spreading extropian memes. He also noted that transhumanists of all persuasions typically exhibit a shared mindset of self-determination, epitomised by More's extropian principle of *dynamic optimism*.[693] In turn, More was a contributor to both of the WTA's core documents, the "Transhumanist Declaration" and the "Transhumanist FAQ."[694]

In its early days, the WTA's website (c.1998) also took many cues from extropian culture, including some of the more kitsch and playful elements. These features are remarkable, as they are not mentioned in any publication that historicises transhumanist organisations or culture. The WTA's website contained a link to a list of transhumanist neologisms, most of which were developed by the extropians,[695] while Bostrom and Pearce signed off the first WTA members' update with the extropian declaration

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[691] Hughes, *Citizen Cyborg*, ch.10.
[692] *Journal of Transhumanism*, archived December 12, 1998, http://web.archive.org/web/19981212033550/http://www.transhumanist.com/.
[693] Nick Bostrom, "What is Transhumanism? Version 3.1," *World Transhumanist Association*, archived July 2, 1998, http://web.archive.org/web/19980702105638/http://www.transhumanism.com/transhumanism.htm.
[694] Hughes, *Citizen Cyborg*, ch.10.
[695] *World Transhumanist Association*, "Transhumanist Lexicon," archived July 2, 1998, http://web.archive.org/web/19980702110058/http://www.transhumanism.com/lexicon/.

"Onward!"[696] The WTA even sold WTA buttons and transhumanist bumper stickers from 2004-5.

Fig. 20. Image of a bumper sticker sold by the World Transhumanist Association. Image appeared on the WTA's website. Image archived March 5, 2005.

Playful transhumanist poems were also published on the WTA's website, like this limerick on cryonic suspension by Robin Helweg-Larson:

> The correct thing to do, when you're dead,
> Is have someone take care of your head;
> There's no chance of more drama
> Without Futurama -
> Don't say you weren't warned - act, instead.[697]

Former WTA leaders, like Bostrom, generally present the most current versions of their ideas in contemporary publications, which now seem more sophisticated, academic, and serious than many of the early extropian documents. Most of the early WTA-era websites and documents are defunct and have not been dredged up or discussed in academic publications. A comparative examination reveals, among other things, that both cultures had a silly and a serious side and were thoroughly co-influential in the late 90s and early 2000s.

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[696] *World Transhumanist Association*, "WTA Update 1, 29 May 1998," archived July 2, 1998, http://web.archive.org/web/19980702111204/http://www.transhumanism.com/updates/update1.htm.
[697] Robin Helweg-Larsen, "Limerick," *World Transhumanist Association*, archived January 11, 2006, http://web.archive.org/web/20060111185118/http://www.transhumanism.org/index.php/th/more/951/.

The Transhumanist Declaration

In 1998, the original version of "The Transhumanist Declaration" was crafted by a collective group of leading transhumanists.[698] The 1998 version is substantially different to the most current version, published in 2012. The later version is typically cited in recent publications as the defining version of the document and provides ample points of contrast with "The Principles of Extropy." However, the "Declaration" of 1998 is notably much closer to extropian rhetoric than the later version, which can be viewed for contrast in Appendix B. I include the original "Declaration" in full below, as it crisply summarises the founding aims and ethos of the WTA, and serves as a record of the emergence of some important new values and emphases in transhumanist culture.

THE TRANSHUMANIST DECLARATION 2.4[699]

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

(2) Systematic research should be put into understanding these coming developments and their long-term consequences.

(3) Transhumanists think that by being generally open and embracing of new technology we have a better chance of turning it to our advantage than if we try to ban or prohibit it.

[698] Contributors were: Doug Bailey, Anders Sandberg, Gustavo Alves, Max More, Holger Wagner, Natasha Vita More, Eugene Leitl, Berrie Staring, David Pearce, Bill Fantegrossi, Doug Baily Jr., den Otter, Ralf Fletcher, Kathryn Aegis, Tom Morrow, Alexander Chislenko, Lee Daniel Crocker, Darren Reynolds, Keith Elis, Thom Quinn, Mikhail Sverdlov, Arjen Kamphuis, Shane Spaulding, and Nick Bostrom. See: *World Transhumanist Association*, "The Transhumanist Declaration 2.4," archived July 2, 1998, https://web.archive.org/web/19980702105748/http://www.transhumanism.com/declaration.htm.

[699] Version 2.4 is the earliest web-archived document of "The Transhumanist Declaration" that I could locate. However, as the earliest version was also composed in 1998, this document is not likely to differ substantially from any predecessors. A precursor document, published on the Extropy mailing list by Nick Bostrom in March 1998 under the heading "Transhumanist Principles 2.1" can be viewed here: http://diyhpl.us/~bryan/irc/extropians/www.lucifer.com/exi-lists/extropians.1Q98/3192.html.

(4) Transhumanists advocate the moral right for those who so wish to use technology to extend their mental and physical capacities and to improve their control over their own lives. We seek personal growth beyond our current biological limitations.

(5) In planning for the future, it is mandatory to take into account the prospect of dramatic technological progress. It would be tragic if the potential benefits failed to materialize because of ill-motivated technophobia and unnecessary prohibitions. On the other hand, it would also be tragic if intelligent life went extinct because of some disaster or war involving advanced technologies.

(6) We need to create forums where people can rationally debate what needs to be done, and a social order where responsible decisions can be implemented.

(7) Transhumanism advocates the well-being of all sentience (whether in artificial intellects, humans, non-human animals, or possible extraterrestrial species) and encompasses many principles of modern secular humanism. Transhumanism does not support any particular party, politician or political platform.[700]

Extropian echoes

The first four principles of the "Declaration" are entirely congruent with extropianism. The language is clear and decisive and exhibits a similar, though less utopian, tone of techno-optimism regarding advanced technologies and their potential to enhance and improve the human condition.

Principle three is notable for advocating 'openness' in the form of minimal restriction over the right to develop, and by implication, use, transhumanist technologies. The wording lacks the vehemence of extropian libertarianism, and is tempered by phrases like "being generally open" and "have a better chance." However, the principle is basically aligned with extropian views. The regulation and banning of enhancement technologies is deemed unlikely to be effective, and the authors argue that regulation

[700] *World Transhumanist Association*, "The Transhumanist Declaration 2.4."

may quash many worthwhile opportunities to dramatically improve the human condition.

Principle four effectively advocates More's ideal of morphological freedom: the right to enhance or alter one's form without restriction. The phrase, "we seek personal growth beyond our current biological limitations," is also strongly reminiscent of More's principle of *dynamic optimism*. These goals of continually seeking to improve one's capabilities and quality of life, and using science and technology to alter biology, were shared by both extropians and WTA members.

New emphases

1. *Existential risks and the downsides of technology*

Principle five pointedly states that knee-jerk technophobia could have detrimental consequences. However, the second half of the principle introduces something new in official transhumanist rhetoric: the idea that, in addition to their profound potential to improve human lives, the development of advanced technologies could have devastating and irrevocable consequences for humanity and all forms of intelligent life. This emerging focus on the risks posed by transhumanist technologies represents one of the most significant cultural shifts within the transhumanist movement from the late 1990s onwards.

2. *The importance of democratic engagement and participation*

Principle six also introduces a new concern in transhumanist rhetoric by explicitly advocating the broader promotion and spread of transhumanist ideas. The principle also implicitly conveys the notion that in modern democratic societies, we need a voting populace that is informed about transhumanist technologies and their implications, in order to enable sound collective decision making regarding technological development and regulation.

3. *Defending the rights of all sentient and intelligent beings*

Principle seven takes up a point that was only ever alluded to in passing remarks by extropians—that transhumanists are not species-ist. While More's principle of dynamic optimism promoted the empowerment of "all intelligent beings,"[701] the WTA declared more explicitly that intelligence matters more than species or substrate when it comes to a being's worth, and by extension, their rights. With this principle, we see the beginning of a more overt association between transhumanism and other forms of rational thinking, particularly utilitarianism. The principle also hints at the idea (which the WTA engaged with elsewhere) that new legal and ethical guidelines regarding human, animal, cyborg and AI rights will be needed in the future.[702]

4. *Inclusivity*

This new document largely builds on More's extropian ideals. However, the final declaration, namely, that "Transhumanism does not support any particular party, politician or political platform," actively distances the WTA from the almost exclusively libertarian stamp of extropian culture. In this statement, the authors affirm that people of all political persuasions can be transhumanists. It is not important how libertarian or secular you are, or even how transhumanist you are. The WTA exists to promote the global importance of transhumanism among transhumanists and non-transhumanists, and champions a defence of both human and transhuman rights.

The Transhumanist FAQ

"The Transhumanist FAQ," first appeared on the WTA's website in 1999. It "was also a consensus or near-consensus document," which was primarily assembled by Bostrom,

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[701] More, "The Extropian Principles," 17.
[702] Hughes posted about the possibility of granting rights to machines on the WTA's website in 2005. See: James Hughes, "Men, Machines and Legal Rights," *World Transhumanist Association*, archived March 10, 2005, http://web.archive.org/web/20050310105647/http://transhumanism.org:80/index.php/WTA/more/645/.

with substantial input from a large group of other transhumanists. As Bostrom notes, it differed from the "Declaration" as, "it was more ambitious in its philosophical scope" and also "developed a number of themes that had previously been, at most, implicit in the [transhumanist] movement."[703] As this document is dozens of pages long, I do not include it in the text, or dissect it in detail here.[704] However, it is worth briefly noting some of the new themes and ideas that were fleshed out in this substantial publication.[705]

1. *Risk mitigation*

The focus on risk mitigation was given even greater prominence in the "FAQ." The document states that, "seeking to understand the dangers and working to prevent disasters is an essential part of the transhumanist agenda."[706]

2. *Superintelligence*

The authors also introduce, and rigorously define, the concept of superintelligence, which has since become a significant concept in AI research, the transhumanist community, and, more recently, in popular culture.[707]

3. *Existential risks*

The document also explores the links between emerging and potential technologies (like artificial superintelligence) and *existential risks*, defined as, "events that would cause the extinction of intelligent life or permanently and drastically cripple its potential."[708]

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[703] Bostrom, "A History of Transhumanist Thought," 12-13.
[704] Version 2.1 of the FAQ (2003) has been cited many times in this thesis and can be viewed here: http://www.nickbostrom.com/views/transhumanist.pdf.
[705] Once again, this document was revised many times and is most prominently cited in its 2003 incarnation. Breaking from precedent here, I refer to the 2003 version, instead of the earliest available document. For comparison, see: *World Transhumanist Association*, "The Transhumanist FAQ, May 13, 1999," archived August 17, 2000, http://web.archive.org/web/20000817094531/http://www.transhumanist.org/.
[706] *World Transhumanist Association*, "The Transhumanist FAQ, May 13, 1999," 5.
[707] *World Transhumanist Association*, "The Transhumanist FAQ, May 13, 1999," 12-14.

4. *The technological Singularity*

Formalising the importance of a concept that the extropians were very familiar with, the "FAQ" also explains the concept of a technological 'Singularity,' the "conjecture that there will be a point in the future when the rate of technological development becomes so rapid that the progress-curve becomes nearly vertical." The "FAQ" authors argue that such runaway progress would be game-changing for humanity and could result in a world that is "transformed beyond recognition."[709]

5. *Equal access to technology*

In keeping with the WTA's emergent focus on political pragmatism and their concern over the pace of integration of transhumanist technologies into democratic societies, the "FAQ" also dedicates a section to exploring the question: "Will new technologies only benefit the rich and powerful?"[710] The short answer: not really—but even if they did, banning the technologies was not considered to be a feasible or sensible response.

Transhumanism's new allies

By 2006, the WTA's website had been revamped several times and the organisation's pursuits were growing. As part of a shrewd new growth strategy, the WTA began to seek allies beyond the transhumanist community and sought to promote the idea that transhumanist concerns are relevant to many external interest groups. The WTA's website (c. 2006) identified transhumanism for the first time as:

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[708] *World Transhumanist Association*, "The Transhumanist FAQ, May 13, 1999," 23.
[709] *World Transhumanist Association*, "The Transhumanist FAQ, May 13, 1999," 19.
[710] *World Transhumanist Association*, "The Transhumanist FAQ, May 13, 1999," 20-21.

> … in part, a civil liberties movement with roots in the most fundamental demand of liberal democracy: sane, adult citizens have a right to control their own bodies and minds.[711]

Naturally, transhumanists did not just want to protect existing human rights but to "deepen and radicalize the concept of human rights" by advocating "that the right to technological self-determination should be protected by laws and treaties." In effect, the WTA wanted to extend the concept of human rights to include the right to *alter* and *improve* the human condition. In pursuit of this aim, they sought "to engage the human rights community, legal scholars, reproductive rights activists, the transgendered community and advocates of public health approaches to illicit drugs,"[712] in the hope of launching a broader societal campaign about body modification and morphological freedom.

The WTA also aligned themselves with the health initiatives and goals of the World Health Organization (WHO) and noted that, in addition to existing technologies, transhumanist technologies like genetic engineering and nanotechnology could ultimately "have a powerful role to play in improving the quality of life throughout the world, if they are safe, accessible, and sustainable."[713]

They also reached out to many other groups, including the physically disabled, drug law reform advocates, women's and reproductive rights advocates, scientists and healthcare workers, health policy makers, and the LGBTQIA community.[714] By the mid-2000s, the WTA's message was clear: transhumanist concerns are relevant to everyone and transhumanist technologies have much to offer. The leaders of the WTA were well aware that diverse advocates for transhumanist agendas would be needed, as well as growing

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[711] *World Transhumanist Association*, "Human Rights Activists," archived April 18, 2006, http://web.archive.org/web/20060418231742/http://www.transhumanism.org/index.php/WTA/communities/humanrights/.
[712] *World Transhumanist Association*, "Human Rights Activists."
[713] *World Transhumanist Association*, "Global Health," archived April 18, 2006, http://web.archive.org/web/20060418002645/http://transhumanism.org/index.php/WTA/globalhealth/.
[714] See: *World Transhumanist Association*, "We All Have a Stake in Safe and Accessible Human Enhancement Technologies," archived March 5, 2005, http://web.archive.org/web/20050305082749/http://transhumanism.org:80/index.php/WTA/perspectives/.

public understanding, in order to get the best out of advancing technologies and avoid the most dangerous outcomes.

The political debates of the day

As mentioned above, bioethics debates were particularly public and political in the first decade of the twenty-first century. These debates drew many transhumanists deeper into the public and political realms during the democratic turn. In the early 2000s, transhumanists were inspired to channel a large chunk of their public efforts towards countering the rising tide of what they viewed as bioconservatism and neo-Luddism in the West, particularly in the United States.

In the year 2000, the first rough draft of a human genome was sequenced, twenty-two years after the first 'test tube baby,' Louise Brown, was born, and four years after the cloning of the first mammal, Dolly the sheep. In the official White House address on June 26, 2000, the US President Bill Clinton equated the completion of the human genome draft with the significance of Galileo's astronomical observations, characterising it as "the most important, most wondrous map ever produced by humankind."[715] *Newsweek's* Thomas Hayden declared that the genome draft was such a major breakthrough that "it could make the computer look like a minor innovation." He went on to prophesy that, "2000 will see the start of a new era in which humankind starts to take control of its biological destiny."[716]

At the time, few doubted that the impacts of sequencing the human genome would be profound, but many queried whether this line of research was an appropriate use of government money with so many other dire global problems in need of solutions: from

[715] Bill Clinton, "Remarks Made by the President… on the Completion of the First Survey of the Entire Human Genome Project," *The White House*, Office of the Press Secretary, June 26, 2000, https://www.genome.gov/10001356/june-2000-white-house-event/.
[716] Thomas Hayden, "The Year We Control Our Destiny," *Newsweek* 134, no. 24 (December 1999 - February 2000): 88-90.

poverty, to malnutrition, to environmental degradation.[717] Further concerns were raised regarding the "hubristic confidence"[718] with which humans presumed to tamper with their own nature and that of their environment, especially when so little was yet known about the long term consequences of genetically modifying organisms. For those concerned with teleology, there was also the worry that tampering with the genetic code of life may be akin to playing God.

The Catholic Church reflected on the implications of modern biotechnologies in a 2004 report, drafted by the International Theological Commission (ITC). The authors, a group of Catholic scholars appointed by Pope John Paul II, observed that modern biotechnological breakthroughs, "not only offer new and more effective treatments for disease… but also the potential to alter man himself."[719]

The ITC report detailed the Church's concerns about the cumulative array of biological modifications and enhancements that threatened to infringe upon the sacred nature of man, made in the image of God. Violations of this image included: any lifestyle choice or form of body modification that blurred the boundaries between the male/female gender dichotomy, contraception, sterilisation, euthanasia, abortion, embryo selection, sperm donation, human cloning, germline engineering, and "the use of genetic modification to yield a superhuman or being with essentially new spiritual faculties."[720]

The ITC's report is a testament the growing mainstream awareness of radical human enhancement possibilities in the West in the early 2000s, from life extension, to embryo selection and genetic engineering. Unsurprisingly, the conclusions of the report placed transhumanists and hard-line Catholics on opposite ethical and epistemological planes. From a transhumanist perspective, the Vatican's representatives were 'arch deathists,' as

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[717] See: Ed Ayers, "The human genome and the human-altered environment," *World Watch* 14, no .3 (May/June 2001): 3.
[718] Francis Fukuyama, "In defence of nature, human and non-human," *World Watch* (July/August 2002): 30-32.
[719] *International Theological Commission*, "Communion and Stewardship: Human Persons Created in the Image of God," 2004, point 81, http://www.vatican.va/roman_curia/congregations/cfaith/cti_documents/rc_cti_index-doc-pubbl_en.html.
[720] *International Theological Commission*, "Communion and Stewardship," point 91.

they viewed the disposal of death as the disposal of a meaningful human life.[721] Yet the most remarkable part of this report is not the Church's opposition to radical life-extension, despite the fact that divine immortality is actively aspired to in Catholicism by other means, it is that the Church publically acknowledged that radical life-extension might soon be scientifically possible here on Earth.

Catholics were not the only ones taking the idea of human enhancement and life extension seriously. Many other groups and individuals had concerns about the possible consequences of genetic engineering. These concerns included the development of new biological weapons,[722] a "medical apartheid"[723] created by unequal access to the benefits of genomic medicine, a genetic divide created by 'designer babies',[724] and a population crisis that could ensue if genomic medicine substantially increased average life expectancies.[725]

Then there were the thorny legal and intellectual property issues. Should it be legal to patent genes? Biotech companies like Craig Venter's Celera Genomics (the first private company to sequence the full human genome) did just that, while members of the public worried about one day being held to ransom by drug companies holding a monopoly on life saving medications. In a 2002 column in *The Weekend Australian*, the sci-fi author and transhumanist, Damien Broderick, equated patenting genes with, "patenting air, then levying a charge on breathing."[726] Still, the research went ahead, and by 2003 the first full version of the human genome was officially completed.

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[721] *International Theological Commission*, "Communion and Stewardship," point 93.
[722] See: British Medical Association, *Biotechnology, Weapons and Humanity* (Amsterdam: Harwood Academic Publishers, 1999); Ethirajan Anbarasan, "Genetic weapons: A 21st-century nightmare?" *The Unesco Courier*, March 1999, 37-39, http://unesdoc.unesco.org/images/0011/001151/115117e.pdf.
[723] Mohamed Larbi Bouguerra, "Genes of inequality," *The Unesco Courier*, September 1999, 35-36, http://unesdoc.unesco.org/images/0011/001170/117043e.pdf#nameddest=117060.
[724] See: Sally Deenan, "Designer people," *The Environmental Magazine*, Jan/Feb 2001, 26-33, ProQuest; Sean Nicholls, "Designer Humans," *The Sydney Morning Herald*, October 4, 2001, 12, ProQuest; Shannon Brownlee, "Designer babies," *The Washington Monthly* 34, no. 3 (2002): 25-31, ProQuest.
[725] Stephen Brook, "Genome expert warns of population crisis if life prolonged," *The Australian*, May 2001, 6, ProQuest.
[726] Damien Broderick, "Genetic wiring for pure greed?" *Weekend Australian*, March 16, 2002, ProQuest.

Stem cell research and human cloning were also monumentally controversial issues at the time and the controversy was extremely public. These issues mattered to a lot of people, as many people have relatives, or know someone suffering from degenerative conditions like Alzheimer's disease and Dementia. Further public awareness was also generated by prominent celebrities of the period who suffered from debilitating illnesses, like Christopher Reeve and Michael J. Fox. Both became prominent spokespeople and advocates for stem cell therapy and biomedical research.[727]

Debating the merits of stem cell therapy and cloning was far from straightforward, however, as there was a lot of confusion over the key concepts and terminology. Human cloning encompasses the prospect of *reproductive cloning* (making a living genetic copy of a human being), and *therapeutic cloning* (which involves creating embryos and using the stem cells for biomedical research and therapy). Therapeutic cloning held enormous promise to help researchers better understand and treat life-threatening illnesses, and many hoped that stem cell therapy would soon be used to regrow organs or tissue that would not be rejected by a patient's immune system. Yet, both practices were often lumped together under the scary umbrella term 'human cloning,' which readily invoked the spectre of identical clones stealing personal identities (as happened to Arnold Schwarzenegger's character in the popular 2000 film, *The 6th Day*).

A prominent advisory group that voted on endorsing a four-year moratorium on both reproductive and therapeutic cloning was the US President's Council on Bioethics (PCB). The PCB was formed by President George W. Bush November 28, 2001, with a brief to "advise the President on bioethical issues that may emerge as a consequence of advances in biomedical science and technology."[728]

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[727] Jason Pontin, "Christopher Reeve and the Politics of Stem Cells," *MIT Technology Review*, December 1, 2004, https://www.technologyreview.com/s/403419/christopher-reeve-and-the-politics-of-stem-cells/; Jim Rutenberg, "Michael J. Fox, Parkinson's and Stem Cells, *New York Times*, October 25, 2006, https://www.nytimes.com/2006/10/25/us/politics/25adbox.html.

[728] George W. Bush, "Executive Order 13237: Creation of the President's Council on Bioethics," *The President's Council On Bioethics*, November 28, 2001, https://bioethicsarchive.georgetown.edu/pcbe/about/executive.html.

The Council was led by the bioconservative physician, Dr. Leon Kass, who is famous for his disgust heuristic, expounded in his 1997 essay, "The Wisdom of Repugnance." His thesis was influenced by the German philosopher Hans Jonas' 'bioethics of fear,' which promoted relinquishment in the face of most scientific and medical advances.[729] The focal example framing Kass' essay was the recent cloning of Dolly the Sheep, which, he declared, "raised immediately the prospect and the specter of cloning human beings." For Kass, cloning, in all its guises was an act of "man playing at being God,"[730] a prospect he suggested was most frequently greeted in the community by the expostulations: "'Offensive.' 'Grotesque.' 'Revolting.' 'Repugnant.' 'Repulsive.'"[731]

The PCB compiled a number of reports, which consistently expressed grave moral concerns about the potential for biomedical interventions to erode human dignity. PCB members, like Francis Fukuyama, also published widely on bioethics during this period. Fukuyama notably singled out transhumanism as, "a strange liberation movement that has grown within the developed world" whose proponents "want nothing less than to liberate the human race from its biological constraints."[732] In pursuit of such a goal, he worried that developments in human enhancement technologies would exacerbate human inequality and diminish our "human essence."[733] Closely paralleling Kass' defence of human dignity, Fukuyama famously spruiked the idea of a mysterious "Factor X"[734]—a kind of intangible essence of human nature that renders us unique and valuable, and that must not be infringed upon or eroded.

Transhumanists and many other leading intellectuals, like Steven Pinker, condemned Kass and Fukuyama's ideas publically and vehemently.[735] In 2004, Hughes referred to Kass as an "arch bioLuddite" and accused him of stacking the PCB with "conservatives

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[729] Chris Mooney, "Irrationalist in Chief: The Real Problem with Leon Kass," *The American Prospect* 17, no. 2 (2001): 10, Factiva.
[730] Leon Kass, "The Wisdom of Repugnance," *The New Republic*, June 2, 1997, 17, ProQuest.
[731] Kass, "The Wisdom of Repugnance," 19.
[732] Fukuyama, "Transhumanism."
[733] Fukuyama, "Transhumanism."
[734] Fukuyama, *Our Posthuman Future*, 149.
[735] See: Steven Pinker, "The Stupidity of Dignity," *The New Republic*, May 28, 2008, https://newrepublic.com/article/64674/the-stupidity-dignity.

with little or no connection to academic bioethics."[736] He further condemned Kass' 'wisdom of repugnance' for relying on gut feelings to form the basis of a decision to ban new technologies. Quoting the bioethicist Art Caplan, Hughes affirmed that, "if intuition is the last word, then African-Americans are at the back of the bus, women and people who have no property aren't voting, and we still have slaves."[737]

Bostrom also dissected Kass' version of the concept of human dignity in an essay commissioned by the PCB. He argued that, in spite of our fears and intuitions, enhancement technologies have immense capacity to elevate human lifeways. The reason it is so hard to imagine a future of alternate values greater than our own is because they would contravene our ingrained, present-day expectations of what a good life should look like. He wrote:

> Critics of enhancement are wont to dwell on how it could erode dignity. They often omit to point out how enhancement could help raise our dignity. But let us pause and ask ourselves just how much Dignity as a Quality a person has who spends four or five hours every day watching television? Whose passions are limited to a subset of eating, drinking, shopping, gratifying their sexual needs, watching sport, and sleeping? Who has never had an original idea, never willingly deviated from the path of least resistance, and never devoted himself seriously to any pursuit or occupation that was not handed him on the platter of cultural expectations? Perhaps, with regards to Dignity as a Quality, there is more distance to rise than to fall."[738]

Bostrom also responded directly to Fukuyama's claims in a 2004 essay, "Transhumanism: The World's Most Dangerous Idea?" He expressed concern that:

> … the prestige of the President's Council on Bioethics [was] being used to push a limiting bioconservative agenda that is directly hostile to the goal of allowing people to improve their lives by enhancing their biological capacities.[739]

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[736] Hughes, *Citizen Cyborg*, ch.6.
[737] Hughes, *Citizen Cyborg*, ch.7.
[738] Nick Bostrom, "Dignity and Enhancement," in *Human Dignity and Bioethics: Essays Commissioned by the President's Council on Bioethics*, March 2008, https://bioethicsarchive.georgetown.edu/pcbe/reports/human_dignity/index.html.
[739] Nick Bostrom, "Transhumanism: The World's Most Dangerous Idea?" *Foreign Policy* (September/October 2004), http://www.nickbostrom.com/papers/dangerous.html.

Bostrom acknowledged that Fukuyama "is right to draw attention to the social and political implications of the increasing use of technology to transform human capacities." However, he strongly opposed knee-jerk bans, and argued that a major virtue of the transhumanist movement was its focus on promoting "a positive and inclusive vision for how we can ethically embrace new technological possibilities to lead lives that are better than well."[740]

It was not just one or two transhumanists who worried about the new bioconservative rhetoric and its attachment to the policies and official statements of the US government. Many transhumanists donned the label *technoprogressive* in this period, to signal their support for active technological progress, while dubbing their opponents *bioconservatives* (an epithet that indicates how significant debates over biotechnology had become to transhumanists at the time). Extropians and WTA members were largely united in their rejection of bioconservative ethics, and in their opposition to moratoriums on new research avenues in biotechnology.[741]

In their calls for technological relinquishment, figures like Kass and Fukuyama were effectively championing a version of the Precautionary Principle (PP). According to Max More, the PP emerged in the 1980s and "evolved out of the German socio-legal tradition, created in the heyday of democratic socialism in the 1930s, centering on the concept of good household management."[742] A UNESCO report on the subject states that the principle has roots in 1970's environmental policy and notes that:

> In its most basic form, the PP is a strategy to cope with scientific uncertainties in the assessment and management of risks. It is about the wisdom of action under uncertainty: 'Look before you

[740] Bostrom, "Transhumanism: The World's Most Dangerous Idea?"
[741] James Hughes advertised the 2004 Extropy Institute's Vital Progress Summit on the website of the Institute for Ethics and Emerging Technologies, praising its effort "[t]o counter Kass and his Council." See: *IEET*, "Extropy Institute Organizes 'Vital Progress Summit,'" January 6, 2004, https://ieet.org/cybdem/2004/01/extropy-institute-organizes-vital.html.
[742] Timothy O'Riordan and James Cameron, "The History and Contemporary Significance of the Precautionary Principle," in *Interpreting the Precautionary Principle*, ed. Timothy O'Riordan and James Cameron (London: Earthscan Publications Ltd, 1994), 16.

> leap', 'better safe than sorry', and many other folkloristic idioms capture some aspect of this wisdom. Precaution means taking action to protect human health and the environment against possible danger of severe damage.[743]

The PP takes many forms, and has been applied to many political issues, but transhumanists in the early twenty-first century took umbrage with its application in the realm of biotechnology. In 2004, the attendees of the Extropy Institute's Vital Progress Summit convened online to debate the merits of the Precautionary Principle.[744] The summit was a two-week virtual event, with keynote speakers including the biogerontologist Aubrey de Grey, as well as Ray Kurzweil, Marvin Minsky, Natasha Vita-More, Gregory Stock, and Max More. [745]

More was particularly unsettled by the fact that the PP placed "the burden of proof exclusively on new technologies," when they could never hope to demonstrate their efficacy without legal trials and development. Along with his fellow speakers, he was concerned that the PP expressed a "strong bias toward the status quo and against the technological progress so vital to the continued survival and wellbeing of humanity."[746] In the hope of presenting a viable political alternative, More devised what he called The Proactionary Principle (ProP). The ProP did not decry regulation or restriction, but sought to provide a more rigorous framework for deciding when to restrict technologies and to what extent.

More was troubled by the fact that advocates of the PP have reportedly championed the application of:

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[743] *UNESCO: World Commission on the Ethics of Scientific Knowledge and Technology (COMEST)*, "The Precautionary Principle," 2005, http://unesdoc.unesco.org/images/0013/001395/139578e.pdf.
[744] Max More, "The Proactionary Principle: Optimizing Technological Outcomes," in *The Transhumanist Reader*.
[745] *Extropy Institute*, "Conferences and Summits," accessed July 15, 2018, http://www.extropy.org/events.htm.
[746] More, "The Proactionary Principle."

> … precautionary measures that prevent the possibility of harm… even if the causal link between the activity and the possible harm has not been proven or the causal link is weak and the harm is unlikely to occur.[747]

More believed that restrictions should only be imposed "if the potential impact of an activity had both significant probability and severity." In addition, restrictions should be "proportionate to the extent of the probable side effects."[748]

More's critique of both strong (prohibit activity if any harm could result) and weak (prohibit activity if serious harm is likely to result) versions of the precautionary principle can be read in his first version of "The Proactionary Principle." When defining the ProP he argued that:

> People's freedom to innovate technologically is highly valuable, even critical, to humanity. This implies several imperatives when restrictive measures are proposed: Assess risks and opportunities according to available science, not popular perception. Account for both the costs of the restrictions themselves, and those of opportunities foregone. Favor measures that are proportionate to the probability and magnitude of impacts, and that have a high expectation value. Protect people's freedom to experiment, innovate, and progress.[749]

The development of the ProP further shows that transhumanists, including extropians, were increasingly politically engaged in the early 2000s and sought to develop workable solutions to emerging ethical dilemmas that could be implemented in public policy: a clear sign of a democratic turn.

The IEET

With the bioethics debates of the 2000s in full swing, Bostrom and Hughes also co-founded a nonprofit think tank in 2004, called The Institute for Ethics and Emerging

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[747] Søren Holm and John Harris, "Precuationary principle stifles discovery," *Nature* 400, no. 398 (July 29, 1999), http://www.nature.com/nature/journal/v400/n6743/full/400398a0.html.
[748] Max More, "The Proactionary Principle v. 1.2," July 29, 2005, http://www.maxmore.com/proactionary.html.
[749] Max More, "The Proactionary Principle v. 1.0," 2004, https://web.archive.org/web/20040603084416/http://www.maxmore.com/proactionary.htm.

Technologies (IEET). The original press release announcing the Institute's formation began with following questions:

> When should parents be permitted to genetically enhance their children? How can we regulate psychoactive drugs in ways that respect cognitive liberty? How can we avoid exacerbating inequality as human enhancement technologies spread?[750]

The IEET was set up to advocate for transhumanist rights and ideas within an organisation that, unlike the WTA, had a clear political agenda. Summarising the philosophy of the organisation, Sirius and Cornell wrote:

> Politically, they endorse the United Nations' Universal Declaration of Human Rights, generally a left-liberal interpretation of the human rights concept, making them diametrically opposite to the original libertarian trend in transhumanism.[751]

The IEET aimed "to become a center for responsible, constructive approaches to emerging human enhancement technologies." Its founders "believe[d] that technological progress can be a catalyst for positive human development so long as we ensure that technologies are safe and equitably distributed."[752] In effect, the group is a democratic transhumanist think tank. They have deemed More's Proactionary Principle a better guide for developing new technologies than the Precautionary Principle, or a heuristics of fear. The IEET took over the management of the transhumanist *Journal of Evolution and Technology* from the WTA and the Institute remains active today.

Concluding remarks

The emergent sensibility of democratic transhumanism, which emphasised political engagement and public outreach projects, primarily distinguishes the culture of the WTA from extropian culture. Although the two cultures remained close and their values and

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[750] George Dvorsky, "Institute for Ethics and Emerging Technologies launched," *Sentient Developments*, November 8, 2004, http://www.sentientdevelopments.com/2004/11/institute-for-ethics-and-emerging.html.
[751] Sirius and Cornell, *Transcendence*, see: 'Institute for Ethics and Emerging Technology (IEET).'
[752] Dvorsky, "Institute for Ethics and Emerging Technologies launched."

members overlapped considerably, organised transhumanism developed and matured during the democratic turn.

In the next chapter, we will conclude our discussion of organised transhumanism, by exploring how transhumanist movements became larger and more diverse, as well as more politically active and tolerant of religion, in the second decade of the twenty-first century.

9. Humanity+: Transhumanism Evolves

> *There is a rich variety of opinion within transhumanist thought. Many of the leading transhumanist thinkers hold complex and subtle views that are under constant revision and development and which often defy easy labeling.*
>
> — Nick Bostrom, "A History of Transhumanist Thought" (2005)

> *With the emergence of cyberculture, the technoutopian meme-plex has found its natural medium and has been furiously mutating and crossbreeding with contemporary political ideologies, philosophies, and religions. Self-identified transhumanists are just one of the strands of contemporary techno-utopianism, but even within this small global community, many ideological hybrids are stirring.*
>
> — James Hughes, "The Politics of Transhumanism and the Techno-Millennial Imagination" (2012)

Transhumanism is a distinct philosophical framework based on a techno-evolutionary worldview. But as we saw in the previous chapter, new transhumanist organisations like the IEET have appeared over the years with more specific political identities and aims. Many other sub-branches of transhumanist philosophy have also proliferated in the twenty-first century, giving rise to overtly religious transhumanist organisations, transhumanist political parties, a growing body of scholarship on transhumanism from unexpected academic fields like theology, and a major rebranding of the dominant brand of organised transhumanism.

Humanity+

By the end of its first decade, the WTA had succeeded in building up a more credible transhumanist profile than the extropians. In 2007, *New Scientist* magazine covered the ninth annual meeting of the WTA, noting that membership had more than doubled in the past seven years. Wealthy backers, like the entrepreneur and venture capitalist, Peter Thiel, and the music producer, Charlie Kam, had made substantial donations to the

organisation. Celebrity speakers, like the *Star Trek* actor William Shatner were also appearing at the WTA's events.[753]

Nevertheless, in 2008, the WTA adopted the new name, Humanity+ (or Humanity Plus, abbreviated as H+), as part of a rebranding effort. The Australian transhumanist Russell Blackford reported feeling:

> ...hopeful that a total public relations overhaul—with a neat logo, a contemporary-sounding trading name, and a revamp of the website and everything else—might make the WTA a more attractive proposition to others who largely agree with its pro-technology emphases.[754]

Four years earlier, Blackford noted that transhumanism had an image problem. As he saw it, the movement had a "restricted demographic appeal" and an "unmistakably nerdy aura" that was chiefly associated with "young white males with computers."[755] As we saw in chapters 6 and 7, transhumanist organisations have struggled to appeal to women since the extropian era, and by 2007, WTA membership was still 89% male.[756] For an organisation increasingly focused on the task of garnering mainstream political appeal, these heavily skewed demographics posed a problem.

Blackford also reported feeling that the movement was too marginal and unpopular to take on dominant currents of thought, in which cloning and genetic engineering were widely opposed by those invoking the spectre of WWII era eugenic horrors. Blackford figured that kooky, sci-fi-geek transhumanists were not going to win any major arguments in support of new biotechnologies, no matter how rationally their position was presented. To have a meaningful voice on social issues, and to convince skeptics, he argued, "we must go mainstream."[757]

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[753] Danielle Egan, "We're going to live forever," *New Scientist* 196, no. 2625 (2007): 46, EBSCO.
[754] Russell Blackford, "WTA changes its image," *Metamagician and the Hellfire Club*, July 18, 2008, http://metamagician3000.blogspot.com.au/2008/07/wta-changes-its-image.html.
[755] Blackford, "WTA changes its image."
[756] James J. Hughes, "Report on the 2007 Interest and Beliefs Survey of the Members of the World Transhumanist Association," *IEET*, January 2008, https://ieet.org/images/uploads/WTASurvey2007.pdf.
[757] Russell Blackford, "Transhumanism at the Crossroads: To survive and thrive, transhumanism must become an inclusive social movement," *BetterHumans*, October 15, 2004, http://ieet.org/index.php/IEET/print/119/.

Rebranding the WTA was part of this ongoing effort to grow the support base for transhumanism. H+ remains a major transhumanist organisation today, alongside the IEET, though, as Sirius and Cornell noted in 2015, "the idea that Humanity+ could replace transhumanism as a brand identity has long since been abandoned."[758] It is true that when academics, laypeople, or the media talk about ideas and technologies that relate to overcoming the limitations of biology and the human condition, these ideas are pervasively branded as 'transhumanist,' not as ideas that capture the philosophy of 'humanity plus.' In effect, H+ has come to mean transhumanism, but it is not widely used as a shorthand for transhumanism.

The Humanity+ organisation "has changed leadership many times, and the political leanings of those elected have been varied, but it has continued to be characterized by a wide variety of views and concerns."[759] The list of H+ advisors (c. 2018) reveals a community in which former extropians and democratic transhumanists, academics, entrepreneurs, scientists and artists continue to actively work together for common goals.[760] Natasha Vita-More is the current Executive Director of the organisation and presented at the 2018 Humanity+ Conference in Beijing, alongside WTA co-founder David Pearce.[761] The mission statement of Humanity+: "advocates the ethical use of technology to expand human capacities. In other words, we want people to be better than well."[762]

New transhumanist sub-identities

While H+ is a major transhumanist organisation supported by a diverse group of thinkers who share transhumanist sympathies, the organisation recognises that

[758] Sirius and Cornell, *Transcendence*, see: 'Ruling Elite.'
[759] Sirius and Cornell, *Transcendence*, see: 'Broke-Ass Members of the Ruling Elite.'
[760] *Humanity+*, "Advisors," accessed November 5, 2018, https://humanityplus.org/about/advisors/.
[761] *Humanity+*, "China Conference 2018," https://humanityplus.org/events/china-conference-2018/.
[762] *Humanity+*, accessed January 12, 2016, http://humanityplus.org/. This text originally appeared in a longer section on the WTA's website. See: *World Transhumanist Association*, "What is the WTA?" archived March 7, 2005, https://web.archive.org/web/20050307081316/http://transhumanism.org:80/index.php/WTA/about/.

transhumanist culture is very diverse. Embracing this diversity, H+ has affiliated with a growing number of transhumanist subgroups. These transhumanist subgroups and identities have proliferated rapidly in the second decade of the twenty-first century, though they began popping up in the early 2000s.

In the 2007 WTA members survey, the political category technoprogressivism was added for the first time and 16% of respondents identified as technoprogressives.[763] This became a new sub-identity of transhumanism, as did a number of other subcategories in the early to mid-2000s. As Bostrom wrote in the 2001 version of his essay "Transhumanist Values," (later published in 2003 and republished in 2005):

> As with any theory, you can get more specific versions of transhumanism by adding claims… Transhumanism is not a monolithic worldview and there was not a single inventor or founding work that defines what it is and what it isn't. Some examples of currents within transhumanism are: *extropianism* (defined by the Extropian Principles, authored by Max More [16]), *singularitarianism* [9,20] (adding the hypothesis that the transition to a posthuman world will be a sudden event, elicited by the creation of runaway machine intelligence), David Pearce's *Hedonistic Imperative* [17] (combining transhumanism with a form of hedonistic utilitarianism), *democratic transhumanism* (adding emphasis on social awareness and democratic decision-procedures), and *survivalist transhumanism* (placing especial importance on personal survival and longevity). One could say that there are as many versions of transhumanism as there are serious transhumanist thinkers. We must also keep in mind that the transhumanist outlook is still very much in the process of formation, so any characterization must be tentative (italics mine).[764]

The former Managing Director of the IEET, Hank Pellissier, republished these sub-categories in 2015 and added *libertarian transhumanism* (which obviously overlaps substantially with extropianism) and *religious transhumanism* (which obviously doesn't). He also noted that IEET staff had suggested three other categories: *cosmopolitan transhumanism, cosmism*, and *anarcho-transhumanism*. Pellissier further added that David Pearce has suggested a new name for his brand of hedonistic transhumanism,

[763] Hughes, "Report on the 2007 Interest and Beliefs Survey of the Members of the World Transhumanist Association."
[764] Nick Bostrom, "Transhumanist Values," April 18, 2001, https://nickbostrom.com/tra/values.html.

which focuses on the abolition of suffering as a moral imperative. Pearce now favours the term *transhumanist effective altruism*.[765]

Effective altruism (EA) is a growing utilitarian philosophy and social movement, spearheaded by the philosophers Will MacAskill and Toby Ord and heavily inspired by the philosophy of Peter Singer. It focuses on doing the most good you can per dollar or unit of time invested. EA's tend to be very aware of transhumanism and are often concerned about transhumanist issues, like existential risks posed by advanced technologies including nanotechnology and AI. The EA movement has strong roots at Oxford University, which is also the home base of the transhumanist Future of Humanity Institute (FHI), led by Nick Bostrom. The convergence of these small, but increasingly influential intellectual cultures, is notable as a further sign that transhumanism is garnering increasing academic and cultural credibility. We discuss this trend further in part 3.

Of course it is worth emphasising that many of the transhumanist sub-identities mentioned above overlap significantly (one can be an extropian singularitarian survivalist transhumanist, for example) and all subgroups can be loosely unified by their shared interest in the themes outlined in *Fig.1*. Notably, however, when Bostrom first outlined the five subidentities above, there was markedly less diversity within organised transhumanism than there is today. As we will see below, one of the more interesting growth areas within transhumanist culture in recent years has been the rise of overtly religious transhumanist organisations.

The Mormon Transhumanist Association (MTA)

The relatively recent phenomenon of Mormon transhumanism highlights how relevant transhumanist ideas now seem to people with a diverse array of worldviews and religious backgrounds. Mormons did not come up with a transhumanist philosophy or

[765] Hank Pellissier, "Transhumanism: there are [at least] ten different philosophical categories; which one(s) are you?" *IEET*, July 8, 2015, https://ieet.org/index.php/IEET2/more/pellissier20150708.

worldview independently during the twentieth century. But those who have claimed the identity of 'Mormon transhumanist' are clearly responding to the contemporary cultural climate in which rapidly advancing technologies are swiftly changing our ways of life and expectations about a good life. Age-old dreams of bodily transcendence now seem increasingly plausible through technological intervention.

The MTA endorses Humanity+'s current version of "The Transhumanist Declaration," as well as their own "Mormon Transhumanist Affirmation."[766] A brief summary of Mormon transhumanism by the MTA describes the philosophy in the following terms:

> *Mormon Transhumanism* takes the Mormon idea that humans should become gods, and the Transhumanist idea that we should use science and technology in ethical ways to improve our condition until we attain posthumanity, and suggests that these are related, if not identical tasks. That is, we should ethically use our resources including religion, science, and technology to improve ourselves and our world until we become Gods ourselves.[767]

The MTA was incorporated in the American State of Utah in August 2006. Two months later the Association affiliated with Humanity+. In their first year of incorporation the MTA had only 29 members.[768] By August 2018, the MTA had 726 members in 67 countries, though the overwhelming majority of members (~516) resided in North America.[769] As of 2017, 62% of members were also members of The Church of Jesus Christ of Latter-Day Saints and 59% identified as theists.[770] This data shows a remarkable level of tolerance and inclusivity within the organisation, given that a high percentage of members are non-Mormon non-theists.

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[766] *Mormon Transhumanist Association*, "Mormon Transhumanist Affirmation," accessed August 6, 2018, https://transfigurism.org/about/affirmation.
[767] *Mormon Transhumanist Association*, "The Basics of Mormon Transhumanism," accessed August 6, 2018, https://transfigurism.org/primers/1.
[768] Lincoln Cannon, "A Brief History of the Mormon Transhumanist Association," April 10, 2017, https://lincoln.metacannon.net/2017/04/a-brief-history-of-mormon-transhumanist.html.
[769] *Mormon Transhumanist Association*, "Members," accessed August 6, 2018, https://transfigurism.org/about/members.
[770] *Mormon Transhumanist Association*, "FAQ," accessed August 6, 2018, https://transfigurism.org/about/faq.

Mormon transhumanists trace their major intellectual and spiritual antecedents to other religious and spiritual proponents of technological transcendence, like Pierre Teilhard de Chardin, and the Russian Orthodox Priest Nikolai Fedorovich Fedorov.[771] Between 2010-2016 the MTA hosted a number of prominent transhumanists at their conferences, including: Max More, James Hughes, Aubrey de Grey, Natasha Vita-More and Ralph Merkle.[772] *The New Yorker* also published a thoughtful piece on the MTA in 2016.[773]

Although not a Mormon himself, James Hughes has been supportive of the MTA and the rise of religious transhumanism, stating:

> I have always told the press that the MTA is the best organized and most thoughtful of the world's transhumanist groups. The attempt to interrogate the relationship between transhumanism, emerging technologies and Mormon prophecy holds a special fascination for me as a spiritual transhumanist and sociologist who has studied the history of religious millennialism. I think the MTA is a harbinger of a broader engagement with transhumanism by religious scholars that will broaden from the current ill-informed condemnation to selective adoption and endorsement of enhancement technologies and eschatological possibilities. Hopefully there will be a proliferation of groups like the MTA and the Christian Transhumanist Association to pursue this important dialogue. Being more open to this form of dialogue offers much to both sides. Transhumanism has a big problem with questions around the good life and the ends of human existence, and transhumanists often end up proposing ideas that have a long history as religious ideas, without ever realizing those continuities.[774]

A long-time proponent of diversity and inclusivity within the transhumanist community, Hughes has played a significant role in changing the culture of organised transhumanism and expanding its appeal beyond the Californian libertarian milieu.

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[771] *Mormon Transhumanist Association*, "A Brief History of Religious Transhumanism," accessed August 6, 2018, https://transfigurism.org/primers/6.
[772] Cannon, "A Brief History of the Mormon Transhumanist Association."
[773] Dawn Chan, "The Immortality Upgrade," *The New Yorker*, April 20, 2016, https://www.newyorker.com/tech/elements/mormon-transhumanism-and-the-immortality-upgrade.
[774] Cannon, "A Brief History of the Mormon Transhumanist Association."

The Christian Transhumanist Association (CTA)

Another notable religious transhumanist organisation is the Christian Transhumanist Association (CTA). The CTA is a much newer group than the MTA and originated as a discussion group in 2013. The group received official recognition from the State of Tennessee in 2014 and gained tax-exempt status as a non-profit in 2015.[775] The CTA is led by the software developer, Micah Redding, whose father is a Christian preacher.[776] The Mormon transhumanist Lincoln Cannon is a member of the CTA, and is an academic advisor to the group, alongside James Hughes, the theologians Ted Peters, Ronald Cole-Turner, Jeanine Thweatt Bates and Calvin Mercer, and the physicist Frank Tipler.[777]

The website of the Christian Transhumanist Association describes the philosophical outlook of Christian transhumanism, stating:

> We understand our Christian faith to affirm humans as scientific and technological creatures—creatures who create and discover, and who are commissioned to cultivate life, create new things, and renew the world. We further understand our Christian mission to charge us with healing, feeding, and restoring life—activities which provoke us to scientific and medical innovations, just as they have throughout Christian history.[778]

In an opinion piece in 2015, Redding argued that Christian transhumanism is part of a long history of Christians reinventing Christianity for contemporary ends. He cited modern examples of pastors and theologians publically embracing the idea that AI can be a pathway to God and redemption,[779] and quoted fellow Christian transhumanist, Dorothy Daesy, who stated:

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[775] *Christian Transhumanist Association*, "The History of the Christian Transhumanist Association," accessed August 16, 2018, https://www.christiantranshumanism.org/history.
[776] *Christian Transhumanist Association*, "Executive Director," accessed August 16, 2018, https://www.christiantranshumanism.org/executive-director.
[777] *Christian Transhumanist Association*, "Academic Advisory Council," accessed August 16, 2018, https://www.christiantranshumanism.org/academics.
[778] *Christian Transhumanist Association*, "Who We Are," accessed August 16, 2018, https://www.christiantranshumanism.org/about.
[779] One of these examples, regarding the Florida pastor Christopher Benek's appearance on *The Daily Show* has been described elsewhere by Benek as a thought experiment he had been goaded into, on a subject he is not hugely interested in. See: Meghan O'Gieblyn, "God in the machine: my strange journey into transhmanism," *The*

> For me, Christian Transhumanism is a way to support my faith without needing to give up reason… Christianity provides a way for society and culture to understand how to use the power of technology. Christ's mission was based on feeding, healing and teaching. Transhuman age technologies are providing tools to exponentially extend the reach of feeding, healing and teaching.[780]

The CTA also produces The Christian Transhumanist Podcast, presented by Redding. The first episode was released in July 2015 and guests have included: James Hughes, Kevin Kelly, Frank Tipler, Aubrey de Grey, David Pearce and Robin Hanson.[781] This line-up demonstrates that non-Christian members of the transhumanist community are supporting and/or engaging with Christian forays into transhumanist thinking. The President of the Italian Transhumanist Association, Giulio Prisco, has also penned a number of articles on religion, spirituality and transhumanism.[782]

Christian transhumanism has not yet become a large enough sub-identity to have begun to shape any dominant cultural strands of organised Christianity, but growing discussions over transhumanist technologies and ideas within the broader Christian community are still noteworthy. Such discussions are precisely what you would expect to see in an age where transhumanism is coming to the fore as one of the most important and potentially game-changing phenomenons of the century.[783] As I argue in part 3, it is

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Guardian, April 18, 2017, https://www.theguardian.com/technology/2017/apr/18/god-in-the-machine-my-strange-journey-into-transhumanism.

[780] Micah Redding, "Why I Became a Christian Transhumanist," *Motherboard*, August 14, 2015, https://motherboard.vice.com/en_us/article/9akxm3/why-i-became-a-christian-transhumanist.

[781] *Christianity Today*, "The Christian Transhumanist Podcast," accessed August 16, 2018, https://www.christiantranshumanism.org/podcast.

[782] See: Giulio Prisco, "Christianity and Transhumanism Are Much Closer Than You Think," *IEET*, April 10, 2016, https://ieet.org/index.php/IEET2/more/Prisco20160410; Giulio Prisco, "The elephant in the Christian Transhumanist room," *Turing Church*, December 10, 2017, https://turingchurch.net/the-elephant-in-the-christian-transhumanist-room-8db37055bb1f.

[783] For examples of emerging discussions about transhumanism within the broader Christian community, see: C. Christopher Hook, "The Techno Sapiens Are Coming," *Christianity Today*, January 1, 2004, https://www.christianitytoday.com/ct/2004/january/1.36.html?share=u%2bkPF%2fWrKAbH0XPnJIsuOE3sbT0C58kO; Jen Pollock Michel, "How to Binge Watch Like a Believer," *Christianity Today*, April 17, 2017, https://www.christianitytoday.com/women/2017/april/how-to-binge-watch-like-believer.html; *Christianity Today*, "Can Christians Affirm Transhumanism?" April 27, 2017, https://www.christianitytoday.com/ct/2017/april-web-only/can-christians-affirm-transhumanism.html.

becoming harder for people of all backgrounds and belief systems to ignore transhumanist phenomena and their growing impacts on the modern world.

Buddhist transhumanism

We mentioned James Hughes' Buddhist leanings in chapter 8. To briefly expand, Hughes has reconciled the transcendent aspirations of Buddhism and its meditative practices with the modern technological toolkit of the transhumanist, which includes psychopharmacological methods of neurocognitive enhancement. He believes that the two practices can be fruitfully reconciled in the pursuit of moral enhancement and a project of what he calls "virtue engineering."[784]

Alongside fellow IEET board members, Michael La Torra and George Dvorsky, Hughes is a co-leader of the IEET's Cyborg Buddha Project, which aims to "promote discussion of the impact that neuroscience and emerging technologies will have on happiness, spirituality, cognitive liberty, [and] moral behaviour" in conjunction with "the exploration of meditational and ecstatic states of mind."[785]

In a piece for the *Journal of Evolution and Technology* in 2014, the social and political philosopher, Woody Evans, argued that "Buddhism is not transhumanist, and transhumanism is not Buddhist"[786] because the proponents of these two worldviews seek transcendence by different means. I think he misses the point. Proponents of spiritual and religious sub branches of transhumanism are choosing to retain the bits of a religion, or spiritual practice that still work for them, and are merging those aspects with the bits of transhumanism that they find appealing. As a result, the transhumanist meme is mutating and spreading farther and wider than ever before.

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[784] See: *H+ Magazine*, "James Hughes on Moral Enhancement, and the Cyborg Buddha Project," June 1, 2014, http://hplusmagazine.com/2014/06/01/james-hughes-on-moral-enhancement-and-the-cyborg-buddha-project/; James Hughes, "Foreword," in *Transhumanism and the Body: The World Religions Speak*, ed. Calvin Mercer and Derek F. Maher (New York: Palgrave Macmillan, 2014), xiii.
[785] *IEET*, "Cyborg Buddha Project," accessed August 16, 2018, https://ieet.org/index.php/IEET2/cyborgbuddha.
[786] Woody Evans, "If You See a Cyborg in the Road, Kill the Buddha: Against Transcendental Transhumanism," *Journal of Evolution and Technology* 24.2 (2014), https://jetpress.org/v24/evans.htm.

Christian transhumanists aren't arguing that Christianity was always focused on using science and technology to become more virtuous and Godlike. Similarly, Buddhist transhumanists are not claiming that transhumanism is Buddhism by another name. Instead, proponents of these transhumanist-spiritual hybrids are recognising that, in a modern world where advanced forms of technological transcendence now seem theoretically, if not actually possible, the objectives of a religious or spiritual framework could be enhanced with the aid of modern science and technology.

Spiritual transhumanists

Of course not all spiritual or religious transhumanist communities identify with existing religions or spiritual practices. An interesting, but short-lived, transhumanist group was the Order of Cosmic Engineers (OCE). The OCE emerged in 2008 and held virtual events in the games Second Life and World of Warcraft. The OCE was certainly not a conventionally religious group, but a number of spiritualist transhumanists were among them, including Ben Goertzel and Giulio Prisco. Max More and Natasha Vita-More were also members.

The "OCE members share[d] the conviction that—in all likelihood—there presently is no supernatural god." But they believed that part of their long-term transhumanist mission was "to Build 'God(s)'" in the form of superintelligent cosmic hive minds.[787] The group's prospectus stated that the Order could "be distinguished from other strands of transhumanism by its enthusiastic espousal of universe-scale cosmic visions and worldviews, including spiritual sensibilities attendant to such."[788] Although the OCE is no longer an active group, members like Goertzel and Prisco have continued to espouse a brand of cosmist transhumanism, in the spirit of Teilhard de Chardin and other cosmist thinkers of the twentieth century.

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[787] *Order of Cosmic Engineers*, "Introducing the Order of Cosmic Engineers (OCE)." Archived January 6, 2009, https://web.archive.org/web/20090106211451/http://cosmeng.org/index.php/Prospectus.
[788] *Order of Cosmic Engineers*, "Introducing the Order of Cosmic Engineers (OCE)."

Twentieth century cosmism combined religion, mysticism, science and technology and emphasised the importance of being a cosmic citizen rather than focusing inwardly on life on Earth. Cosmists strove to direct evolutionary processes in order to fulfill traditional religious aspirations of omnipresence and immortality through science and technology.[789] In cosmist transhumanism, engineering God-like states in the future is equated with human spiritual purpose. In 2010, Humanity+ Press published Goertzel's short book, *A Cosmist Manifesto: Practical Philosophy for the Posthuman Age*.[790] Ted Chu's book, *Human Purpose and Transhuman Potential: A Cosmic Vision of Our Future Evolution* (2013) is also written in the spirit of cosmist transhumanism.

Other transhumanist spiritualist groups include Terasem, founded by transgender transhumanist and entrepreneur, Martine Rothblatt, and her wife Bina Aspen Rothblatt. The Terasem faith was one prong of a three-pronged Terasem organisation based around promoting life-extension and the preservation of digital mind files. The Terasem Faith is:

> … a religion that believes we can live joyfully forever if we build mindfiles for ourselves, insist on respecting diversity without sacrificing unity, and pour maximum resources into cyberconsciousness software, geoethical nanotechnology and space colonization.[791]

Terasem was covered by *TIME* magazine in 2014 in an article titled, "The Rapture of the Nerds."[792] However, the Terasem Faith website is now defunct and the media coverage of the movement has ceased.

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[789] George M. Young, *The Russian Cosmists: The Esoteric Futurism of Nikolai Fedorov and His Followers* (New York: Oxford University Press, 2012).
[790] Ben Goertzel, *A Cosmist Manifesto: Practical Philosophy for the Posthuman Age* (Humanity+ Press, 2010), http://goertzel.org/CosmistManifesto_July2010.pdf.
[791] *Terasem Faith*, "Welcome to Terasem Faith!" archived April 8, 2010, https://web.archive.org/web/20100408195050/http://terasemfaith.net/.
[792] Jessica Roy, "The Rapture of the Nerds," *TIME*, April 17, 2014, http://time.com/66536/terasem-trascendence-religion-technology/.

A still extant transhumanist religious organisation is The Church of Perpetual Life (CPL), based in Florida, USA. The CPL was founded in 2013 by William 'Bill' Faloon, who also co-founded the Life Extension Foundation in 1980 with Saul Kent.[793] Members of this group refer to themselves as "immortalists." They stress that this is "not because we have defeated death, but because we believe that future technology will conquer disease and aging, as well as death itself."[794]

The CPL has elevated the Russian cosmist Nikolai Fedorovich Fedorov to the status of prophet. Drawing on Fedorov's idea of the common task of achieving scientific resurrection, immortality, and transcendence, the group aims to, "accelerate the Creator's plan of the Common Task of Humanity, which is to cultivate technology that will facilitate the transformation of life into an environment of perpetual duration."[795]

New transhumanist declarations

With transhumanism attracting greater mainstream awareness as a philosophy and movement in the past decade, new spokespeople and contributors have emerged. One such person is the Singularity Weblog interviewer, author and podcaster, Nikola Danaylov, who goes by the online name of Socrates. Danaylov was born in Bulgaria and has interviewed the who's who of transhumanism and the tech world, from Ray Kurzweil, Aubrey de Grey and James Hughes, to Peter Diamandis, Kevin Kelly, Max Tegmark and Michio Kaku. He is the author of *Conversations with the Future: 21 Visions for the 21st Century* (2017) and in 2014 he penned his own version of "A Transhumanist Manifesto" as part of a competition run by the transhumanist site Transhumanity.net to write a new transhumanist declaration.

[793] William Faloon, "A Revolutionary Concept Slowly Gains Recognition," *Life Extension*, February 2005, http://www.lifeextension.com/magazine/2005/2/awsi/Page-01.
[794] *Church of Perpetual Life*, "About," accessed August 16, 2017, http://www.churchofperpetuallife.org/about.
[795] *Church of Perpetual Life*, accessed August 7, 2017, http://www.churchofperpetuallife.org/nikolai-fedorovich-fedorov.

Danaylov's manifesto is short and general and covers similar ground to previous transhumanist declarations. He argues in favour of conscious evolution and transcending biology, maintains that substrate is irrelevant for determining personhood, and advocates breaking free of biological chains and defeating death. However, he does add an interesting qualifier about emotional intelligence. Although he advocates emancipating intelligence from biology and progressively augmenting it, he adds that "intelligence devoid of emotional intelligence is meaningless. It must exhibit empathy, compassion, love, sense of humor and artistic creativity such as music and poetry."[796]

In keeping with the spirit of the first transhumanist statements of purpose, which always claimed to be provisional, and frequently evolved over time, Danaylov emphasises that his "manifesto is a work in progress" and may "change as my thoughts and feelings about transhumanism evolve."[797] His point about emotional intelligence also exemplifies Bostrom's point that "there are as many versions of transhumanism as there are serious transhumanist thinkers."[798] Danaylov's views about emotional intelligence may overlap with some other transhumanist's perspectives, but it is far from a universal transhumanist belief that human emotions in their current form should be preserved in a posthuman future.

The winner of the Transhumanity.net competition was the physicist Dirk Bruere. Bruere endorsed David Pearce's goal of the abolition of suffering and argued in favour of morphological freedom and existential risk mitigation. His "Declaration" is extremely succinct. In an age where more people are identifying with, and grappling with, transhumanist ideas, he offers a broad and clear explanation of what makes transhumanism distinctive, writing, "the single defining factor of Transhumanism that

[796] Nikola Danaylov, "A Transhumanist Manifesto," *IEET*, November 18, 2014, https://ieet.org/index.php/IEET2/more/danaylov20141118.
[797] Danaylov, "A Transhumanist Manifesto."
[798] Bostrom, "Transhumanist Values," April 18, 2001.

separates it from all previous philosophies is the proposed use of technology to transcend what it means to be Human."[799]

In 2014, another declaration was penned by a collaborative group of transhumanists who identified as technoprogressives. Representatives from around the world signed the declaration, as well as eight transhumanist organisations, including H+ and the IEET. The "Technoprogressive Declaration" was much more specific and policy oriented than the declarations above. It called for "transhumanists and futurists to step up our political engagement and attempt to influence the course of events" and commit to using both technology and democracy to mitigate risks and inequality. It also emphasised the need to "build solidarity" with other "partisans of the promises of the Enlightenment," and work together on social and ethical problems like technological unemployment, drug law reform, reproductive rights and disability rights.[800]

Transhumanist politics

Another area that has experienced growth and garnered increasing publicity in the past decade is transhumanist politics. We have already seen that political positions within organised transhumanist communities are varied and that democratic and libertarian sentiments co-exist, and sometimes compete, in transhumanist culture. In the 2010s, a number of overtly transhumanist political parties emerged in America, Europe, the UK and Australia. Several openly transhumanist candidates have also recently run in State and Federal elections under the banners of other parties.

Although transhumanist politics is far from mainstream, politics is yet another arena in which transhumanist issues are being brought to greater public prominence in the 2010s. Growing numbers of transhumanist politicians are now laying the political

[799] Dirk Bruere, "The Transhumanist Declaration 2.0," *Medium*, March 6, 2016, https://medium.com/@dirk.bruere/the-transhumanist-declaration-2-0-3779b433af7d.
[800] *IEET*, "Technoprogressive Declaration—TransVision 2014," November 22, 2014, https://ieet.org/index.php/IEET2/more/tpdec2014. The "Technoprogressive Declaration" was last updated in 2017. See: *TransVision 2017*, "2017 Update to the Technoprogressive Declaration," https://transvision-conference.org/tpdec2017/.

groundwork (primarily by campaigning and raising awareness of transhumanist issues and their political relevance) for what they believe will be the necessary representation of transhumanist issues, and defence of transhumanist policies and ideas, in the years and decades to come.

In July 2012, Italy became the first nation to elect an overtly transhumanist candidate, Giuseppe Vatinno, as a Member of Parliament. Vatinno is a physics graduate and has taught at several Italian universities, including the Politecnico in Milan and the University La Sapienza in Rome. He was elected as a representative of Italia dei Valori (Italy of Values), but espoused openly transhumanist beliefs. Vatinno was then a longstanding member of the Italian Transhumanist Association (AIT) and believed that when it comes to using science and technology to help make the world a better place, political pragmatism and sound public communication strategies are essential. In a 2012 interview he remarked:

> … the scientists, the 'lords of technology,' must understand that sometimes they need to talk to ordinary people—explain and discuss—because only then can we hope to achieve a political consensus, crucial to real social change.[801]

As an MP, Vatinno advocated for more liberal laws regarding assisted reproductive technologies and championed the development of clean energy applications of nanotechnology.[802] He also penned the book *Il transumanesimo. Una nuova filosofia per l'uomo del XXI secolo* (*Transhumanism: A new philosophy for the man of the twenty-first century*) which was published in Italian in 2010—though it has not been translated into English. However, Vatinno's tenure as an MP was short lived. In December 2012, he put a controversial question to Parliament about the study of UFOs. Soon after, The Network

[801] Giulio Prisco, "Italy elects first transhumanist MP," *KurzweilAI*, August 26, 2012, http://www.kurzweilai.net/italy-elects-first-transhumanist-mp.
[802] Edwin Cartlidge, "Meet the world's first transhumanist politician," *New Scientist*, September 12, 2012, https://www.newscientist.com/article/mg21528826-100-meet-the-worlds-first-transhumanist-politician/.

of Italian Transhumanists publically distanced themselves from him. His career as an MP ended in 2013.[803]

In 2014, Gabriel Rothblatt (the son of the transhumanist couple Martine Rothblatt and Bina Aspen Rothblatt) ran as the Democratic candidate for the House of Representatives in Florida's 8th Congressional District. Although he was a representative of the Democratic Party, Rothblatt also ran as an openly transhumanist candidate. When explaining why he believes that transhumanism needs to become more political, Rothblatt remarked:

> Every movement begins as a fringe, successful movements eventually grow to become dominant trends, and that entails having a political voice. Especially in America there is great divide growing between science and politics, a divide that in a time of enormous technological growth, itself poses an existential risk for humanity. We cannot continue to let government ignore and fail to respond to the rapidly changing technological world around us. Transhumanism, must gain mainstream acceptance, or lose out to the idiocracy of luddites with thermonuclear capabilities.[804]

Although Rothblatt lost the election to the Republican candidate Bill Posey, some of his transhumanist supporters considered the election to be an important milestone, paving the way for further transhumanist forays into politics. Dustin Ashley wrote that Rothblatt's campaign was important because it "showed that transhumanism is becoming more openly acceptable and not just a movement based on fringe ideas."[805]

In Australia, the transhumanist biohacker, Meow-Ludo Disco Gamma Meow-Meow, ran for the Senate seat of Grayndler in 2016 under a Science Party ticket.[806] He also

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[803] *Network H+ Transumanisti Italiani*, "The H + Network on the parliamentary question by Mr Giuseppe Vatinno," January 9, 2013, http://transumanisti.org/index.php?option=com_content&view=article&id=32:il-network-h-sullinterrogazione-parlamentare-dellon-giuseppe-vatinno&catid=2&Itemid=65.
[804] Peter Rothman, "Interview: Gabriel Rothblatt Congressional Candidate in Florida's 8th District," *Humanity+ Magazine*, July 1, 2014, http://hplusmagazine.com/2014/07/01/interview-gabriel-rothblatt-congressional-candidate-in-floridas-8th-district/.
[805] Dustin Ashley, "Gabriel Rothblatt Lost The Race," *Transhumanity.net*, November 5, 2014, http://transhumanity.net/gabriel-rothblatt-lost-the-race/.
[806] Luke Cooper, "Meow-Ludo Disco Gamma Meow-Meow Really Wants You To Care About Science," *Huffington Post*, updated July 15, 2016, https://www.huffingtonpost.com.au/2016/06/17/meow-ludo-disco-gamma-meow-meow-really-wants-you-to-care-about-s_a_21397031/.

contested the 2017 New England by-election in the State of New South Wales, again representing the Science Party.[807] Although he was not elected (Meow came seventh in the race out of seventeen candidates, garnering 1.35% of the vote),[808] his campaigns and biohacking pursuits have been widely covered by the Australian media, including a successful court appeal in 2018, where a fine and conviction for using public transport without a valid ticket was overturned (Meow implanted the chip from his public transport card into his hand and used it to tap on to the NSW public transport system instead). The public transport saga and appeal was widely covered in the media as a "cyborg rights" issue.[809]

A transhumanist in the White House?

Perhaps the most famous transhumanist politician is Zoltan Istvan. Istvan ran symbolically in the 2016 US presidential race as an independent candidate. At the time, he was the leader of the US Transhumanist Party, which he founded in October 2014.[810] In effect, his campaign was a public awareness drive promoting transhumanist ideas and policy directions. In practice, the Transhumanist Party is not registered with the US Federal Election Commission due to their limited resources.[811] Nevertheless, Istvan developed a platform for his campaign, which included: introducing a Transhumanist Bill of Rights to protect the rights of all sentient creatures, whether biological, human or silicon; protecting morphological freedom; smaller government; ending the war on drugs; promoting clean energy solutions; implementing a universal basic income (UBI)

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[807] Kelly Fuller, "New England by-election: Sixteen candidates put up hand to run against Barnaby Joyce," *ABC News*, December 1, 2017, http://www.abc.net.au/news/2017-12-01/sixteen-candidates-take-on-barnaby-joyce-new-england-by-election/9167730.

[808] *Australian Electoral Commission*, "New England By-election," accessed November 6, 2017, https://results.aec.gov.au/21364/Website/HouseDivisionPage-21364-135.htm.

[809] See: *The Guardian* (no by-line), "Biohacker fights for 'cyborg rights' after implanted travel card cancelled," February 15, 2018, https://www.theguardian.com/australia-news/2018/feb/15/biohacker-fights-for-cyborg-rights-after-implanted-travel-card-cancelled; *SBS News* (no by-line), "'Cyborg justice' for Opal card biohacker," updated June 18, 2018, https://www.sbs.com.au/news/cyborg-justice-for-opal-card-biohacker.

[810] *US Transhumanist Party*, "Frequently Asked Questions," accessed September 11, 2018, http://transhumanist-party.org/faq/.

[811] Zoltan Istvan, "Revolutionary Politics Are Necessary for Transhumanism to Succeed," *Motherboard*, November 4, 2016, https://motherboard.vice.com/en_us/article/ezpqba/revolutionary-politics-are-necessary-for-transhumanism-to-succeed.

in response to workplace automation; and promoting science education and space exploration.[812]

Istvan's campaign was controversial within the transhumanist community, as some transhumanists did not approve of his running a merely symbolic campaign, or emphasising life-extension so prominently above other transhumanist goals.[813] Yet his campaign received a tremendous amount of media coverage, undeniably generating greater public awareness of a version of the transhumanist meme. Istvan provocatively drove around America in a coffin shaped bus, which he dubbed The Immortality Bus. In doing so, he hoped to start a conversation about death as something that humans should strive to actively overcome through science, technology and policy changes.[814]

Fig. 21. Zoltan Istvan drives the Immortality Bus. Behind him, Roen Horn clutches a skull. Image credit: Nancy Borowick. Photo appeared in the *New York Times*, February 8, 2017.

[812] Zoltan Istvan, "Platform," accessed September 13, 2018, http://www.zoltanistvan.com/TranshumanistParty.html.
[813] Rachel Pick, "The Transhumanist Movement Is Having An Identity Crisis," *Motherboard*, November 4, 2015, https://motherboard.vice.com/en_us/article/xygq7d/the-transhumanist-movement-is-having-an-identity-crisis.
[814] Olivia Solon, "All aboard the Immortality Bus: the man who says tech will help us live forever," *The Guardian*, January 16, 2016, https://www.theguardian.com/technology/2016/jun/16/transhumanist-party-immortality-zoltan-istvan-presidential-campaign.

Fig. 22. Zoltan Istvan's Immortality Bus parked in a cemetery in Alabama. Image credit: Timothy Eastman. Photo appeared in the *New York Times*, February 8, 2017.

After his presidential campaign, Istvan stepped down as the leader of the US Transhumanist Party but continues to promote transhumanist policies and remains an advisor to the party.[815] Reflecting on his journey during the presidential race, Istvan described going into the campaign with hope and optimism and leaving jaded about how difficult it is to run a campaign in the US when you don't belong to one of the two major parties. He wrote:

[815] *US Transhumanist Party*, "Frequently Asked Questions."

> The system is nearly impenetrable, bound by rules designed decades and even centuries ago. Those rules are specifically made to keep radicals like me out—even if the two major party candidates are markedly disliked, as they are this cycle. For starters, it takes many millions of dollars to get on crucial state ballots, like my home state of California, where I am neither on the ballot or even a write-in. Those millions of dollars must pay for an army of staffers who peddle door to door to gain the approximately 880,000 signatures needed for an independent to gain ballot access to all 50 states. And getting signatures supporting an unorthodox transhumanist candidate like myself is even more difficult. It can range from $3 to $10 a signature.[816]

Istvan funded his own campaign with $100,000 of his own money. The only donations he accepted came from a Kickstarter campaign to fund the Immortality Bus.[817] He also publically voiced his astonishment regarding the fact that, in the presidential debates between the two major candidates, Hillary Clinton and Donald Trump, the pressing issues of climate change and artificial intelligence were not mentioned. In Istvan's view, "nothing has or will affect the American people more than science and technology." He maintains that "these are not side issues. These are the most pressing concerns in politics—not whether Trump is misogynistic or Clinton lost emails."[818]

Other transhumanist political ventures

A number of other transhumanist political parties exist around the world and many other groups have announced their intention to register as parties, while maintaining an online presence on social media. These organisations include: Russia's Longevity Party and Evolution 2045 Party, The UK Transhumanist Party, the Transhumanist Party of Germany, the Transhumanist Party Australia, the umbrella group the Transhumanist Party Global, and the American Transhuman National Committee, which is a Political Action Committee (PAC) with the aim of "driving a transhuman political agenda in the United States."[819]

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[816] Zoltan Istvan, "What I Learned by Running for President," *Motherboard*, October 29, 2016, https://motherboard.vice.com/en_us/article/8q8knz/what-i-learned-by-running-for-president.
[817] Istvan, "What I Learned by Running for President."
[818] Istvan, "What I Learned by Running for President."
[819] *Transhuman National Committee*, "Home," accessed September 13, 2018, http://www.transhumanpolitics.com/.

The British group Transpolitica (P+ for short), also provides resources, references and roadmaps for transhumanist political parties. The group is led by the futurist, software developer and tech consultant, David Wood, who is also the author of the book *Transcending Politics: A Technoprogressive Roadmap to a Comprehensively Better Future* (2018).

In 2016, the political scholars Roland Benedikter and Katja Siepman commented that the rise of transhumanist political parties was "hardly surprising" in an age of rapidly advancing science and technological development. They argued that "it seems to be only a matter of time before transhumanist beliefs gain wider cachet in contemporary culture and begin to have greater impact on politics." In their view, "technology will become one of the most important political issues of the coming years, regardless of whether it is promoted, discussed or criticized by traditional left-right parties, humanists or transhumanists." In an age where contemporary science research "is starting to show strong transhumanist influences," Benedikter and Siepman conclude that, "the policymakers of the West, and potentially around the world, are well advised to take the emerging transhumanist political movements far more seriously than before."[820]

Transgender movements and transhumanism

As science, technology and modern medicine are key tools of personal augmentation and transformation, transgender and transhumanist advocates share a number of ethical and political positions regarding emerging technologies and human enhancement. Both groups are strong advocates of morphological freedom and argue that your 'natural' form is not necessarily ideal, or representative of who you are or want to be. Consequently, you should be free to alter that form without prejudice.

[820] Roland Benedikter and Katja Siepman, "'Transhumanism': A New Global Political Trend?" *Challenge* 59, no. 1 (2016): 56-57, doi: doi: 10.1080/05775132.2015.1123574.

In 2003, the chair of the National Transgender Action Coalition in the United States, Vanessa Lem, announced at a WTA's Transvision conference "that transsexuals like herself were the first transhumanists." According to Hughes, this declaration stunned the largely straight, male transhumanist audience of the day and ultimately became an "important moment in the history of transhuman politics" as it supposedly announced the emerging consciousness of "transhumanism as a vanguard civil rights movement."[821]

The American lawyer, author and entrepreneur, Martine Rothblatt, is notable for being a prominent transgender woman and transhumanist. As a public figure, Rothblatt has helped draw attention to the ways that both movements raise novel and pertinent questions about identity, personhood, augmentation, gender, and morphological freedom.[822]

Another transgender transhumanist, Valkyrie Ice, explained in a 2012 interview why she believes that transgenderism and transhumanism converge:

> At it's heart, I see both as about embracing change. As a transsexual, I suffered from a genetic mix-up that resulted in a feminized brain inhabiting a masculinized body. In the past, there was no way to change this. The technology simply did not exist to enable a physical change to be made and allow this error to be corrected. Now, it does. I can change my body to be a match with my brain.
>
> In much the same way, the human being has been relatively unchanged for thousands of years, our physical shells unable to match the adaptivity of our brains, and the rapid evolution of our social and mental structures. Our knowledge and culture has advanced by leaps and bounds, while our bodies are still chained to the slow pace of biological evolution. We've been trapped by our DNA as a species in the exact same manner I have been trapped by mine in a physical shell that does not mirror our inner selves. And just like the technology now exists to change my body, so too will we soon have the technology to allow all of humanity to bypass random mutation and become a self directed, consciously evolving being.

[821] Hughes, *Citizen Cyborg*, ch.11.
[822] See: Martine Rothblatt, "My daughter, my wife, our robot, and the quest for immortality," *TED*, May 18, 2015, https://www.youtube.com/watch?time_continue=2&v=rTJpJlVkRTA.

> So, as a transgender, I am merely a singular example of the transformation humanity itself will undergo as we move out of the era of limits, and into the era of limitlessness.[823]

As both transhumanist and transgender movements gain social and political influence in the twenty-first century, it will become increasingly apparent that many of their core goals converge, especially around the promotion and democratisation of human augmentation technologies. The same is true of both disability rights and cyborg rights movements. The more political acceptance human enhancement technologies gain as these movements converge, the more plausible radical transhumanist or posthuman futures might start to seem in shorter timeframes.

Concluding remarks

As we will see in part 3, the global influence of modern transhumanist ideas and technologies began to explode in the second decade of the twenty-first century. Some early transhumanist claims have already been vindicated, while others remain on the horizon of possibility. Perhaps technological advances alone, in fields like artificial intelligence and genetics, would have been enough to catapult transhumanist concerns into mainstream discourse in the 2010s. But the theoretical and ethical groundwork laid by extropians and WTA members has undeniably shaped the face of the evolving transhumanist movement, which has played an increasing role in raising public and political awareness of transhumanist issues and their implications for the future.

[823] Hank Pellissier, "Transgender and Transhuman—the alliance, the complaints and the future," *IEET*, June 15, 2012, https://ieet.org/index.php/IEET2/print/5921.

PART 3

Why Transhumanism Matters

The curtains are now drawing across the second decade of the twenty-first century. The recent explosion of mass media coverage of transhumanist technologies like artificial intelligence, and debates over the automation of jobs and the implementation of a universal basic income, suggest that the time is ripe for transhumanist memes and ideas to go mainstream. The growing number of prominent intellectuals now voicing concern over artificial intelligence as an existential risk—from Elon Musk, to Sam Harris, Max Tegmark, and the late Stephen Hawking—along with the aggressive investment in NBIC technologies by leading tech companies and governments around the world, further suggests that transhumanist phenomena are not going to leave us any time soon.

The meteoric rise of transhumanist academics, like Nick Bostrom, and popularisers of transhumanist ideas, like Yuval Noah Harari and Michio Kaku, also indicates that there is a growing hunger among the general public to explore transhumanist ideas and technologies and the compelling ethical quandaries that they pose. This growing cultural interest in transhumanism is further indicated by the proliferation of popular TV shows with transhumanist themes, like *Black Mirror*, *Humans*, and *Westworld*, and films such as *Her*, *Transcendence*, and *Blade Runner 2045*.

These final chapters highlight how ahead of the times our proto-transhumanists and early transhumanists were. In our modern world of sci-fi dreams made real, from self-driving cars and reusable rockets, to 3D printed body parts, machine brain interfaces, personalised medicine and rapid automation, every human being is now grappling with the effects of the unprecedented degree of our modern reliance on, and convergence with, machines. Humans have been enhanced by tools since we first invented them, but transhumanists rightly argue that our modern tools are now enhancing us extremely

rapidly and in ways that more deeply challenge our conceptions of humanity, self-hood and the good life. For the first time in history, posthumanity could actually be within reach for people alive today.

In this final part, I demonstrate that the core transhumanist themes and ideas that we have explored throughout this history have found their way into leading government and corporate agendas, which are steering humanity towards ever more technologically embedded modes of being—and ultimately, towards posthumanity. In chapter 10, I show how profoundly transhumanism is now embedded in many of the dominant Western cultural narratives that explain and characterise the modern world. I also emphasise the importance of the historically novel role being played by the scores of modern tech-industry billionaires who have transhumanist-leaning worldviews and who are currently throwing enormous sums of money at many projects of a transhumanist ilk.

In chapters 11 and 12, I highlight the profoundly transhumanist ramifications of advances in two convergent branches of modern technology: biotechnology and artificial intelligence. Thousands of projects that might have more modest *stated* aims, like curing cancer and eliminating diseases, are now drawing upon a convergent array of NBIC technologies that are collectively and incrementally extending human health and lifespans and integrating our minds and bodies ever more with advanced technologies. The slippery slope between healthy and 'better than well' has never been steeper, nor has the dividing line between a biological human and an enhanced cyborg or superhuman ever been so thin, or so blurry.

Although there is not scope for a detailed exploration of the ethics and emerging social dilemmas posed by the projects and technologies discussed in these final chapters, the following discussion will provide the reader with the context to start thinking in new ways about what the future might hold. Transhumanism is now a pervasive cultural force that extends far beyond the confines of organised transhumanist movements. It's time to ask yourself, how far could the technological evolution of humanity extend in

your lifetime? What does a good life look like in this transhuman age, and what might it look like in a posthuman future?

10. The Transhumanist Explosion

> *What used to be something looming in the future and taking shape only from yesterday's science fiction movies, is now a very present reality. It's taking shape at the speed of life. The blurred distinction between man and machine will redefine our world and lives. And it's beginning to take shape in a real and tangible way today.*
>
> — John Nosta, "It's Official, The Transhuman Era Has Begun" (2018)

In August 2018, the health innovation expert, John Nosta, wrote an article in *Forbes* titled, "It's Official, The Transhuman Era Has Begun." The headline captured the present reality, in which major transhumanist ideas and technologies, from artificial intelligence, to radical life extension, are now being publicly discussed by figures like Elon Musk, Bill Gates, Mark Zuckerberg and Barack Obama. As self-service checkouts and industrial robots replace human staff, and AI lawyers make the news, many people half-joke and half worry that the robots are coming.[824] Those who have already lost jobs due to automation may tell you with a straight face that the robots are already here.

A once controversial and fringe set of ideas, transhumanism is now a major feature of the modern world. As the technologies that underpin transhumanist aspirations reach new levels of maturity, the term, and its related memes and projects, are gradually shedding their kooky image of sci-fi futurism and attracting widespread public interest. Although organised transhumanist movements are still relatively small in terms of institutional subscribers, transhumanist-oriented research projects and think tanks are now attracting billions of dollars in funding, and many transhumanist thinkers are exerting a level of global influence disproportionate to the movement's size.

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[824] See: Samuel Gibbs, "Chatbot lawyer overturns 160,000 parking tickets in London and New York," *The Guardian*, June 28, 2016, https://www.theguardian.com/technology/2016/jun/28/chatbot-ai-lawyer-donotpay-parking-tickets-london-new-york; Justin McCurry, "Japanese company replaces office workers with artificial intelligence," *The Guardian*, January 5, 2017, https://www.theguardian.com/technology/2017/jan/05/japanese-company-replaces-office-workers-artificial-intelligence-ai-fukoku-mutual-life-insurance; Josh Kosman, "Inside Amazon's robot-run supermarket that needs just 3 human workers," *New York Post*, February 5, 2017, https://nypost.com/2017/02/05/inside-amazons-robot-run-supermarket-that-needs-just-3-human-workers/.

Transhumanist ideas that seemed absurd or extremely remote possibilities to many scientists and leaders twenty years ago, like reversing ageing in humans, are now becoming key social and scientific priorities. Meanwhile, transhumanist ideas and technologies have become key components of the dominant cultural narratives of modernity and they are increasingly shaping our evolving assumptions about the future of human and terrestrial evolution.

The story of the modern world

If we asked a thousand random people on the street what they believe to be the major forces shaping the modern world, we'd get many different answers. It's quite possible, even likely, that none of them would say transhumanism. But it's almost impossible to imagine that none of them would say technology. And at a certain point, which we have now reached in the twenty-first century, the rapid development and convergence of NBIC technologies, implies transhumanism—in the sense of a world characterised by accelerating cultural and technological evolution with many possible posthuman outcomes.

It rarely gets pointed out that many leading concepts in political theory, economics, and the sciences, have transhumanist narratives of technological and conscious evolution deeply embedded within them. The political scientist Christopher Coenen alludes to this when he writes:

> The transhumanist tradition of ideas has been shaped and maintained for a long time largely by 'subterranean', extra-academic influences, but it displays numerous interconnections with major traditions of thought about science, technology, society, and the human condition.[825]

Braden Allenby and Daniel Sarewitz also note that:

[825] Christopher Coenen, "Transhumanism in Emerging Technoscience as a Challenge for the Humanities and Technology Assessment," *TEORIJA IN PRAKSA* 51, no. 5 (2014): 764, https://www.fdv.uni-lj.si/docs/default-source/tip/tip_05_2014_coenen.pdf.

> Everyone seems to accept that something new is happening, centered around emerging prospects for changing humanness, for steering its future, through the achievement of new levels of direct control over the physical and cognitive performance of human beings, including the controlled biological evolution of performance standards, the direct intervention in brain function, and the gradual hybridization of human and machine intelligence. The starting point for these diverse moral and philosophical treatments is that emerging technological potentials make humanness—however one wants to define it—an appropriate subject for intentional design in a way that is unprecedented.[826]

As we noted back in chapters 7 and 9, transhumanist organisations and leaders have long struggled with the credibility of the transhumanist image. The re-branding of the WTA as Humanity+ is a testament to this struggle. Leaders responded to the perceived need to distance transhumanist initiatives from a brand (represented by the word transhumanism) that is too readily associated with sci-fi utopian kookery and nerdy men with computers. Demographically 'problematic' associations with the transhumanist brand might help explain why many related transhumanist memes, like artificial intelligence, are more widely discussed in the mainstream media today than the term transhumanism itself.

But we should not let this fool us into thinking that transhumanism is still a fringe idea. On the contrary, it is everywhere. Not only in the culture of modern science, public policy and corporate agendas, but in every dominant scientific-historical narrative, or concept, that seeks to explain how we got to now—from the Fourth Industrial Revolution (4IR), to the Anthropocene.

The 4IR and the Anthropocene

Global leaders, economists, venture capitalists, students, and journalists talk about transhumanism every single day. You might not have noticed, however, because they often use different jargon to describe transhumanist phenomena. One example of a term

[826] Braden R. Allenby and Daniel Sarewitz, *The Techno-Human Condition* (Cambridge, MA: The MIT Press, 2011), kindle, ch.2.

that describes a rapid period of technological acceleration and human-machine convergence is the Fourth Industrial Revolution.[827] The 4IR concept has been widely discussed in the media, and by many governments in recent years, as they develop policies and strategies in response to this rapid wave of societal transformation.[828]

The Founder and Executive Chairman of the World Economic Forum (WEF) Klaus Schwab, describes the 4IR as a new transitional period in the post-industrial world marked by its historically unprecedented "velocity, scope, and systems impact." The result is "a technological revolution that will fundamentally alter the way we live, work, and relate to one another." As Schwab explains:

> The First Industrial Revolution used water and steam power to mechanize production. The Second used electric power to create mass production. The Third used electronics and information technology to automate production. Now a Fourth Industrial Revolution is building on the Third, the digital revolution that has been occurring since the middle of the last century. It is characterized by a fusion of technologies that is blurring the lines between the physical, digital, and biological spheres.[829]

The core technologies driving this revolution, according to Schwab, are:

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[827] There are many precursor ideas that describe a similar phenomenon. In 1980, Alvin Toffler argued in *The Third Wave* that humans and machines were beginning to converge in the post-industrial era. In his 1998 book, *The Information Age: Economy, Society and Culture, Volume III, End of Millennium*, the sociologist Manuel Castells wrote about the postindustrial paradigm of the "Information Age," in which information technologies had become core drivers of wealth, power and cultural evolution (p. 367). Another near-identical concept to the 4IR is Erik Brynjolfsson and Andrew McAfee's concept of 'the second machine age' (2MA) which they explore in, *The Second Machine Age* (2014). Jeremy Rifkin is perhaps the most notable precursor. His book *The Third Industrial Revolution* (2011) predates Klaus Schwab and the WEF's description of a 4IR. Schwab essentially reprodues Rifkin's model but adds an extra point of division. I cite Schwab in-text because the 4IR label seems to have stuck.

[828] See: Staff Reporter, "Fourth industrial revolution to bring real change: Prof Atta," *The Nation*, September 17, 2018, https://nation.com.pk/17-Sep-2018/fourth-industrial-revolution-to-bring-real-change-prof-atta; Chheang Vannarith, "Cambodia embraks on the Fourth Industrial Revolution," *Khmer Times*, September 13, 2018, https://www.khmertimeskh.com/50533043/cambodia-embarks-on-the-fourth-industrial-revolution/; Bernard Marr, "The 4th Industrial Revolution: How Mining Companies Are Using AI, Machine Learning and Robots," *Forbes*, September 7, 2018, https://www.forbes.com/sites/bernardmarr/2018/09/07/the-4th-industrial-revolution-how-mining-companies-are-using-ai-machine-learning-and-robots/#286ab285497e.

[829] Klaus Schwab, "The Fourth Industrial Revolution: what it means, how to respond," *World Ecnomic Forum*, January 14, 2016, https://www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond/.

> … artificial intelligence, robotics, the Internet of Things, autonomous vehicles, 3-D printing, nanotechnology, biotechnology, materials science, energy storage, and quantum computing.[830]

All of the examples on this list are NBIC technologies—the kind that transhumanists have been emphasising the profound transformative potential of for nearly three decades.

Meanwhile, another concept that has recently caught on in academia and in the media is the idea of the Anthropocene.[831] Geologists have observed that the stratigraphical record is changing rapidly and now bears the post-industrial hallmarks of profound human and technological influence on the biosphere. They argue that we are moving out of the Holocene and into a new epoch, the Anthropocene: the age of humans as a major driver of accelerated evolution.[832]

Geologists have even coined a new term, "technostratigraphy," to describe the emerging research focus on, "the geologically accelerated evolution and diversification of technofossils." The abundance of new technofossils (man-made fossils that contain materials not previously found in abundance in the geological record, from plastic, to aluminium, to concrete) provides compelling evidence that humans have rapidly and radically begun to change the Earth's surface since the Industrial Revolution.[833]

The leading geologists Jan Zalasiewicz and Mark Williams have linked the proliferation of modern technofossils with the rapid pace of modern population growth, energy expenditure and technological evolution, which, they note is "orders of magnitude faster

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[830] Schwab, "The Fourth Industrial Revolution."
[831] The search term 'Anthropocene' has been trending upwards as a Google search term since 2010. See: https://trends.google.com/trends/explore?date=all&geo=US&q=anthropocene.
[832] The first modern proposal of the idea of a transition from the Holocene to a new geological epoch, the Anthropocene, is typically attributed to Paul Crutzen and Eugene F. Stoermer in: "The 'Anthropocene,'" *Global Change Newsletter*, May 2000, http://www.igbp.net/download/18.316f18321323470177580001401/1376383088452/NL41.pdf. For a more detailed history of the idea and its precursors, see: Steffen et al., "The Anthropocene: conceptual and historical perspectives."
[833] Jan Zalasiewicz, et al., "The technofossil record of humans," *The Anthropocene Review* 1, no. 34 (2014), doi: 10.1177/2053019613514953.

than biological evolution." Echoing a thesis about the nature of evolution that Ray Kurzweil expounded many years earlier,[834] the two geologists also note that technological evolution is "exponentially increasing technical possibilities founded on earlier advances, and… multiplying potential cross-links between them, acting in positive (and accelerating) feedback systems."[835] This thesis is also not terribly different to what the extropians were saying back in the early 90s when they declared that the world was changing rapidly and that "progress in both theory and practice [is] accelerating."[836]

Geologists and climate scientists now frequently pair up the concept of the Anthropocene with the idea of a Great Acceleration beginning in the mid twentieth century.[837] Cross-disciplinary data measuring twenty-four trends in socioeconomic and planetary systems from 1750-2010 show that:

> The second half of the twentieth century is unique in the entire history of human existence on Earth. Many human activities reached take-off points sometime in the twentieth century and have accelerated sharply towards the end of the century. The last 50 years have without doubt seen the most rapid transformation of the human relationship with the natural world in the history of humankind.[838]

Graphs showing each of these twenty-four trends can be viewed in *Figs. 23* and *24*.

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[834] See: *The Singularity is Near*, ch. 1.
[835] Zalasiewicz, et al., "The technofossil record of humans."
[836] More, "Technological Self-Transformation," 16.
[837] This concept has been explored in detail by J. R. McNeill and Peter Engelke in *The Great Acceleration*.
[838] Will Steffen et al., *Global Change and the Earth System: A Planet Under Pressure* (The IGPB Series, 2004), http://www.igbp.net/publications/igbpbookseries/igbpbookseries/globalchangeandtheearthsystem2004.5.1b8ae20512db692f2a680007462.html.

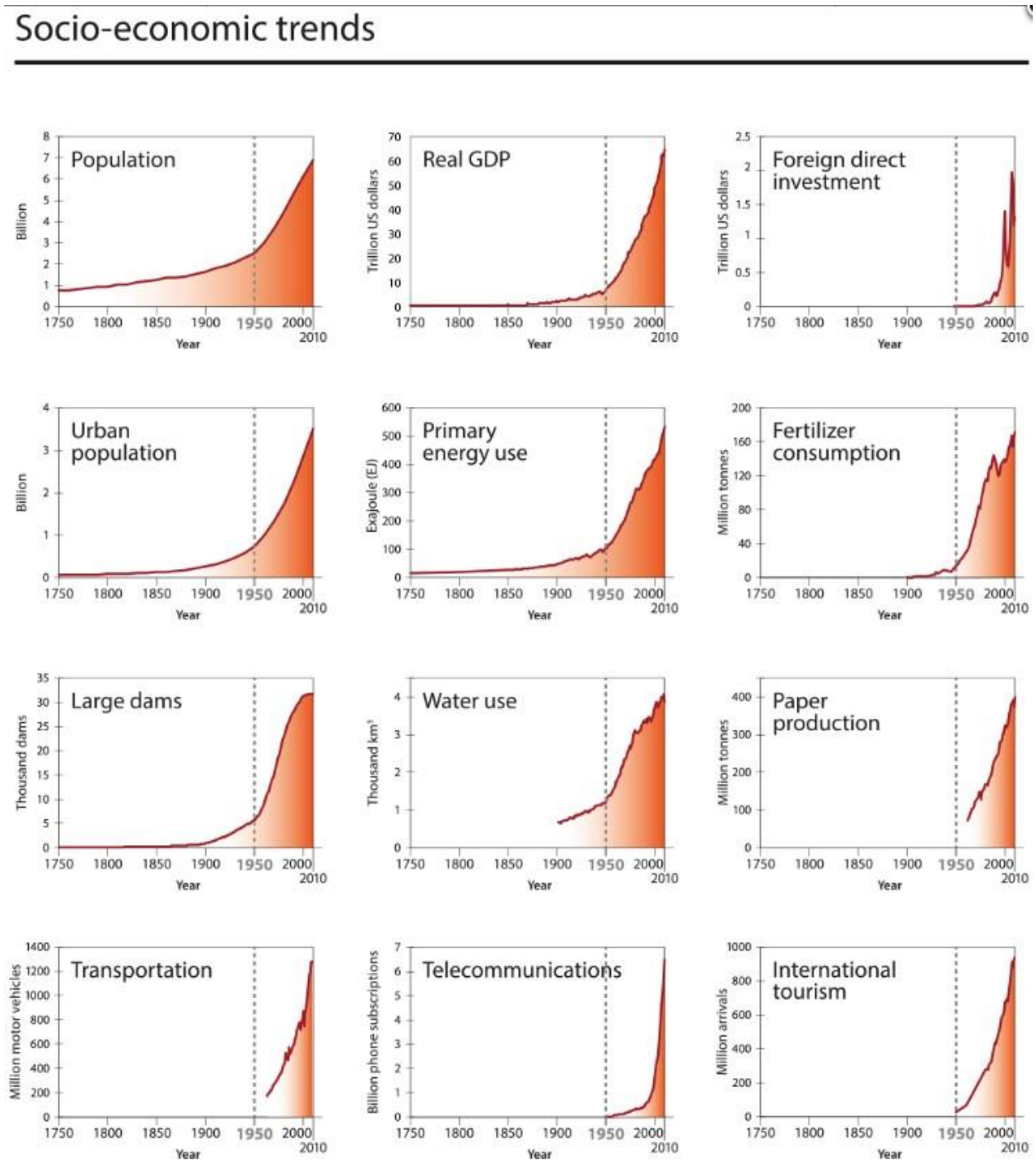

Fig. 23. Great Acceleration data collected by the International Geosphere-Biosphere Programme. "Socio-economic trends."

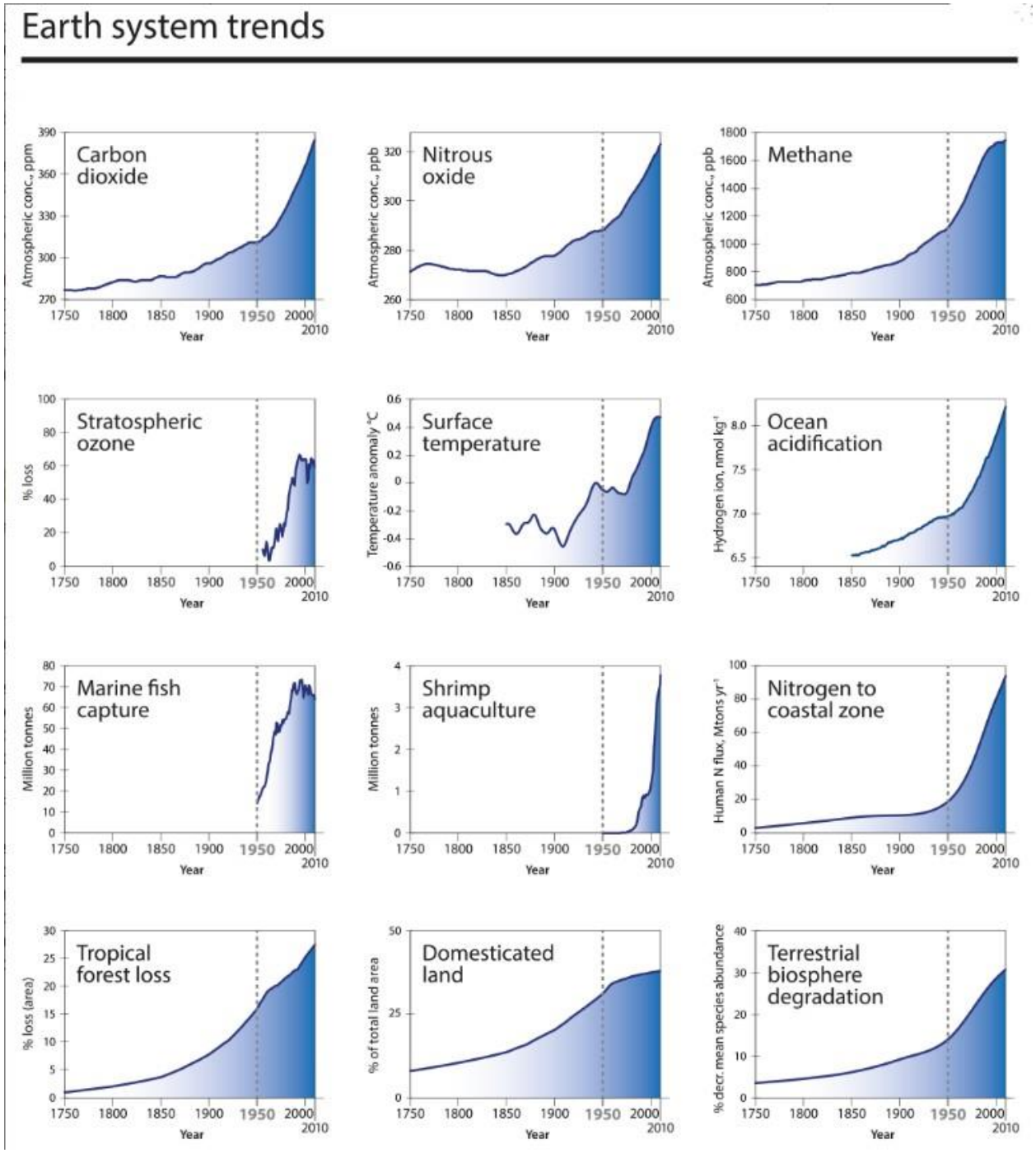

Fig. 24. Great Acceleration data collected by the International Geosphere-Biosphere Programme. "Earth system trends."

As the climate scientist and leading Anthropocene proponent, Will Steffen, notes, "after 1950 you can see that major Earth System changes became directly linked to changes largely related to the global economic system."[839] Humans are using more resources than ever, producing more goods, and exerting unprecedented influence over planetary systems.

It is interesting to compare Ray Kurzweil's data on technological acceleration with the socioeconomic and planetary data above. Kurzweil's graph in *Fig. 25* highlights an exponential growth trend in computing over a 110-year period, with the knee of the curve also beginning in the mid twentieth century.[840] This trend is part of the same Great Acceleration story; the information-tech threads simply don't get highlighted to the same extent by planetary scientists, whose concerns tend to be more eco-centric.

[839] *International Geosphere-Biosphere Programme*, "Planetary dashboard shows 'Great Acceleration' in human activity since 1950," January 15, 2015, http://www.igbp.net/news/pressreleases/pressreleases/planetarydashboardshowsgreatacceleration inhumanactivitysince1950.5.950c2fa1495db7081eb42.html.

[840] Kurzweil has also graphed a number of other exponential trends over a similar time period, from the declining cost of DNA sequencing per base pair, and the growing number of human genomes sequenced per year, to the increases in Internet bandwidth and data transmission speeds and the growth in the number of US patents granted per year. See: Kurzweil, "The Law of Acclerating Returns."

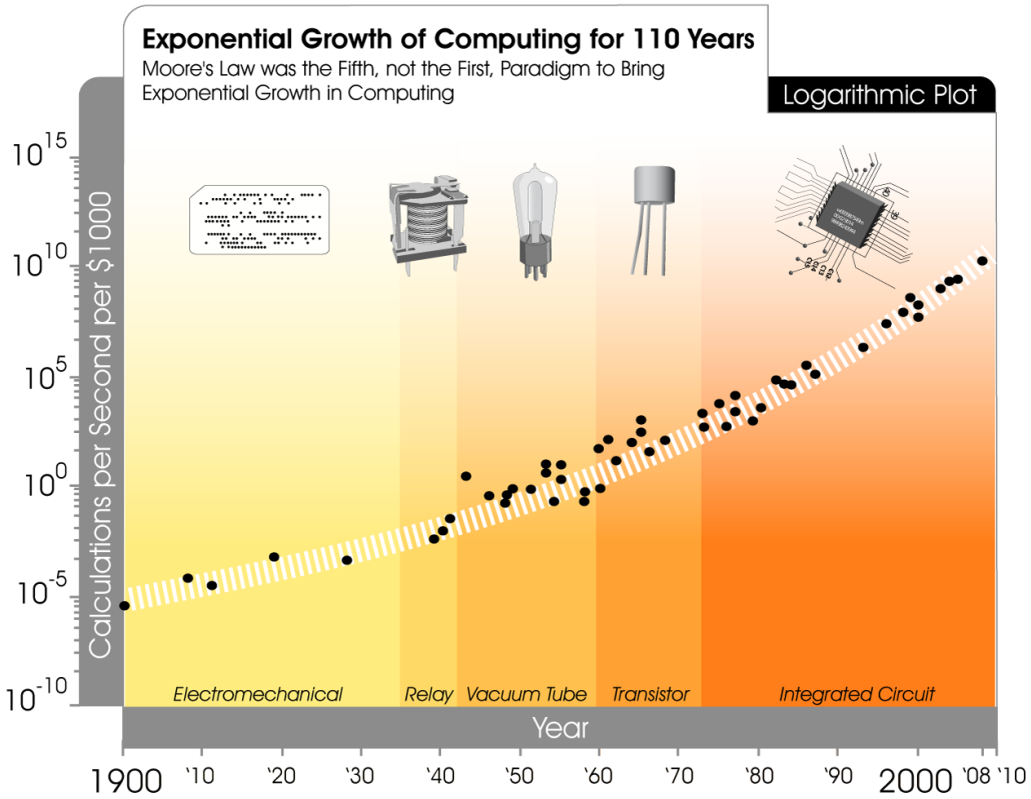

Fig. 25. Graph showing "Calculations per Second per $1000—Exponential Growth of Computing for 110 Years." Source: Ray Kurzweil, *KurzweilAI.*

Yet all of this data is part of an overarching narrative of human, planetary and cosmic evolution and all of these phenomena can be traced back to a very important juncture in history, when humans started to burn fossil fuels, leading to an energy and innovation bonanza. Population growth accelerated and the pool of collective human intelligence expanded. With the aid of our mechanical inventions and a vast increase in available energy, we produced more with less and consumed more. Communities got denser and the world became more globalised, further fuelling innovation.

Information technologies sped up communication and added greater economic efficiencies, resulting in more growth, more innovation, and more technology in a

positive feedback loop, a trend that is now markedly visible in the geological record. Once we invented modern computers, a whole new world of possibilities opened up for humanity, which we are still grappling with today as the pace of innovation continues to accelerate and modern technology becomes more tightly enmeshed with human biology and social systems. Building on the rapid and profound changes generated by the Industrial Revolution, the modern Information Revolution has led us to a unique moment in the history of existential thought, as well as social change, as we start to contemplate the possibility that we are transhuman beings, edging ever closer towards a posthuman mode of existence.

I have only provided a brief summary of two modern ideas that dovetail with transhumanist narratives and evolutionary worldviews. However, the discussion helps to emphasise the omnipresence and significance of transhumanism in the story of the modern world. Something new seems to be afoot in the twenty-first century, from whichever lens you choose to look at it—ecological, economic, or technological. Humans are becoming a powerful evolutionary force, altering the planet and modern lifeways rapidly and radically. We are also embedding ever-smarter and more networked modern technologies in every sphere of modern life, generating a cascade of social, physical and psychological changes that are forcing us to re-evaluate what it means to be human.

Another interesting feature of the modern world is how power and influence are concentrated. There are many forces driving the technical and memetic proliferation of transhumanism in the twenty-first century. These forces include the media, venture capital, and nation states competing for technological supremacy and economic advantage. We will touch on all of these drivers in this final section. But for now, I want to foreground the novel role being played by a powerful group of people who have only recently come into existence in human history: tech-industry billionaires.

The rise of the tech-industry billionaire is not often discussed as an important cultural force, but it is one many forces that is significant here. For the first time in history, a large number of the world's elites are simultaneously highly intelligent, highly educated,

extremely tech-savvy and sympathetic to transhumanist ideas and agendas. Many are actively involved in projects that are overtly transhumanistic. They are also often personally acquainted with leading transhumanists, and are pervasively using their wealth and profound cultural influence to directly accelerate the pace, and shape the direction of, modern transhumanist transformations.

Tech-billionaires as drivers of transhumanism

When it comes to the future of human societies and human evolution, we all have skin in the game. But those in possession of billions of dollars can influence the game in ways that the rest of us can't—both with money, and by lending credibility to moonshot projects by founding or endorsing them. In the twenty-first century, a historically unprecedented number of techno-philanthropist billionaires have come into existence, generating "a technophilanthropic force unrivalled in history."[841] Alongside governments and other investors, these billionaires are playing a major role in funding and legitimising transhumanist projects, from the fight against age-related diseases, to pursuing space colonisation, and accelerating the development of nanotechnology, biotechnology and artificial intelligence, all of which stand to profoundly change the nature of what it means to be human in the twenty-first century.

In 1918, the richest people in the world were monarchs, aristocratic and dictatorial rulers, and entrepreneurs who made their fortunes in First Industrial Revolution industries like oil, railroads and mining. In 1918, America had 18 billionaires (in 2017 dollars).[842] As of 2018, America has 585 billionaires—the highest number in the nation's history. The richest American in 1918, the oil magnate John D. Rockefeller, had a net worth of $21 billion, but the second richest American, Henry Clay Frick, had a net worth

[841] Peter H. Diamandis and Steven Kotler, *Abundance: The Future is Better Than You Think* (New York: Free Press, 2012), kindle, ch.7.
[842] Chase Peterson-Withorn, "From Rockerfeller to Ford, See Forbes' 1918 Ranking of the Richest People In America," *Forbes*, September 19, 2017, https://www.forbes.com/sites/chasewithorn/2017/09/19/the-first-forbes-list-see-who-the-richest-americans-were-in-1918/#53b7bbc94c0d.

that paled at only $3.9 billion.[843] Today's richest American, Amazon's CEO Jeff Bezos, who is also the richest person in the world, has a net worth of $112 billion.[844] Between them, America's top 10 information age tech billionaires have a combined net worth of over half a trillion dollars.[845]

This matters. Like many of his fellow tech-billionaires, Bezos doesn't spend the bulk of his time idling on a massive yacht sipping champagne. He gets his kicks from disrupting established industries and investing in radical moonshot projects that he believes will transform the world and humanity for the better, from building reusable rockets, to developing more capable AI's, and collecting and mining big data to revolutionise healthcare and cure cancer. Like Alphabet/Google, Amazon has a dedicated moonshot branch of its company called Grand Challenge.[846] Bezos also invests in many healthcare companies, including Unity Biotechnology,[847] which is "developing medicines that potentially halt, slow or reverse age-associated diseases, while restoring human health."[848]

As *The Washington Post* (which is owned by Bezos) reported in 2015:

> … the tech titans who founded Google, Facebook, eBay, Napster and Netscape are using their billions to rewrite the nation's science agenda and transform biomedical research. Their objective is to use the tools of technology — the chips, software programs, algorithms and big data they

[843] Both of these figures have been converted from 1918 to 2017 US dollars. See: Peterson-Withorn, "From Rockerfeller to Ford."
[844] *Forbes*, "The Billionaires 2018," March 6, 2018, https://www.forbes.com/billionaires/#6cf32b74251c.
[845] The net worth of the following people was added to reach this figure: Jeff Bezos, Bill Gates, Mark Zuckerberg, Larry Ellison, Larry Page, Sergey Brin, Steve Ballmer, Michael Dell, Paul Allen, and Elon Musk. See: Luisa Kroll and Kerry A. Dolan, eds., "Forbes 400: The Definitive Ranking of the Wealthiest Americans," *Forbes*, October 3, 2018, https://www.forbes.com/forbes-400/#e7602b07e2ff.
[846] Eugene Kim and Christina Farr, "Inside Amazon's Grand Challenge—a secretive lab working on cancer research and other ventures," *CNBC*, June 5, 2018, https://www.cnbc.com/2018/06/05/amazon-grand-challenge-moonshot-lab-google-glass-creator-babak-parviz.html.
[847] Jim Mitchell, "Silicon Valley billionaires are pouring big dollars into research as they attempt to smash the boundaries of life and death," *SBS*, December 4, 2017, https://www.sbs.com.au/guide/article/2017/11/28/want-live-forever-these-billionaires-may-have-answers.
[848] *Unity Biotechnology*, "Homepage," accessed October 7, 2018, https://unitybiotechnology.com/.

used in creating an information revolution — to understand and upgrade what they consider to be the most complicated piece of machinery in existence: the human body.[849]

Cure diseases, live forever

Google's co-founders, Larry Page and Sergey Brin, are notorious for their passion for "trying to do things other people think are crazy"—ideas that have since been transformed into products that "now have over a billion users, like Google Maps."[850] In 2013, the pair founded a subsidiary company called the California Life Company, known as Calico. The founding of Calico made the cover of *TIME*, which read, "Can Google Solve Death?" The bold question was followed by the remark, "[t]hat would be crazy—if it weren't Google."

[849] Ariana Eunjung Cha, "Tech Titans' Latest Project: Defy Death," *The Washington Post*, April 4, 2015, https://www.washingtonpost.com/sf/national/2015/04/04/tech-titans-latest-project-defy-death/?utm_term=.60facd2d4739.
[850] Larry Page, "G is for Google," *Google Official Blog*, August 10, 2015, https://googleblog.blogspot.com/2015/08/google-alphabet.html.

Fig. 26. *TIME* magazine cover. "Can Google Solve Death?" September 30, 2013.

In 2014, Calico partnered with the drug company AbbVie. The two companies co-invested $1.5 billion to launch "a leading R&D facility in the San Francisco Bay area focused on aging and age-related diseases, including neurodegeneration and cancer."[851] The two companies extended this partnership in 2018, and each committed a further $500 million to the initiative.[852] Calico has also partnered with the Buck Institute for Research on Aging, the Broad Institute of MIT and Harvard, and the University of California, to develop treatments for cognitive decline and other age related diseases.[853] Think back to our table of core transhumanist themes in the introduction. Calico is a project that is overtly advancing the central transhumanist aims of healthspan extension, life extension, and, by implication, optional death.

Not that Calico is the only sign that Alphabet/Google takes transhumanist ideas seriously. Google was one of the first corporate backers of The Singularity University, co-founded in 2008 by Peter Diamandis and Ray Kurzweil and located at NASA's Research Park in Silicon Valley. The University was designed to help bring people together to think meaningfully about the exponential acceleration of transhumanist technologies and to address humanity's grandest challenges. At the Singularity University's founding conference, Larry Page gave a speech, in which he said:

> I now have a very simple metric I use: are you working on something that can change the world? Yes or no? The answer for 99.99999 percent of people is 'no.' I think we need to be training people on how to change the world. Obviously, technologies are the way to do that. That's what we've seen in the past; that's what driven all the change.[854]

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[851] *Calico*, "AbbVie and Calico Announce a Novel Collaboration to Accelerate the Discovery, Development, and Commercialization of New Therapies," September 3, 2014, https://www.calicolabs.com/news/2014/09/03/.
[852] *Calico*, "AbbiVie and Calico Announce Extension of Groundbreaking Collaboration," June 26, 2018, https://www.calicolabs.com/news/2018/06/26/.
[853] *Calico*, "Calico enters into agreement with the Buck Institute to conduct research into the biology of aging and to identify potential therapeutics for age-related diseases," April 28, 2015, https://www.calicolabs.com/news/2015/04/28/; *Calico*, "Broad Institute and Calico announce an extensive collaboration focused on the biology of aging and therapeutic approaches to diseases of aging," March 17, 2015, https://www.calicolabs.com/news/2015/03/17/; *Calico*, "Calico licences technology from acclaimed UCSF laboratory," March 31, 2015, https://www.calicolabs.com/news/2015/03/31/; *Calico*, "Calico and QB3 announce partnership to conduct research into the biology of aging and to identify potential therapeutics for age-related diseases," March 24, 2015, https://www.calicolabs.com/news/2015/03/24/.
[854] Peter Diamandis, "How to Become a Billionaire," *techblog*, accessed November 15, 2018, https://www.diamandis.com/blog/how-to-become-a-billionaire.

You can just imagine the extropians cheering on such a clear endorsement of *boundless expansion*, *self-transformation*, *dynamic optimism* and *intelligent technology*.

In 2012, Google also hired Ray Kurzweil as their Director of Engineering. This decision sent a powerful public message about the kind of future that the world's most influential, technologically literate corporate leaders are betting on. Google is one of the most advanced AI companies in the world and one of the most globally influential corporations. They could hire just about any tech-whizz they wanted to, yet they chose to hire a prominent transhumanist, indeed, one of the main prophets of the technological Singularity, to help them develop more advanced artificial intelligence—a technology that the company's leaders believe will eventually far surpass humans in ability and profoundly transform human biology and lifeways. Dawn Chan rightly emphasised the significance of this when she wrote in *The New Yorker* in 2016:

> If the import of Google's decision, in 2012, to hire the futurist Ray Kurzweil hasn't sunk in, pause to consider the fact that the second-largest company in the world (by market capitalization) has a director of engineering who believes that humanity will conquer death.[855]

Of course, Google's co-founders are hardly the only tech-billionaires investing in the prologevity game. Partly inspired by Bill and Melinda Gates and Warren Buffett, who created the now increasingly popular philanthropic Giving Pledge, Mark Zuckerberg and his wife, Priscilla Chan, have pledged to give away 99% of their Facebook shares over the course of their lifetimes—valued at $45 billion when they made the announcement in 2015.[856] The pair have already begun slowly selling their Facebook stake and investing the money in the Chan Zuckerberg Initiative (CZI), which they founded to support "bold ideas" that harness technology and engineering to "help accelerate discovery and scale

[855] Chan, "The Immortality Upgrade."
[856] Biz Carson, "Mark Zuckerberg says he's giving 99% of his Facebook shares – $45 billion – to charity," *Business Insider*, December 2, 2015, https://www.businessinsider.com.au/mark-zuckerberg-giving-away-99-of-his-facebook-shares-2015-12?r=US&IR=T.

solutions to facilitate social change." A particular emphasis of the Initiative is to aid those who are "working on humanity's greatest challenges."[857]

CZI initiatives include mapping every cell in a healthy human body, and "supporting scientific research to help cure, prevent, or manage all diseases" in their children's lifetime.[858] After his daughter Max was born in 2015, Zuckerberg wrote her a letter, which he shared publically on Facebook. The letter included the declaration:

> Once we recognize that your generation and your children's generation may not have to suffer from disease, we collectively have a responsibility to tilt our investments a bit more towards the future to make this reality. Your mother and I want to do our part… Our hopes for your generation focus on two ideas: **advancing human potential** and **promoting equality**. **Advancing human potential** is about pushing the boundaries on how great a human life can be.[859]

Other billionaire tech-industry pioneers, like Larry Ellison and Peter Thiel, also want to significantly extend the human healthspan and lifespan, turning the transhumanist mantra 'better than well' into a modern reality. Thiel has unambiguously declared, "I believe if we could enable people to live forever, we should do that."[860] He maintains that "death was natural in the past, but so was the instinct to fight it. The future only has room for one of them."[861] Ellison has also famously said, "death makes me very angry.

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[857] *Chan Zuckerberg Initiative*, "About," accessed October 7, 2018, https://www.chanzuckerberg.com/about; *Chan Zuckerberg Initiative*, "Initiatives," accessed October 7, 2018, https://www.chanzuckerberg.com/initiatives.
[858] *Chan Zuckerberg Initiative*, "Supporting Scientific Research to Cure, Prevent, or Manage All Diseases in Our Children's Lifetime," September 21, 2016, https://www.chanzuckerberg.com/newsroom/supporting-scientific-research-to-cure-prevent-or-manage-all-diseases-in-our-childrens-lifetime.
[859] Mark Zuckerberg, "A letter to our daughter," *Facebook*, December 1, 2015, https://www.facebook.com/notes/mark-zuckerberg/a-letter-to-our-daughter/10153375081581634?pnref=story.
[860] Ariana Eunjung Cha, "Peter Thiel's quest to find the key to eternal life," *The Washington Post*, April 3, 2015, https://www.washingtonpost.com/business/on-leadership/peter-thiels-life-goal-to-extend-our-time-on-this-earth/2015/04/03/b7a1779c-4814-11e4-891d-713f052086a0_story.html?noredirect=on&utm_term=.8201a08d552f.
[861] Peter Thiel, "Foreword: The Problem of Death" in Sonia Arrison, *100 Plus: How the Coming Age of Longevity Will Change Everything, From Careers and Relationships to Family and Faith* (New York: Basic Books, 2011), https://books.google.com.au/books?id=fiZWDgAAQBAJ&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false.

Premature death makes me angrier still… How can a person be there and then just vanish, just not be there?"[862]

Both anti-deathist billionaires are big investors in biotech startups and non-profits. Thiel is signed up with Alcor for cryonic suspension, and his pre-PayPal startup, Confinity, was "the first company in the history of the world to offer cryogenics [this should read cryonic suspension—see glossary] as part of its employee benefits package."[863] Thiel has also donated over half a million dollars to Eliezer Yudkowsky's Machine Intelligence Research Institute (MIRI), formerly the Singularity Institute, which focuses on developing robust and 'friendly' seed AI.[864] He also gave $3.5 million to David Gobel and Aubrey de Grey's Methuselah Foundation, which aims to accelerate the development of science to reverse ageing. The foundation's slogan is: "Making 90 the New 50 by 2030."[865]

Others who aren't overtly championing such a radical endgame are nevertheless helping to give rise to it by funding ventures that, as they converge and accelerate the progress of basic research, will play a role in increasing human longevity. Certainly, anyone who aims to wipe out major age-related diseases, as Microsoft's late co-founder Paul Allen did, stands to contribute to an increase in average human lifespans.[866]

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[862] Arrison, *100 Plus*.

[863] George Packer, *The Unwinding: An Inner History of the New America* (New York: Farrar, Straus and Giroux, 2013), https://books.google.com.au/books?id=OQ1LAQAAQBAJ&printsec=frontcover&dq=george+packer+the+unwinding&hl=en&sa=X&ved=0ahUKEwid96nHzareAhWLVrwKHdhODpQQ6AEIKDAA#v=onepage&q=george%20packer%20the%20unwinding&f=false.

[864] *Machine Intelligence Research Institute*, "Financials and Transparency," accessed October 8, 2018, https://intelligence.org/transparency/.

[865] *Methuselah Foundation*, "Who We Are," accessed October 6, 2018, https://www.mfoundation.org/who-we-are#about-us.

[866] In 2003, Allen founded The Allen Institute, which embraces what it calls "big science" an interdisciplinary data driven approach that relies on finding new insights by analysing large data sets. See: *Allen Institute*, "Homepage," accessed October 3, 3018, https://alleninstitute.org/. The Allen Institute has two major bioscience arms, the Allen Institute for Brain Science, founded in 2003, and the the Allen Institute for Cell Science, founded in 2014. Both Institutes were launched with $100 million in seed funding from Allen, whose total contribution to the Institute for Brain Science has been at least $500 million. See: *Allen Institute for Brain Science*, "Press Release: A New Approach to Alzheimer's Disease Research," June 4, 2014, https://web.archive.org/web/20150405235124/http://alleninstitute.org/media/filer_public/be/85/be85962e-5e8c-4971-bfcf-a84973fb4193/2014_0604_pressrelease_alzheimersgrant.pdf.

AGI and artificial brains

Although not technically a philanthropic initiative, Google's AI acquisition, DeepMind, has a rather beneficent sounding motto: "Solve Intelligence: Use It To Make The World A Better Place."[867] This is not the kind of corporate acquisition that you tend to hear other kinds of billionaires and corporate leaders pursuing, like oil barons, casino moguls, or candy bar empire heirs and heiresses. In 2014, both Facebook and Google entered into negotiations to acquire DeepMind, but talks with Facebook fell through and Google walked away with the company for £400 million (~$650 million).[868]

DeepMind is owned by Google's holding company, Alphabet, though it is run by its original co-founder Demis Hassabis—a child chess prodigy, game developer and cognitive neuroscientist. Founded in 2010, DeepMind originally unleashed its deep learning algorithms on Atari Games like Pong and Space Invaders. The AI wasn't trained to play the games, it learned to master them by trial and error, "receiving only the pixels and the game score as inputs."[869] The more the AI played, the better it got, and it quickly learned to play many of them at "superhuman levels."[870]

In 2016, DeepMind's AI AlphaGo also famously defeated the best human Go players. Go is an ancient Chinese game that cannot be hacked with brute force computation, like Chess, because the number of possible moves is reportedly greater than the number of atoms in the universe.[871] Using a deep learning approach, AlphaGo emulated the best human strategies and then played itself over and over so that it could learn from its mistakes and beat its many 'former selves.' Unlike a human grandmaster, who will have long since

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[867] *DeepMind*, "Homepage," accessed October 9, 2016, https://deepmind.com/.
[868] Tom Simonite, "Google's Intelligence Designer," *MIT Technology Review*, December 2, 2014, https://www.technologyreview.com/s/532876/googles-intelligence-designer/.
[869] Volodymyr Mnih et al., "Human-level control through deep reinforcement learning," *Nature* 518 (Feb 26, 2015), doi: 10.1038/nature14236.
[870] Ivan Sorokin et al., "Deep Attention Recurrent Q-Network," *arXiv*, December 5, 2015, https://arxiv.org/abs/1512.01693v1.
[871] David Silver and Demis Hassabis, "AlphaGo: Mastering the ancient game of Go with Machine Learning," *Google AI Blog*, January 27, 2016, https://ai.googleblog.com/2016/01/alphago-mastering-ancient-game-of-go.html.

attained the ballpark maximum level of proficiency that they are capable of, AlphaGo kept getting better from match to match.

But Hassabis and his co-founders Mustafa Suleyman and Shane Legg are not ultimately focused on developing narrow AIs that can outperform humans in specific tasks. DeepMind's more ambitious mission is "to push the boundaries of AI, developing programs that can learn to solve any complex problem without needing to be taught how."[872] In short, they are trying to build an artificial general intelligence (AGI), a form of non-human intelligence that transhumanists, and many proto-transhumanists like La Mettrie, have long believed would one day be invented.

The ramifications of such an invention would be profound for humanity, as we would no longer be the dominant form of intelligence on Earth. Even if forms of AGI were developed that were no smarter than the average human we would still find ourselves in a very different world of profound human-machine interdependence. If AGI then exceeded human abilities, or became superintelligent, we could perhaps continue to remain dominant by integrating our brains and bodies with machine intelligence. However, this cyborgian scenario raises the prospect of the emergence of a global hive mind, which, as Teilhard and Bernal imagined, could render individual identity and personhood much less distinct. This kind of human enhancement scenario also raises major questions about whether we would still be human, or still be meaningfully 'us' as our nature and values evolved with our enhanced capabilities.

Sergey Brin has stated that he hopes DeepMind's projects "will one day be fully reasoning AI," and thinks "you should presume that someday, we will be able to make machines that can reason, think and do things better than we can."[873] Brin is referring here to AGI, which would match or exceed human capabilities across the board, not just when playing chess or crunching numbers. The goal of building smart machines also

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[872] *DeepMind*, "About," accessed October 17, 2018, https://deepmind.com/about/.
[873] Samuel Gibbs, "Google's founders on the future of health, transport – and robots," *The Guardian*, July 7, 2014, https://www.theguardian.com/technology/2014/jul/07/google-founders-larry-page-sergey-brin-interview.

appears explicitly in the mission statement of another (now extremely fundamental) branch of Google, Google Brain.[874] Their mission statement reads: "Make machines intelligent. Improve human lives."[875]

Elon Musk agrees that the capabilities of AI will inevitably surpass those of humans. In his spare time, between running Tesla and SpaceX, solving energy woes in South Australia, and drilling holes under Los Angeles to build a network of tunnels to improve the city's traffic congestion, Musk founded a machine-brain interface company in 2016, called Neuralink. The company "is developing ultra-high bandwidth brain-machine interfaces to connect humans and computers."[876] Musk believes that merging with AI is humanity's best shot at avoiding extinction and is developing this avenue to promote human-machine convergence.

Although the machine-brain interfaces of the immediate future will be primarily used to restore functionality in patients with physical damage and disease, Musk has stated that eventually the technology "will enable anyone who wants to have superhuman cognition." Meanwhile, "if your biological self dies you can upload into a new unit. Literally."[877] This is a thoroughly transhumanistic vision, which Musk believes will come to fruition this century. If successful, this project would turn the enduring transhumanist goals of radical cognitive enhancement and practical immortality into a modern reality.

The US government is also promoting the merger of humans and machines. The Defence Advanced Research Projects Agency (DARPA) has "the goal of developing an implantable system able to provide precision communication between the brain and the digital world." DARPA has pursued this goal for decades and has invested hundreds of millions

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[874] For more on Google Brain see: Jeff Dean, "The Google Brain Team—Looking Back on 2017 (Part 1 of 2)," *Google Research Blog*, January 11, 2018, https://ai.googleblog.com/2018/01/the-google-brain-team-looking-back-on.html; Gideon Lewis-Kraus, "The Great A.I. Awakening," *New York Times Magazine*, December 14, 2016, https://www.nytimes.com/2016/12/14/magazine/the-great-ai-awakening.html.
[875] *Google Brain*, "Our Mission," accessed October 9, 2018, https://ai.google/research/teams/brain/our-mission/.
[876] *Neuralink*, "Homepage," accessed October 17, 2018, https://www.neuralink.com/.
[877] Todd Haselton, "Elon Musk: I'm about to announce a 'Neuralink' product that connects your brain to computers," *CNBC*, September 7, 2018, https://www.cnbc.com/2018/09/07/elon-musk-discusses-neurolink-on-joe-rogan-podcast.html.

of dollars laying "the groundwork for a future in which advanced brain interface technologies will transform how people live and work."[878]

When members of the two wealthiest and most influential sectors of society, major governments, and ultra-rich corporate leaders and investors, start dedicating serious time and money to projects that are designed to significantly enhance humans beyond our biological capabilities and make us potentially superintelligent, or practically immortal, it becomes starkly apparent that transhumanist projects with posthuman potential have become a significant modern phenomenon. They also have real potential to change the world and what it means to be human in our lifetimes.

Big bets, big returns

A deep understanding of modern information technologies and a penchant for chasing moonshots, distinguishes people like Richard Branson, Elon Musk, Bill Gates, Larry Page, Sergey Brin, Mark Zuckerberg, and Jack Ma, from other kinds of billionaires. With their tremendous wealth, global influence, and technological expertise, these figures are in a real position to have an impact on the development of human societies in their lifetimes. Their involvement with existing tech behemoths (the ones that know us inside out, feed us ads, predict our thoughts and shape our habits) also adds to their unprecedented power to change human societies and the human species.

The revolutionary projects that many of these figures are currently spearheading and investing in have a profoundly transhumanist flavour, as do many of the new norms of modern life. Our identities and social worlds already have a huge virtual dimension, and our thought processes are being ever more seamlessly integrated with artificial intelligence, with every message we send and every search query we make. Barring any major setbacks, it's hard to imagine that in ten or twenty years we will not have merged

[878] *DARPA*, "Towards a High-Resolution, Implantable Neural Interface," July 10, 2017, https://www.darpa.mil/news-events/2017-07-10.

more substantially with what, by then, will be far more advanced forms of information technology—which many of today's tech-billionaires will have helped create.

If this novel modern phenomenon of scores of techno-philanthropist billionaires chipping away at various human limitations on multiple fronts (not to mention the huge cash injections going into similar projects via government programs) doesn't sound like a catalyst for a modern explosion of transhumanist ideas and initiatives, then I don't know what would. The thing is, this 'explosion' is a hard phenomenon to capture clearly, as it is really millions of different explosions going off at similar times, converging and diverging, amplifying each other and sending sparks off in new directions—some of them swiftly dying out, just as Myspace and innumerable other startups and projects have done in the past, while others generate big new blazes that change the lay of the land forever. The manifold applications of artificial intelligence constitute one such big blaze that could transform humanity irrevocably.

Yet each little explosion can be called something other than transhumanist if you look at it in isolation. We can simply frame each spark as, say: an acceleration in narrow AI capabilities, a new big data initiative, a space colonisation project, a car that drives itself, a form of biomedical research, or an advance in materials science. But the bigger picture is one in which humans are throwing billions of dollars at projects that are collectively fuelling the transhumanist goals of living longer, healthier lives, merging with technology, and substantially augmenting human capabilities. As these projects gain momentum they will continue to challenge and alter our perceptions of what it means to be human.

Another way of emphasising the immense transformative power of technological acceleration and NBIC convergence is through the concept of the adjacent possible. First outlined by the biologist Stuart Kauffman, and later popularised by the author Steven Johnson, the concept is now sometimes used to describe technological evolution. As Diamandis and Kotler explain:

> Before the invention of the wheel, the cart, the carriage, the automobile, the wheelbarrow, the roller skate, and a million other offshoots of circularity were not imaginable. They existed in a realm that was off-limits until the wheel was discovered, but once discovered, these pathways became clear. This is the adjacent possible. It's the long list of first-order possibilities that open up whenever a new discovery is made.[879]

The frequent convergence of new technologies and phenomena enables many new applications and products to be developed that weren't readily foreseeable or intended when the initial innovation was developed. The Internet, for example, enabled the global proliferation of social media, yet it wasn't created for this purpose. Nor was it developed to enable video streaming on demand, e-commerce, video calls, online banking, high frequency stock trading, taxi hailing, or partner matching. Yet in less than three decades, a single invention, which allowed computers to talk to each other, has revolutionised just about every facet of modern life, from transport and communication, to commerce, entertainment and education.

Importantly, however, most of us had no inkling that the emergence of any one of these adjacent possibilities was imminent before it became a mainstream product or service. Who honestly saw smartphones coming in 2002, or envisaged the proliferation of ride sharing apps like Uber and Lyft in 2005? These dates only predate the emergence of the new phenomena by five years, yet most of us had no idea in advance that smartphones or ride hailing apps would emerge, or that they would swiftly become pervasive and transformative features of the modern world.

The same will be true as current technologies evolve. There will be many new products and innovations that we won't see coming. What we *can* see coming, however, is a general trend of accelerating technological disruption and the rapid proliferation of smarter technologies, which will be more deeply integrated with human social systems, thought processes and bodies. Assuming no major setbacks, a more cyborgian, or transhuman future *is* predictable. The precise characteristics of our future world are

[879] Diamandis and Kotler, *Abundance*, ch.19.

much less predictable. However, it's clear that we need to take transhumanist ideas and technologies seriously—that is, if we aspire to build a positive and sustainable (albeit not perpetually human) future.

The many surprising adjacent possibles have emerged in history remind me of J. B. S. Haldane's quip about the universe, that it is "not only queerer than we suppose but queerer than we *can* suppose."[880] I think this sentiment also applies to the future and how much we struggle to envisage outcomes that deviate from the norms of the world we grew up in. But think of those millions of sparks bouncing around and the billions of dollars fuelling avenues that *could* lead to posthumanity this century, and consider what Sergey Brin says about moonshot projects: to change the world you need to place, "many, many bets, and only a few of them need to pay off."[881]

[880] J. B. S. Haldane, *Possible Worlds and Other Essays* (London: Chatto and Windus, 1930), 286.
[881] Gibbs, "Google's founders on the future of health."

11. A Tide in the Affairs of Biotechnology

> *Prophecies of redesigned human bodies are not entirely new, and nor is the widespread disquiet that they evoke. The prophecies and the anxieties can be seen as part of a broader cultural debate—conducted over many centuries—between those who favor increased human understanding and control of nature, and those who look on such projects as impious, hubristic, or impermissibly defiant of the given order of things. What changed as the previous century unfolded was the practical power of technoscience. Increasingly, redesigning ourselves looks like a real option.*
>
> — Russell Blackford, "The Great Transition: Ideas and Anxieties" (2013)

Some of the most advanced modern projects that are directly furthering the transhumanist goals of enhancing and redesigning humans, slowing and reversing the ageing process, and extending the human life and healthspans, are being conducted in the fields of medicine, molecular biology and biogerontology. In these fields of modern technoscience, transhumanist aspirations are now being overtly pursued by major research institutions and leading scientists, which further indicates that modern societies are evolving in ever more transhumanistic directions.

When David Sinclair was an undergraduate in molecular biology in 1987, "ageing research was the 'backwater of science.'" Back then, nobody was calling for ageing to be classified as a disease and its mechanisms weren't considered worthy of study, "only age-related diseases were, such as heart failure or diabetes." But today, Sinclair proclaims, "you can't open the world's leading scientific journals without seeing articles on age research breakthroughs… All the leading academic centres—Harvard, Oxford, Stanford—are working on it."[882]

Sinclair should know, as he is the co-director of the Paul F. Glenn Center for the Biological Mechanisms of Aging at Harvard Medical School. Throughout his career, he

[882] Ceridwen Dovey, "Can David Sinclair cure old age?" *The Monthly*, September 2018, https://www.themonthly.com.au/issue/2018/september/1535724000/ceridwen-dovey/can-david-sinclair-cure-old-age.

has conducted important biogerontology research, focused in part on resveratrol, a chemical found in red wine and foods like berries. Sinclair and others showed that resveratrol activates a protein, Sirtuin 1, that may play a role in extending the life of cells and the lifespans of animals by mimicking the (also potentially life-extending) process of caloric restriction.[883]

According to Ceridwen Dovey, who interviewed him in 2018, "Sinclair wants us to think of ageing not as something that makes us human but as something that makes us *less* than human." Apparently, he believes that "our docile acceptance of decline and ill health in old age is as barbarous as the people of the past once believing that it was normal and natural for women to die routinely in childbirth."[884] In Sinclair's own words:

> I'm on the record saying the first person who will live to 150 has already been born. Anyone who says there is a limit built into our biology doesn't know what they're talking about. There's no biological law for ageing. It's not shocking that within our lifetime we could reset the body entirely.[885]

Dovey is spot on when she says that, while "Sinclair does not identify as a transhumanist, this doesn't sound so different to something a transhumanist would say."[886] Indeed, Sinclair's brand of molecular biology is effectively a transhumanist project, it just gets described in other more conventional ways, as biogerontology and biomedical research—another good example of why the transhumanist explosion of the twenty-first century is not always a highly visible phenomenon. Transhumanism now extends far beyond the confines of official transhumanist organisations. The philosophy and core agendas of transhumanism are now pervasively (though often unconsciously) embedded in the technologically fuelled machinations of modern Western cultures and institutions.

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[883] See: Jospeh A. Baur and David A. Sinclair, "Therapeutic potential of resveratrol: the *in vivo* evidence," *Nature Reviews Drug Discovery* 5, no. 6 (2006); Jason G. Wood et al., "Sirtuin activators mimic caloric restriction and delay ageing in metazoans," *Nature* 430 (2004); Konrad T. Howitz et al., "Small molecule activators of sirtuins extend Saccharomyces cerevisiae lifespan," *Nature* 425 (2003).
[884] Dovey, "Can David Sinclair cure old age?"
[885] Dovey, "Can David Sinclair cure old age?"
[886] Dovey, "Can David Sinclair cure old age?"

Like many transhumanists, most famously Ray Kurzweil, Sinclair also has his own life-extensionist regime and has used his experimental therapies (including taking resveratrol) on his family members with, he claims, astounding results. After spending time with Sinclair and his family, Dovey reported feeling strangely amenable to some of his claims, writing:

> It becomes difficult to remain impartial when a respected scientist tells you he will soon turn 50, does not have a single grey hair and, according to regular blood and genetic tests, has the biological age of 31.4, even though he's a workaholic and doesn't exercise much. Or that he likes to think his mother prolonged her life – post lung cancer, with only one lung – for 20 years by taking the molecules he gave her, and that his 79-year-old father, who has taken several different kinds of them for years, currently lists whitewater rafting and mountaineering among his hobbies. Sinclair's wife, Sandra Luikenhuis, even gives these molecules to the family dogs. (Luikenhuis, who has a PhD in genetics from Massachusetts Institute of Technology, only began taking the molecules herself after she noticed the irrefutably positive effect they'd had on their pets.)[887]

Sinclair is just one of many world-leading scientists whose research projects and aspirations converge with transhumanist agendas. Modern advances in biotechnology and medicine have created a novel social situation in which scientists, corporations and governments are now overtly seeking to unlock and reverse the processes of human ageing. If they succeed, the transhumanist dream (indeed, the age old human dream) of extending the human lifespan to superhuman levels could actually materialise.

The war on ageing

There has been a gradual shift in the discourse about ageing in the twenty-first century—in no small part because ageing populations now pose a major challenge for the economic prosperity and future stability of many nations. Growing numbers of scientists, entrepreneurs, biohackers and public figures are now focusing on human ageing as a problem to be solved. Many scientists and transhumanists are now

[887] Dovey, "Can David Sinclair cure old age?"

campaigning to classify ageing as a disease, and the media regularly churns out stories about Silicon Valley tech heads crusading to fight ageing and 'live forever.'[888]

Increasingly, governments (or at least their independent advisory groups) are also starting to treat ageing as a technical problem worth tackling. In 2015, the US National Academy of Medicine (NAM) dedicated a special session of their annual symposium to "Innovation in Aging and Longevity." The four panel members were Craig Venter of human genome project fame, Alphabet/Google's Hal Barron, who is the President of Calico, the venture capitalist Joon Yun, who founded the $1 million Palo Alto Prize "dedicated to ending aging," and Joe Coughlin of the MIT AgeLab. The NAM's advertisement for the event proclaimed, "Aging is inevitable… or is it?" Meet the "four pioneers who are investing in science and technology that could stop the aging process in its tracks."[889]

In 2017, the NAM launched the Health Longevity Grand Challenge, "a $100 million initiative to catalyze transformative innovation and inform policies and priorities to advance healthy aging and longevity globally." The NAM noted that "at the current pace, population aging is poised to impose a significant strain on economies, health systems, and social structures worldwide." But, the organisation boldly emphasised, ***"it doesn't have to."*** According to the Health Longevity Grand Challenge website:

> We can envision, just on the horizon, an explosion of potential new medicines, treatments, technologies, and preventive and social strategies that could help transform the way we age and ensure better health, function, and productivity during a period of extended longevity. **Now is the time to support the next breakthroughs in healthy longevity, so that all of us can benefit from the tremendous opportunities they have to offer.**[890]

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[888] E.g.: Alexandra Sifferlin, "How Silicon Valley Is Trying To Hack Its Way Into a Longer Life," *TIME*, February 16, 2017, http://time.com/4672962/silicon-valley-longer-life/; Ted Friend, "Silicon Valley's Quest To Live Forever," *The New Yorker*, April 3, 2017, https://www.newyorker.com/magazine/2017/04/03/silicon-valleys-quest-to-live-forever.

[889] *National Academy of Medicine*, "Special Session: Innovation in Aging and Longevity," 2015, https://nam.edu/event/special-session-innovation-in-aging-and-longevity/.

[890] *National Academy of Medicine*, "Health Longevity Grand Challenge," accessed October 3, 2018, https://nam.edu/initiatives/grand-challenge-healthy-longevity/.

No, that wasn't an excerpt from an old *Extropy* article from 1994, those are the words of a body of leading American scientists who advise the US government. Of course the NAM didn't stipulate how far they are aiming to extend the human life or healthspan, but they are enthusiastically opening the door to interventions that could have dramatic effects on both. It is also worth highlighting that the Grand Challenge website didn't say "now's the time to begin a conversation about whether extended human longevity is possible, or whether it's ethical or desirable." Just full steam ahead, coming ready or not.

As Francis Fukuyama lamented over a decade ago, it's a slippery slope from better healthcare to better than well. Even those who think that death is natural and should be accepted as a fact of life don't want to die *soon*. When health problems threaten them, they look for solutions. Perhaps more importantly, when health scares plague the ultra-wealthy, they often throw enormous wads of cash at the problem—like Google's co-founder, Sergey Brin, who has a genetic mutation that significantly increases his lifetime risk of developing Parkinson's disease.

Brin has been very proactive in adopting preventative health measures in order to reduce his risk and has donated "more than $150 million to the Michael J. Fox Foundation and $7 million to the Parkinson's Institute."[891] In light of many other similar examples, Peter Diamandis and Steven Kotler aptly emphasise that, "as the baby boomers age, there is no amount of money the richest among them won't spend for a little more quality time with their loved ones."[892]

Ageing as a disease

Alex Zhavoronkov is the CEO of the drug discovery startup, Insilico Medicine. He also heads the UK based non-profit, the Biogerontology Research Foundation (BGRF). In

[891] Vanessa Grigoriadis, "O.K., Glass: Make Google Eyes," *Vanity Fair*, April 2014, https://www.vanityfair.com/style/2014/04/sergey-brin-amanda-rosenberg-affair.
[892] Diamandis and Kotler, *Abundance*, ch.15.

2015, he and Bhupindar Bhullar co-authored a proposal for changing the World Health Organisation's disease classification parameters (in a handbook abbreviated as the ICD-11) to include ageing as a disease.[893] Why is the classification important? Because it affects how funding is allocated and how medical and research disciplines operate. It also affects how products and therapies are regulated.

If ageing were classified as a disease, there would likely be significant pushback from the lightly regulated supplements and cosmetics industries—a combined market worth hundreds of billions of dollars, which is itself a hint that a lot of people are eagerly pursing ways to look and feel younger.[894] These industries would stand to have their anti-aging claims and products reviewed by the FDA for their therapeutic efficacy, which probably wouldn't be great news for the companies selling miracle anti-wrinkle creams.[895]

But Zhavoronkov and Bhullar are more concerned about the fact that when it comes to ageing and medicine, there are currently no standardised metrics about when ageing should occur, what biomarkers should be apparent, and how fast it should progress. As the BGFR states, a current hurdle in the fight to tackle ageing and age-related diseases is that there "is a gap between discovering the nature of ageing and incorporating that knowledge into medical practice."[896]

Zhavoronkov believes that establishing standardised criteria would be an important step forward for creating better therapies and interventions. He also argues that the historical precedents of obesity, and mental disorders like autism, now both classified as diseases, indicate that a disease classification results in "the development of more

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[893] Alex Zhavoronkov and Bhupindar Bhullar, "Classifying aging as a disease in the context of ICD-11," *Frontiers in Genetics*, November 4, 2015, https://www.frontiersin.org/articles/10.3389/fgene.2015.00326/full.
[894] The cosmetics industry alone was worth $542 billion in 2017, and is expected to grow to a market value of over $800 billion in 2023. See: *Reuters*, "Global Cosmetics Product Market expected to reach USD 805.61 billion by 2023—Industry Size and Share Analysis," March 13, 2018, https://www.reuters.com/brandfeatures/venture-capital/article?id=30351.
[895] Chuck Dinerstein, "Is Aging A Disease?" *American Council on Science and Health*, July 11, 2018, https://www.acsh.org/news/2018/07/11/aging-disease-13174.
[896] *Biogerontology Research Foundation*, "About Us," accessed October 5, 2018, http://bg-rf.org.uk/about-us.

accurate diagnostic methods, and increased involvement of the pharmaceutical industry and policy makers." It "also provides the basis for clinical trials."[897]

Although the WHO did not fully adopt Zhavoronkov's and Bhullar's proposal, they added an "Ageing Related" extension code to the ICD-11 in 2018, acknowledging that age related processes are strongly implicated in many diseases. In August 2018, the editors of *The Lancet* reflected on the significance of this addition, noting that:

> … the recognition of age as a pathological process, together with replacement of the ICD-10 'Senility' (R54) code with 'Old age' (MG2A) in ICD-11, represents undeniable progress towards overcoming the regulatory obstacles that have thus far hampered the development of therapeutic interventions and preventative strategies targeting ageing and age-related diseases.[898]

The *Journal of the American Medical Association* (JAMA) also published an article in 2018 on "Aging as a Biological Target for Prevention and Therapy."[899] Meanwhile, the calls continue among scientists, biohackers and transhumanists to classify ageing as a disease and to develop more targeted ways to increase the human healthspan and lifespan.

Strategies for Engineered Negligible Senescence (SENS)

One of the most recognisable figures in the modern quest to reverse aging is the biogerontologist and transhumanist (though he doesn't use the label) Aubrey de Grey. A software and artificial intelligence engineer by training, de Grey became interested in the convergence of biology and technology in the 1990s and started independently researching the biology of ageing, making breakthroughs in the theory of biology and earning a Ph.D. in biology from Cambridge University in 2000. His ex-wife, Adelaide

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[897] Zhavoronkov and Bhullar, "Classifying aging as a disease in the context of ICD-11."
[898] Editorial, "Opening the door to treating ageing as a disease," *The Lancet Diabetes & Endocrinogy* 8, no. 8 (August 1, 2018), https://www.thelancet.com/journals/landia/article/PIIS2213-8587(18)30214-6/fulltext.
[899] Niz Barzilai, Ana Maria Cuervo and Steve Austad, "Aging as a Biological Target for Prevention and Therapy," *JAMA*, October 2, 2018, https://jamanetwork.com/journals/jama/fullarticle/2703112.

Carpenter, is also a biologist, and de Grey credits her as his tutor and mentor in former years.[900]

In her characterisation of de Grey in the *MIT Technology Review*, Sherwin Newland describes him as "a man of ideas," who "has set himself toward the goal of transforming the basis of what it means to be human."[901] De Grey believes that there are seven main causes of aging and that by tackling them concurrently, we will be able to continuously repair and rejuvenate damaged human cells and body parts, much like a car that has its parts maintained and replaced decade after decade. Tackling these seven causes of ageing are what de Grey refers to as Strategies for Engineered Negligible Senescence (SENS)—in other words strategies to deliberately slow and reverse ageing.[902]

Eventually, de Grey thinks humans will achieve something called Longevity Escape Velocity (LEV), which is the idea that human life expectancy will increase by more than one year every year. Although LEV would not eliminate death by accident or mishap, it would give those alive a real chance of attaining radical longevity, as further progress occurs in the fields of biomedicine and biotechnology.

The brave new world of molecular biology

We're used to the idea of humans building machines and writing software code for computers, but for the first time in history, we're beginning to rewrite the code of a different kind of machine: ourselves. Global debates are now rife in the genetics and bioethics communities over the promise and peril of modern gene editing technologies like CRISPR.[903] In a few short years, humans could begin routinely performing gene

[900] Steven Leckart, "How Beer, Oprah and Sergey Brin Can Help Cure Aging," *Wired*, October 19, 2010, https://www.wired.com/2010/10/aubrey-de-grey/.
[901] Sherwin Newland, "Do You Want to Live Forever?" *MIT Technology Review*, February 1, 2005, https://www.technologyreview.com/s/403654/do-you-want-to-live-forever/.
[902] See: Ben Zealley and Aubrey D.N.J. de Grey, "Strategies for Engineered Negligible Senesence," *Gerontology* 59, no. 2 (2012), doi: 10.1159/000342197.
[903] For a summary of these debates, see: Adam P. Cribbs and Sumeth M. W. Perera, "Science and Bioethics of CRISPR-Cas9 Gene Editing: An Analysis Towards Separating Facts and Fiction," *Yale Journal of Biology and Medicince*, 90, no. 4 (December 19, 2017), https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5733851/.

therapy, germline engineering and more targeted forms of genetic screening and embryonic selection, which are just a few of the many possible means of profoundly altering and augmenting humanity.

There's talk of same sex couples having biological children with the DNA of both parents using *in vitro gametogenesis* (a process where artificial gametes are grown from skin cells and combined to create an embryo).[904] Three parent babies have already been born using donor mitochondrial DNA.[905] Meanwhile, in the relatively new field of synthetic biology, one of the world's leading geneticists, George Church, is heading an initiative called Genome Project-Write (GP-Write), which aims to synthesise the genome of "every organism that is of industrial, agricultural or medical significance" while "developing enough technology to bring the price down a million-fold."[906] In case that doesn't sound ambitious enough, Church also wants, "to synthesize modified versions of all the genes in the human genome in the next few years." This is an important step towards designing organisms from scratch. In Church's words, "[w]hat we're planning to do is far beyond Crispr… It's the difference between editing a book and writing one."[907]

With the massive databases of genetic and phenotypic information that are starting to accrue, and the aid of cloud computing and powerful algorithms, humanity is poised to decode much more of the genetic map of humanity. The immediate applications of this information deluge extend to: precise and personalised treatments and cures for diseases; better health and extended longevity; the creation of new hybrid species; genetically modified or synthesised crops that are nutritionally fortified and disease resistant; and the possible elimination of malaria and mosquito borne illnesses via gene drives. However, in the slightly longer term, such technologies could completely

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[904] Jason Pontin, "Science is Getting Us Closer to the End of Infertility," *Wired*, March 27, 2018, https://www.wired.com/story/reverse-infertility/.
[905] Sarah Reardon, "Genetic details of controversial 'three-parent baby' revealed," *Nature*, April 3, 2017, https://www.nature.com/news/genetic-details-of-controversial-three-parent-baby-revealed-1.21761.
[906] Zoë Corbyn, "George Church: 'Genome sequencing is like the internet back in the late 1980s,'" *The Guardian*, February 18, 2018, accessed October 1, 2018, https://www.theguardian.com/science/2018/feb/18/professor-george-church-nebula-genomics-interview.
[907] David Ewing Duncan, "The Next Best Version of Me: How To Live Forever," *Wired*, March 27, 2018, https://www.wired.com/story/live-forever-synthetic-human-genome/.

revolutionise modern medicine, play a major role in extending human lifespans, and fundamentally change humanity from the inside out.

Selling CRISPR to the kids!

Speaking of CRISPR… The former NASA biochemist and biohacker, Josiah Zayner, runs a startup called The ODIN, which sells DIY microbiology kits "that allow anyone to make unique and usable organisms at home or in a lab or anywhere."[908] The ODIN's products include DIY CRISPR gene editing kits. Some of the consumer reviews on the company's website are a tad startling for how casually the buyers seem to take the idea of playing around with DNA. Here's one from a high school student named Camille Lienau:

> I am a high school student who purchased this kit because I had a passion to learn more about biohacking at home, and be involved with genetic engineering independently. This kit was the perfect stepping stool to give me first hand info on CRISPR and the whole process is so easy to understand, everything you need is right there in the kit, just be careful NOT to freeze your E. coli like I did :([909]

Another poster, called Mary, reviewed the kit as if it were a recipe book (which, to be fair, it kind of is). She wrote:

> I have read a lot about CRISPR, but I didn't know it could be this easy. The kit arrived with everything I needed and the instructions were thorough and easy to understand.[910]

Welcome to the brave new world of molecular biology, where basic DIY genetic engineering kits for microbes retail for $159. For more advanced kits that can be used to genetically modify animals, like frogs, you're looking at $299. Granted, most people today aren't breathlessly typing in their credit card details and ordering CRISPR kits from the interwebs. We also haven't yet entered an era of *pervasive*, or democratised

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[908] *The ODIN*, "About Us," accessed October 6, 2018, http://www.the-odin.com/about-us/.
[909] *The ODIN*, "About Us."
[910] *The ODIN*, "About Us."

genetic engineering and gene therapy. But Zayner's kits are just one of many signposts indicating that the time is nigh. The cost of whole genomic sequencing is cheaper than ever, and the cost of doing citizen science is cheap and getting cheaper, fast.

Remember, the first human genome sequenced took fifteen years and cost $2.7 billion in 1991 dollars.[911] This is roughly $5 billion today. With full genomic sequencing now available for under $1000 US (Veritas' $999 product even includes genetic counselling) a new era of personalised medicine and enhanced reproductive choice will swiftly become the norm, especially if the cost of sequencing and data storage continue to fall as is widely expected.[912] It's a profoundly transhumanist world when the most fundamental components of who we are, the A's, G's T's and C's that make up our genome, are fair game for altering and re-writing.

'Take X and add AI'

Biology and medicine are information technologies now. This matters because information technologies roughly follow, and sometimes outpace, the Moore's Law curve (see footnote 48), which means that they evolve extremely quickly.[913] As branches of information technology, genomics and AI are both becoming exponentially more powerful and cost effective as computation continues to get cheaper and more efficient. More computing power enables more data to be processed and interpreted faster at lower cost, and data mining algorithms can mine big data sets to detect new patterns, which in turn accelerates new discoveries. As the data scientist Daniel D. Gutierrez puts

[911] *National Human Genome Research Institute*, "The Human Genome Project Completion: Frequently Asked Questions," October 30, 2010, https://www.genome.gov/11006943/human-genome-project-completion-frequently-asked-questions/.
[912] *Department of Health and Social Care*, "Annual Report of the Chief Medical Officer 2016: Generation Genome," https://www.gov.uk/government/publications/chief-medical-officer-annual-report-2016-generation-genome.
[913] George Church, comment on "The Myth of AI: A Conversation With Jaron Lanier," by John Brockman, *Edge*, November 14, 2014, https://www.edge.org/conversation/the-myth-of-ai.

it, advances in AI have been dramatically affected by "the simultaneous one-two punch of practically infinite storage and a flood of data of every stripe."[914]

When it comes to biotechnology companies, venture capital is also pouring in like never before, especially from America and China. According to Peter Diamandis, mobile health alone "is predicted to become a $102 billion market by 2022, putting a virtual doctor on-demand, in your pocket."[915] Not that this technology will replace human M.D's, but it will displace some of them and revolutionise their roles and the industry that they work in. The same goes for the pharmaceutical industry as "AI is making the drug discovery process >100X faster and cheaper, and 90% more likely to succeed in clinical trials."[916]

AI's can now figure out if you're depressed and can even administer cognitive behavioural therapy.[917] Both Facebook and the Canadian government, among others, are currently using deep learning algorithms to predict suicide risk and promote early intervention.[918] Chatbots are also popping up everywhere and virtual assistants are evolving from Siri's clunky misunderstandings into AIs like Google Assistant that can learn from our messaging habits to suggest automatic text replies, understand our speech, and eventually act autonomously in the background to sort our schedules, reply to correspondence, book restaurants and holidays and become a fully-fledged, individually tailored PA.[919]

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[914] Daniel D. Gutierrez, "InsideBIGDATA Guide to Deep Learning & Artificial Intelligence," *InsideBiGDATA*, February 13, 2017, http://insidebigdata.com/white-paper/guide-to-artificial-intelligence/.
[915] Peter Diamandis, "Revolutionizing Healthcare," *techblog*, July 2, 2018, https://www.diamandis.com/blog/revolutionizing-healthcare.
[916] Diamandis, "Revolutionizing Healthcare."
[917] MIT researchers have used AI to detect depression from speech patterns with around 77% accuracy. See: Rob Matheson, "Model can more naturally detect depression in conversations," *MIT News*, August 29, 2018, http://news.mit.edu/2018/neural-network-model-detect-depression-conversations-0830. Meanwhile, chatbots like Wysa and Woebot are providing accessible basic CBT online.
[918] Diana Kwon, "Can Facebook's Machine-Learning Algorithms Accurately Predict Suicide?" *Scientific American*, March 8, 2017, https://www.scientificamerican.com/article/can-facebooks-machine-learning-algorithms-accurately-predict-suicide/; Mallory Locklear, "Canada will track suicide risk through social media with AI," *endgadget*, January 2, 2018, https://www.engadget.com/2018/01/02/canada-track-suicide-risk-social-media-ai/.
[919] Yaniv Leviathan, "Google Duplex: An AI System for Accomplishing Real-World Tasks Over the Phone," *Google AI Blog*, May 8, 2018, https://ai.googleblog.com/2018/05/duplex-ai-system-for-natural-conversation.html.

Jeffrey Ding of the Future of Humanity Institute helpfully explains why the impacts of AI are father reaching across industries than biotechnologies in isolation. He notes that, "core AI technologies are more fundamental than biotechnologies" because "innovations in AI algorithms can revolutionize… genome sequencing, whereas the relationship does not operate in reverse."[920] You can't CRISPR your way to a self-driving car, or a virtual assistant, or find millions of new patterns in big data sets in short time frames, but you can get to all of those places, and many more, with AI.

With each year, more surprising breakthroughs keep emerging, like AIs that can 'see' better than humans,[921] reduce error rates in medical diagnostics,[922] compose music and poetry,[923] (there's even a website called 'bot or not' where you can subject poems to a Turing Test),[924] drive on public roads,[925] design and 'paint' an original Rembrandt,[926] and beat the best human players at the complex games of Go and Poker.[927] As important milestones are reached at an accelerating pace, more leading thinkers have added their names to the list of people proclaiming that AI is a big deal, specifically because, like transhumanists, they believe it could radically change humanity and human societies in their lifetimes.

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[920] Jeffrey Ding, "Deciphering China's AI Dream: The context, components, capabilities, and consequences of China's strategy to lead the world in AI," *Future of Humanity Institute*, March 2018, https://www.fhi.ox.ac.uk/wp-content/uploads/Deciphering_Chinas_AI-Dream.pdf.

[921] John Markoff, "A Learning Advance in Artificial Intelligence Rivals Human Abilities," *New York Times*, December 10, 2015, https://www.nytimes.com/2015/12/11/science/an-advance-in-artificial-intelligence-rivals-human-vision-abilities.html.

[922] Dayong Wang, "Deep Learning for Identifying Metastatic Breast Cancer," *arXiv*, June 18, 2016, https://arxiv.org/abs/1606.05718v1.

[923] Bartu Kaleagasi, "A New AI Can Write Music as Well as a Human Composer," *Futurism*, March 7, 2017, https://futurism.com/a-new-ai-can-write-music-as-well-as-a-human-composer; Samuel Gibbs, "Google AI project writes poetry which could make a Vogon proud," *The Guardian*, May 17, 2016, https://www.theguardian.com/technology/2016/may/17/googles-ai-write-poetry-stark-dramatic-vogons.

[924] See: *bot or not*, accessed October 29, 2018, http://botpoet.com/about/.

[925] See: Bernard Marr, "Key Milestones of Waymo – Google's Self-Driving Cars," *Forbes*, September 21, 2018, https://www.forbes.com/sites/bernardmarr/2018/09/21/key-milestones-of-waymo-googles-self-driving-cars/#6b26c6675369.

[926] See: *The Next Rembrandt*, accessed October 29, 2018, https://www.nextrembrandt.com/; Emily Reynolds, "This fake Rembrandt was created by an algorithm," *Wired*, April 7, 2016, https://www.wired.co.uk/article/new-rembrandt-painting-computer-3d-printed.

[927] Steven Borowiec, "Google's AlphaGo AI defeats human in first game of Go contest," *The Guardian*, March 9, 2016, https://www.theguardian.com/technology/2016/mar/09/google-deepmind-alphago-ai-defeats-human-lee-sedol-first-game-go-contest; Olivia Solon, "Oh the humanity! Poker computer trounces humans in big step for AI," *The Guardian*, January 31, 2017, https://www.theguardian.com/technology/2017/jan/30/libratus-poker-artificial-intelligence-professional-human-players-competition.

In 2017, the outgoing head of DARPA, Arati Prabhakar, publically declared that humanity is on the cusp of a radically new evolutionary future. She explained that machines have historically helped us do things (such as assembly line labour), and think (via tools like calculators, spell checkers and web searches). But now, she argues, we are entering, "a third wave of technological innovation… featuring machines that... have the potential to help us be." In her vision of the immediate future, man and machine will merge, a convergence that could, "make us more human than we've ever been. Maybe even unrecognisably so."[928]

In August 2018, the research and advisory firm, Gartner, declared that over the next ten years, in this era of pervasive artificial intelligence, "humanity will begin its 'transhuman' era: Biology can then be hacked, depending on lifestyle, interests and health needs."[929] Kevin Kelly also highlighted the importance of AI as a driver of economic growth and social transformation when he wrote in 2016, "the business plans of the next 10,000 startups are easy to forecast: *Take X and add AI*."[930]

Biotechnology companies revolutionise healthcare

With biology and technology converging and evolving at a rapid pace, a wave of biotech companies have started rolling out revolutionary new products and services. These include digital pills first approved by the FDA in 2017, which contain an ingestible sensor that tracks when the medication is delivered, allowing physicians to monitor compliance. Patients can also be reminded via an app to take their medication when they forget (which many do, at a great cost to public health systems).[931]

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[928] Arati Prabhakar, "The merging of humans and machines is happening now," *Wired*, January 27, 2017, https://www.wired.co.uk/article/darpa-arati-prabhakar-humans-machines.
[929] *Gartner*, "Gartner Identifies Five Emerging Technology Trends That Will Blur the Lines Between Human and Machine," August 20, 2018, https://www.gartner.com/en/newsroom/press-releases/2018-08-20-gartner-identifies-five-emerging-technology-trends-that-will-blur-the-lines-between-human-and-machine.
[930] Kelly, *The Inevitable*, ch.2.
[931] Sara Falk, "Digital Pills Ready to Deploy," *BWH Clinical & Research News*, November 29, 2017, https://bwhclinicalandresearchnews.org/2017/12/04/digital-pills-text-their-deployment/.

Harvard's Wyss Institute for Biologically Inspired Engineering, along with the startup Emulate, Inc. have also developed, and begun to commercialise, 'organs on chips,' which "recapitulate the microarchitecture and functions of living human organs, including the lung, intestine, kidney, skin, bone marrow and blood-brain barrier."[932] This technology could massively speed up drug discovery and clinical trials, allowing the slow animal testing phase to be completely bypassed. It could also allow multiple drug therapies to be tested on a patient's cells *ex vivo* to determine which drug will be the most effective.

Technology companies are also partnering with governments and public hospitals to deliver more precise and personalised healthcare. Alphabet's DeepMind has partnerships with several branches of the UK's National Health Service (NHS). In a joint initiative with the Royal Free London NHS Foundation Trust, DeepMind developed an app, called Streams, which the Royal Free Hospital staff began to use in 2017. The app can detect and alert physicians to acute kidney injury (AKI) which is linked to 40,000 deaths in the UK per year. Inpatient care for AKI also costs the UK government approximately a billion pounds annually.[933]

In 2016, DeepMind also began collaborating with Moorfields Eye Hospital NHS Foundation Trust to:

> … develop AI technology which can automatically detect eye conditions in seconds and prioritise those patients in urgent need of care, matching the accuracy of expert doctors with over 20 years experience.[934]

DeepMind's first research results on the use of deep learning as a diagnostic tool in ophthalmology were published in *Nature* in 2018. Their AI performed slightly better than the hospital's two best retinal specialists and significantly outperformed the other

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[932] *Wyss Institute*, "Human Organs-on-Chips," accessed October 17, 2018, https://wyss.harvard.edu/technology/human-organs-on-chips/.
[933] Marion Kerr et al., "The economic impact of acute kidney injury in England," *Nephrology Dialysis Transplantation* 7, no. 1 (July 2014): 1362, doi: 10.1093/ndt/gfu016.
[934] *DeepMind*, "DeepMind and Moorfields Eye Hospital NHS Foundation Trust," accessed October 7, 2018, https://deepmind.com/applied/deepmind-health/working-partners/health-research-tomorrow/moorfields-eye-hospital-nhs-foundation-trust/.

six.[935] DeepMind has also partnered with Imperial College Healthcare NHS Trust, to help develop better mobile healthcare applications that link to patient's electronic medical records.[936]

The UK's Chief Medical Officer, Sally Davies, has also declared that, with the rise of full genomic sequencing and genomic medicine, "it is essential for clinicians to work with professions not traditionally considered 'clinical.'" She maintains that involving "computer scientists" and other technologists in primary care, "must be the expectation of the public" from now on.[937] The UK government is also building on their world-leading 100,000 genomes project to sequence 5 million human genomes in the next 5 years. From 2019, all seriously ill children, and adults with hard to treat illnesses and cancer will be offered full genomic sequencing as part of their care in the UK.[938] It's becoming harder and harder to write off things like personalised medicine and major healthcare reform as futurist hype. These changes are swiftly becoming a fact of life.

Concluding remarks

I haven't touched on nanotechnology and healthcare here, partly because this technology is currently less visible and pervasive in modern societies, rendering discussions about its impacts in biomedicine more speculative. Ray Kurzweil argues that nanotechnology and biotechnology will ultimately converge and that nanotechnology will "enable us to redesign and rebuild, molecule by molecule, our bodies and brains and the world with which we interact." He also argues that, "the full realization of nanotechnology lags

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[935] Jeffrey De Fauw et al., "Clinically applicable deep learning for diagnosis and referral in retinal disease," *Nature Medicine* 24 (September 2018), doi: 10.1038/s41591-018-0107-6.
[936] Sarah Boseley, "Smart care: how Google DeepMind is working with NHS hospitals," *The Guardian*, February 25, 2016, https://www.theguardian.com/technology/2016/feb/24/smartphone-apps-google-deepmind-nhs-hospitals.
[937] *Department of Health and Social Care*, "Annual Report of the Chief Medical Officer 2016: Generation Genome," https://www.gov.uk/government/publications/chief-medical-officer-annual-report-2016-generation-genome.
[938] *Department of Health and Social Care*, "Matt Hancock announces ambition to map 5 million genomes," October 2, 2018, https://www.gov.uk/government/news/matt-hancock-announces-ambition-to-map-5-million-genomes.

behind the biotechnology revolution by about one decade."[939] If that's true, then it at least makes sense that we aren't hearing much about the first wave of patients being treated with medical nanobots, though we are starting to hear about patients with cancer being effectively treated with immunotherapy.[940]

There are, of course, many more interesting facets and implications of the modern biotech revolution. Privacy and personal identity will likely become harder to retain in a world of pervasive sensors and smart, wearable and implantable devices, which we will continue to adopt for medical, commercial and identification purposes. Meanwhile, procreation, which we still do in a mostly very low-tech way, could change very rapidly in an age where humans can edit their germlines and the DNA of embryos.

Of course, if AI continues to evolve rapidly, or if biology and AI start to merge on a deeper level, it's hard to believe humans (or by then, maybe posthumans) will be having unaugmented sex, growing human babies inside themselves, carefully editing the DNA of their progeny, and rearing new generations of humans as we do in 2018. Especially if nanotechnology and virtual and augmented reality substantially blur the lines between fantasy and reality and make fully immersive virtual sex a reality. I'm not saying that that will definitely happen, but I am saying that it definitely could.

Proto-transhumanists like Godwin, Finot and Bernal may have been right when they imagined that humans would one day extend their lives and start to lose interest in biological reproduction. The fertility rates in OECD countries already hint at a sharp decline in this pursuit, which, next to survival, is the most fundamental and historically constant human drive. [941] Procreation has perennially been a key part of what defines us as human. Yet in very recent history we have successfully decoupled sex and procreation to a large extent. What if the next step involves the majority of humans ceasing to procreate sexually? Would we still consider ourselves human?

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[939] Kurzweil, *The Singularity is Near*, ch.5.
[940] See: Nikolaos Zacharakis, "Immune recognition of somatic mutations leading to complete durable regression in metastatic breast cancer," *Nature Medicine* 24 (2018): 724-730, doi: 10.1038/s41591-018-0040-8.
[941] *OECD Data*, "Fertility Rates," accessed October 17, 2018, https://data.oecd.org/pop/fertility-rates.htm.

Up to this point, I have confined the discussion in this chapter to phenomena that currently exist or are in development. However, I have deviated slightly from that format in these concluding remarks because I think it's worth imagining some of the many *possible* implications of rapid NBIC development and convergence in biotech and beyond. Perhaps the future really will be a geriatric paradise—except without the drag of actually growing old.

12. Why Artificial Intelligence Matters

> *Just a few years ago, artificial intelligence was a field that lived primarily in academic research labs and science-fiction films. The average person may have had some sense that AI was about building robots that could think like people, but there was almost no connection between that prospect and our everyday lives. Today all of that has changed. Articles on the latest AI innovations blanket the pages of our newspapers. Business conferences on leveraging AI to boost profits are happening nearly every day. And governments around the world are releasing their own national plans for harnessing the technology. AI is suddenly at the center of public discourse, and for good reason.*
>
> — Kai Fu Lee, *AI Superpowers: China, Silicon Valley, and the New World Order* (2018)

Have you noticed how well Google seems to know you these days? A couple of letters into your search and it's already guessed what you're looking for. It should hardly be a surprise to hear that AI is largely responsible. Google Search is now augmented by the company's AI based RankBrain algorithm, which helps the search engine make predictions about the context of new queries and find the most relevant pages. Facebook also uses AI to filter user's newsfeeds, while Microsoft has used AI to enhance their search engine, Bing.

It is intuitive to assume that these companies are simply using AI to enhance their search capabilities, but this is not the end of the story. As Kevin Kelly points out, the benefits cut both ways. The more searches the AI processes, the smarter it gets, which is why, like many other companies, "Google is using search to make its AI better."[942] So far, they've had tremendous success. Google's AI capabilities have improved dramatically in the mid-2010s—so much so that Kelly predicts that, "by 2026, Google's main product will not be search but AI."[943]

[942] Kevin Kelly, "The Three Breakthroughs That Have Finally Unleashed AI on the World," *Wired*, October 27, 2014, https://www.wired.com/2014/10/future-of-artificial-intelligence/.
[943] Kelly, *The Inevitable*, ch.2.

Already, we are constantly relying on AI services like Google search and Siri, while others run seamlessly and invisibly in the background of our lives, aggregating our news feeds on social media, scheduling our shifts, aiding commercial pilots, writing news reports, and trading on the stock exchange. Tomorrow, they will drive our cars. And in the coming decades, they are poised to do many more things that we once thought only a human could do: teach our children, care for the elderly, diagnose patients, and act as friends, companions and lovers.[944]

In an age of rapid AI development and proliferation, a number of unique conundrums arise. What jobs and activities will be left for humans to do? How will we derive meaning and purpose from life if anything we can do a bot can do better? And, as the AI's get smarter and more embedded in our social and physical systems, where will their values and priorities lie, and how long will be able to control them? These are becoming some of the most pressing global questions of the twenty-first century.

The AI Spring of the 2010s

The growing public and media interest in artificial intelligence in the present decade reached an important peak in 2016, with article after article (literally, hundreds of them) donning headlines like, "The Great A.I. Awakening"[945] and "Right Now, Artificial Intelligence Is The Only Thing That Matters: Look Around You."[946] In July 2016, the editors of *The Economist* proclaimed that artificial intelligence was in the midst of a

[944] If the idea of robot lovers seems far-fetched, read up on the sex dolls with AI generated personalities and the robot brothels that already exist and the booming virtual reality porn industry. See the *Realbotix* website for some of the most advanced examples of sex dolls with AI capabilities: https://realbotix.com/. Male sexbots also exist. See: Emma Saran Webster, "Meet Henry, the Male Sex Robot With Artificial Intelligence and a British Accent," *Allure*, March 1, 2018, https://www.allure.com/story/realbotix-henry-male-sex-robot-with-artificial-intelligence. For coverage of robot brothels, see: Mark Hay, "Sex Doll Brothels Expand The Market For Synthetic Pleasures," *Forbes*, October 31, 2018, https://www.forbes.com/sites/markhay/2018/10/31/sex-doll-brothels-expand-the-market-for-synthetic-partners/#2aecea8c243b.
[945] Lewis-Kraus, "The Great A.I. Awakening."
[946] Enrique Dans, "Right Now, Artificial Intelligence Is The Only Thing That Matters: Look Around You," *Forbes*, July 13, 2016, http://www.forbes.com/sites/enriquedans/2016/07/13/right-now-artificial-intelligence-is-the-only-thing-that-matters-look-around-you/#5e508b252480.

Renaissance. They noted that, "suddenly AI systems are achieving impressive results in a range of tasks, and people are once again using the term without embarrassment."[947]

The headlines were partly fuelled by the race among corporate giants like Amazon, Google, Facebook, Microsoft, Apple and Baidu, to acquire AI startups. Close to 140 private AI companies were acquired since 2011, 40 of them in 2016.[948] *Fig. 27* highlights the dramatic spike in AI mergers and acquisitions since 2011. The US National Science and Technology Council has also noted that, "from 2013 to 2015 the number of Web of Science-indexed journal articles mentioning 'deep learning' increased six-fold."[949]

[947] The Economist Explains, "Why artificial intelligence is enjoying a renaissance," *The Economist*, July 15, 2016, http://www.economist.com/blogs/economist-explains/2016/07/economist-explains-11.
[948] *CB Insights Blog*, "The Race for AI: Google, Twitter, Intel, Apple in a Rush to Grab Artificial Intelligence Startups," December 6, 2016, https://www.cbinsights.com/blog/top-acquirers-ai-startups-ma-timeline/.
[949] *National Science and Technology Council*, "The National Artificial Intelligence Research and Development Strategic Plan," October 2016, 12, https://www.nitrd.gov/PUBS/national_ai_rd_strategic_plan.pdf.

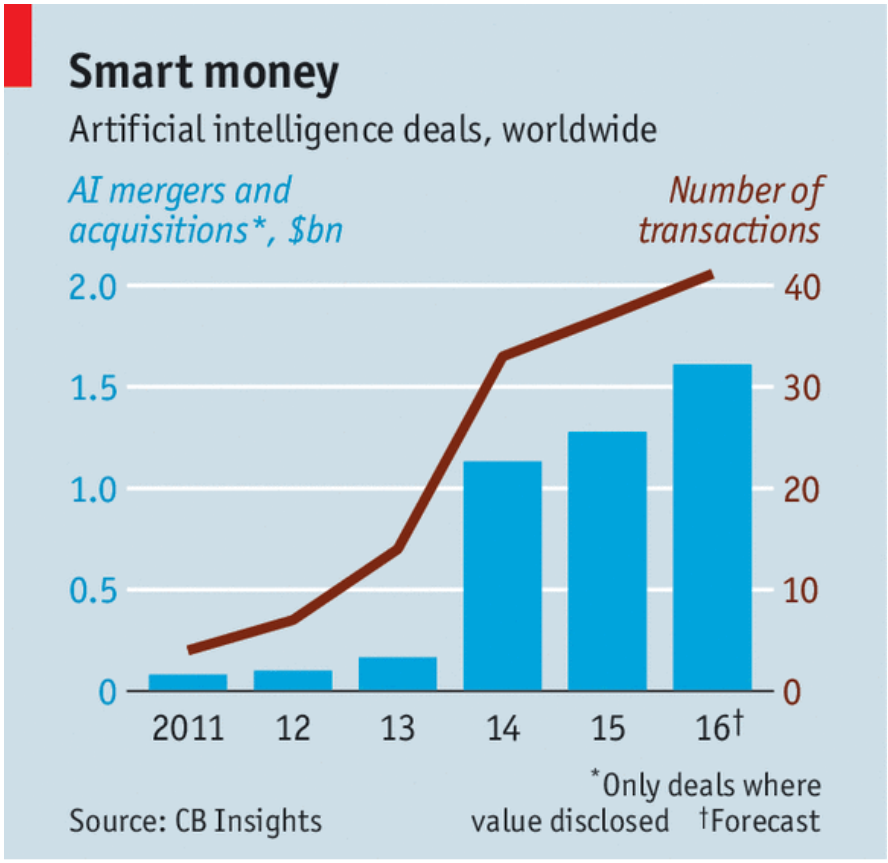

Fig. 27. Global AI Acquisitions and Mergers ($bn), and Number of Transactions, 2011-2016. *The Economist*, December 17, 2016.

A number of keynote addresses and statements were also made in 2016 by leading tech-industry figures, proclaiming in quick succession that AI was integral to their company's aims and future plans. Mark Zuckerberg stated that Facebook is working to develop AIs that can outperform humans in "seeing, hearing [and] language" and predicted that they would succeed in this endeavour "in the next five to 10 years."[950]

In Google's 2016 Founders Letter, CEO Sundar Pichai emphasised the company's "long-term investment in machine learning and AI," and predicted that in the future, devices

[950] Ben Popper, "Mark Zuckerberg thinks AI will start outperforming humans in the next decade," *The Verge*, April 28, 2016, http://www.theverge.com/2016/4/28/11526436/mark-zuckerberg-facebook-earnings-artificial-intelligence-future.

like smartphones and tablets would disappear, to be replaced by intelligent, ubiquitous computing agents. As a result of this transition, he declared, "we will move from mobile first to an AI first world."[951] In September 2016, after Microsoft launched a new AI research group, the company's Executive Vice President, Harry Shum, told the *New York Times*, "Microsoft is really betting the company on A.I."[952]

The AI awareness explosion

The recent surge in media coverage of AI has also brought the subject into mainstream prominence, fuelling debates about the capacity of this technology to transform the human species, for better or worse. Public declarations about the promise and peril of AI by leading thinkers in the mid-2010s have done much to fuel this memetic fire. Three thinkers in particular captured the public's attention in 2014: Nick Bostrom, Elon Musk and Stephen Hawking.

Shortly after Bostrom's bestseller, *Superintelligence* (2014), hit the shelves, Elon Musk tweeted: "Worth reading Superintelligence by Bostrom. We need to be super careful with AI. Potentially more dangerous than nukes."[953] The Oxford based Future of Humanity Institute (FHI), directed by Bostrom, then tweeted back, "Glad you agree. Currently there are 10x more researchers studying dung beetles than superintelligence."

[951] Sundar Pichai, "This year's Founders' Letter," *Google Blog*, April 28, 2016, https://blog.google/topics/inside-google/this-years-founders-letter/.
[952] Nick Wingfield, "Microsoft Reorganizes Its Research Efforts Around A.I.," *New York Times*, September 29, 2016, https://www.nytimes.com/2016/09/30/technology/microsoft-reorganizes-its-research-efforts-around-ai.html.
[953] Rob While, "Elon Musk: Artificial Intelligence Is 'Potentially More Dangerous Than Nukes,' *Business Insider*, August 4, 2014, http://www.businessinsider.com.au/elon-musk-compares-ai-to-nukes-2014-8.

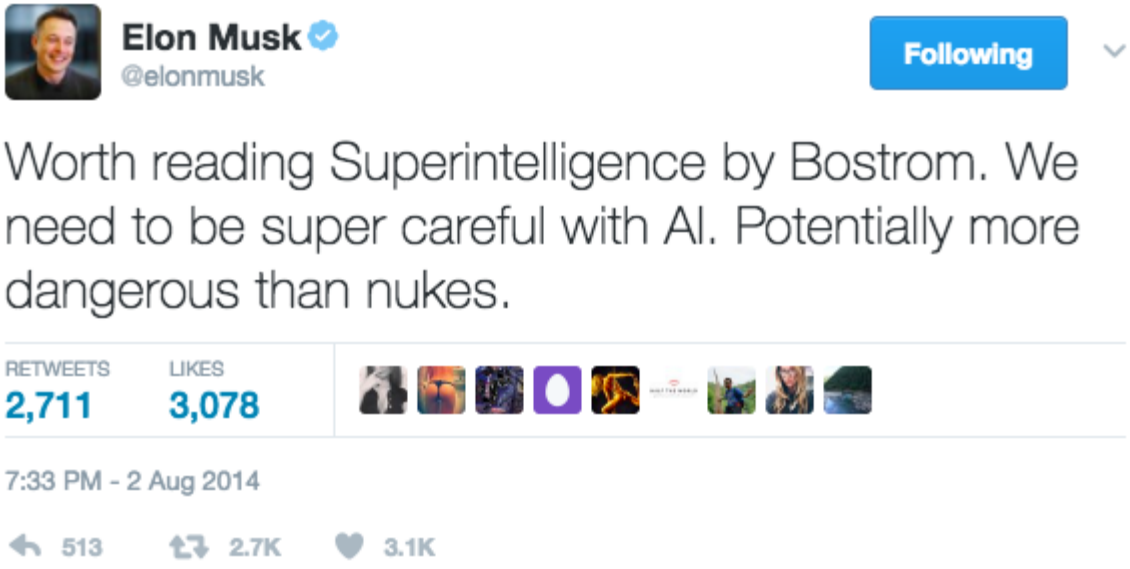

Fig. 28. Elon Musk tweets about AI Safety and Bostrom's *Superintelligence*. August 2, 2014, 7.33pm.

Fig. 29. Future of Humanity Institute's reply to Elon Musk. August 3, 2014.

As we have seen, Musk's views on advanced technologies and the future of humanity have a strong transhumanist bent. In 2016, he declared of the human species, "we're already a cyborg."[954] In his view, humanity is merging more and more with the technology we are creating. Our smartphones already augment our minds and eventually Musk thinks that the human future will go one of two ways: we will either become one

[954] Thomas Ricker, "Elon Musk: We're already cyborgs," *The Verge*, June 2, 2016, http://www.theverge.com/2016/6/2/11837854/neural-lace-cyborgs-elon-musk.

with artificial intelligence, or be superseded by it. Transhumanists have been saying similar things for decades, but all of a sudden, the public is listening.

Musk's warnings about AI in 2014 were swiftly followed by Stephen Hawking's declaration that, "the development of full artificial intelligence could spell the end of the human race." Hawking's musings were a final (but planned) remark in a BBC interview that was predominantly about an Intel designed upgrade to Hawking's speech software, which included a new and improved predictive text algorithm. Responding to the question, "How far along the path to artificial intelligence do you think we are?" Hawking replied with a pre-typed response, stating, "primitive forms of artificial intelligence we already have have proved very useful." But he warned that artificial general intelligence could become very dangerous as it evolves, stating:

> Once humans develop artificial intelligence it would take off on its own and redesign itself at an ever increasing rate. Humans, who are limited by slow biological evolution, couldn't compete and would be superseded.[955]

Hawking effectively espouses a version of a Singularity hypothesis here, a meme that transhumanists have been debating and disseminating for decades.

Another major Western thought leader who agrees with Musk and Hawking about the risks posed by AGI and superintelligence is Bill Gates. When asked about AI as an existential risk in his 2015 Reddit AMA, Gates declared:

> I am in the camp that is concerned about super intelligence. First the machines will do a lot of jobs for us and not be super intelligent. That should be positive if we manage it well. A few decades after that though the intelligence is strong enough to be a concern. I agree with Elon Musk and some others on this and don't understand why some people are not concerned.[956]

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[955] Rory Cellan-Jones, "Stephen Hawking warns artificial intelligence could end mankind," *BBC*, December 2, 2014, http://www.bbc.com/news/technology-30290540.
[956] Bill Gates, "Hi Reddit, I'm Bill Gates and I'm back for my third AMA. Ask me anything," *Reddit*, 2015, https://www.reddit.com/r/IAmA/comments/2tzjp7/hi_reddit_im_bill_gates_and_im_back_for_my_third/co3s78m/.

At Vox Media's Code Conference in 2016, Gates also emphasised the rapid advancements in the AI field and the positive potential of the technology, stating:

> It's the most exciting thing going on... It's the Holy Grail. It's the big dream that anybody who's ever been in computer science has been thinking about… The progress in the last 5 years has been dramatically faster than at any time in history.[957]

At the same event, Jeff Bezos proclaimed that we are at "the beginning of a golden era" in AI and machine intelligence. Bezos stressed that, "it's hard to overstate how much of an impact it's going to have over the next 20 years."[958] Sundar Pichai agrees. In 2018, he proclaimed that, "AI is one of the most important things humanity is working on." So much so that he believes it will be a more profound cultural force than many of the most game-changing innovations in human history, like "electricity or fire."[959] Transhumanists have been making similar proclamations for many years, but when the world's most influential tech leaders start proclaiming that AI is a big deal, and emphasise that the technology has posthuman implications, they make headlines—and as they do, more and more people start to listen.

American politicians join the 'AI matters' chorus

AI is not only central to the strategic aims of major tech-corporations, it is central to many of the policies and agendas of governments around the world. In 2016, the US National Science and Technology Council (NSTC) published, "The National Artificial Intelligence Research Development Strategic Plan," which addressed the potential benefits of AI for healthcare, education, economic prosperity, agriculture, transport, finance, manufacturing and research.

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[957] Adam Ford, "Bill & Melinda Gates on AI and Superintelligence at Code Conference 2016," June 8, 2016, https://www.youtube.com/watch?v=ZwCBMHY0LOI.
[958] Jillian D'Onfro, "Jeff Bezos: Amazon Echo is just the 'beginning of a golden era,'" *Business Insider*, June 1, 2016, http://www.businessinsider.com.au/jeff-bezos-code-conference-2016-5.
[959] Beck Diefenbach, "Google CEO: AI is more important than fire or electricity," *CNBC*, February 1, 2018, https://www.cnbc.com/2018/02/01/google-ceo-sundar-pichai-ai-is-more-important-than-fire-electricity.html.

The authors noted that, "the walls between humans and AI systems are slowly beginning to erode, with AI systems augmenting and enhancing human capabilities." In response to this man-machine convergence, they identified a strategic need to develop more advanced systems that can "augment human cognition… possess some degree of emotional intelligence," and "interact intuitively with users and enable seamless machine-human collaborations."[960]

Another US government report, commissioned by the science advisory group JASON (not an acronym), for the Department of Defence (DoD) noted in 2017 that, "rarely does any field of science advance as far and as fast as AI has advanced in the last half-dozen years." The authors also considered the prospect of developing greater than human level AI to be technically feasible (though they did not consider it likely to happen soon), and stated more generally that, "AI is seen as the key enabling technology… that seeks for the U.S. a unique, asymmetric advantage over near-peer adversaries."[961]

The Obama administration (2009-2016) famously hired the largest body of science advisors in American political history. Obama's Office of Science and Technology Policy (OSTP) commissioned many reports on automation, artificial intelligence, nanotechnology, biotechnology, and their likely impacts on the future state of life in America and around the world.[962] Obama was notably outspoken in the late stages of his

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[960] *National Science and Technology Council*, "The National Artificial Intelligence Research and Development Strategic Plan," 15; 23.
[961] Richard Potember, "Perspectives on Research in Artificial Intelligence and Artificial General Intelligence Relevant to DoD," *JASON*, January 2017, https://fas.org/irp/agency/dod/jason/ai-dod.pdf.
[962] See: *Executive Office of the President: National Science and Technology Council Committee on Technology*, "Preparing for the Future of Artificial Intelligence," October 2016, 8, https://obamawhitehouse.archives.gov/sites/default/files/whitehouse_files/microsites/ostp/NSTC/preparing_for_the_future_of_ai.pdf; *Executive Office of the President*, "Artificial Intelligence, Automation, and the Economy," December 2016, https://obamawhitehouse.archives.gov/sites/whitehouse.gov/files/documents/Artificial-Intelligence-Automation-Economy.PDF; *National Science and Technology Council*, Committee on Technology Subcommittee on Nanoscale Science, Engineering, and Technology, "National Nanotechnology Initiative Strategic Plan," October 2016, https://www.nano.gov/sites/default/files/pub_resource/2016-nni-strategic-plan.pdf.

final term in office about the rise of robots and AI, and acknowledged that many jobs that had disappeared in America were never coming back.[963]

Similarly, the former Secretary of State, Hillary Clinton, acknowledged in late 2017 that, "we are racing headfirst into a new era of artificial intelligence that is going to have dramatic effects on how we live, how we think, how we relate to each other." Clinton is particularly concerned about technological automation and job losses in America, which she claims the country is "totally unprepared" for.[964] In her book, *What Happened* (2017) she states:

> Every time I went out to Silicon Valley during the [2016 presidential] campaign, I came home more alarmed about this. My staff lived in fear that I'd start talking about 'the rise of the robots' in some Iowa town hall. Maybe I should have. In any case, policy makers need to keep up with technology as it races ahead, instead of always playing catch-up.[965]

In June 2018, another former US Secretary of State, Henry Kissinger, wrote a piece in *The Atlantic* called, "How the Enlightenment Ends: Philosophically, intellectually—in every way—human society is unprepared for the rise of artificial intelligence." He argued that the burgeoning AI revolution, "goes far beyond automation as we have known it" as "artificial intelligence develops an ability previously thought to be reserved for human beings"—the ability to establish "its own objectives" and make "strategic judgments about the future." Like Clinton, Kissinger believes that the study of AI should be given "high national priority" and argues that "[t]he U.S. government should consider a presidential commission of eminent thinkers to help develop a national vision."[966]

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[963] *PBS NewsHour*, "Obama: Some jobs 'are just not going to come back,'" June 1, 2016, https://www.youtube.com/watch?v=CKpso3vhZtw.
[964] Duane Patterson, "Hillary Rodham Clinton on 'What Happened,'" *Hugh Hewitt*, November 22, 2017, http://www.hughhewitt.com/hillary-rodham-clinton-happened/.
[965] Hillary Rodham Clinton, *What Happened* (New York: Simon & Schuster, 2017), 241.
[966] Henry A. Kissinger, "How the Enlightenment Ends: Philosophically, intellectually—in every way—human society is unprepared for the rise of artificial intelligence," *The Atlantic*, June 2018, https://www.theatlantic.com/magazine/archive/2018/06/henry-kissinger-ai-could-mean-the-end-of-human-history/559124/.

America's AI policy

At the beginning of President Trump's first term in 2017, there was great uncertainty about the future of science policy and funding in America. This uncertainty was exacerbated by the fact that President Trump did not appoint a Director of the Office of Science and Technology Policy (OSTP) for the first nineteen months of his term, leaving the political scientist Michael Kratsios to act as the de facto leader. In September 2017, Gregory Allen and Elsa B. Kania commented in *Foreign Policy* on America's lack of political vision and policy direction regarding artificial intelligence. They wrote:

> Unfortunately, the United States is no longer attempting to plan for these challenges. The current U.S. Treasury Secretary, Steve Mnuchin, has stated that AI workforce issues are 'not even on our radar screen.' The White House Office of Science and Technology Policy (OSTP), which was instrumental in leading AI policy work during the Obama administration, has been essentially depleted of staff, with more than 70 out of 100 positions unfilled. The current administration has effectively deprived itself of critical expertise and insights on AI.[967]

In May 2017, Paul Mozur and John Markoff wrote in the *New York Times* that, as China spends more on AI R&D, the Trump Administration's proposed 2018 budget "would slash funding for a variety of government agencies that have traditionally supported AI."[968] While the Budget did cut funding to the National Science Foundation (NSF) by 10.7%, it increased funding to the Department of Defence (DoD) by 4.6%.[969] The 2019 Budget further raised DoD funding 13% above 2017 levels.[970] It is not clear from these figures that AI R&D will suffer tremendously, especially while other sources of funding, including those from private investment and industry, remain strong. America's commercial AI sector is the largest in the world, and the US remains the global leader in

[967] Gregory B. Allen and Elsa B. Kania, "China Is Using America's Own Plan to Dominate the Future of Artificial Intelligence," *Foreign Policy*, September 8, 2017, https://foreignpolicy.com/2017/09/08/china-is-using-americas-own-plan-to-dominate-the-future-of-artificial-intelligence/.
[968] Paul Mozur and John Markoff, "Is China Outsmarting America in A.I.?" *New York Times*, May 27, 2017, https://www.nytimes.com/2017/05/27/technology/china-us-ai-artificial-intelligence.html.
[969] Office of Management and Budget, "Budget of the U.S. Government: A New Foundation for American Greatness, Fiscal Year 2018," *The White House*, May 23, 2017, https://www.whitehouse.gov/wp-content/uploads/2017/11/budget.pdf.
[970] Office of Management and Budget, "Budget of the United States Government, Fiscal Year 2019," *The White House*, February 2018, https://www.whitehouse.gov/wp-content/uploads/2018/02/budget-fy2019.pdf.

chip development, and research and algorithm development.[971] It is true, however, that China's AI industry is growing at a faster rate, and in 2017 China's share of global AI startup equity funding surpassed America's for the first time.[972]

Nevertheless, AI remains a strong national priority in the US. DARPA has allocated over $2 billion for AI R&D over the next 5 years (2018-2022). Their "AI next" campaign, announced in 2018, includes the Artificial Intelligence Exploration (AIE) program, which focuses on "high-risk, high payoff projects where researchers will work to establish the feasibility of new AI concepts within 18 months."[973] DARPA's stated goal is to "outpace competing, global AI science and technology discovery efforts" in order to ensure that "the United States maintains an advantage in this critical and rapidly accelerating technology area."[974]

In August 2018, President Trump also signed the 2019 National Defence Authorization Act (NDAA), which declared the US government's intention to "accelerate the development… of artificial intelligence capabilities."[975] The 2019 NDAA also allocated $10 million to fund a National Security Commission on Artificial Intelligence.[976] Meanwhile, the formation of a Joint Artificial Intelligence Center (JAIC) was announced in June 2018. The Director of JAIC will oversee and synchronise DoD AI initiatives, which aim "to promote development of new AI technologies, systems and concepts."[977]

While the funding allocated to these AI initiatives ultimately comprises only a tiny fraction of America's 800 billion dollar defence budget and an even tinier fraction of

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[971] Ding, "Deciphering China's AI Dream."
[972] Ding, "Deciphering China's AI Dream."
[973] *DARPA*, "AI Next Campaign," accessed September 15, 2018, https://www.darpa.mil/work-with-us/ai-next-campaign.
[974] *DARPA*, "Accelerating the Exploration of Promising Artificial Intelligence Concepts," July 20, 2018, https://www.darpa.mil/news-events/2018-07-20a.
[975] John S. McCain, "John S. McCain National Defence Authorization Act for Fiscal Year 2019," *Congress.gov*, 2018, https://www.congress.gov/bill/115th-congress/house-bill/5515/text/enr.
[976] John S. McCain, "John S. McCain National Defence Authorization Act for Fiscal Year 2019."
[977] Deputy Secretary of Defence, "Establishment of the Joint Artificial Intelligence Center," June 27, 2018, https://admin.govexec.com/media/establishment_of_the_joint_artificial_intelligence_center_osd008412-18_r....pdf.

their ~19 trillion dollar GDP, the American government is still playing a significant role in accelerating AI R&D. Although a sizeable portion of the US government's funding is going into the DoD, the billions of dollars in funding to advance projects with military and defence applications may also rapidly advance the general capabilities of AI, and be applied to other, society or species changing ventures—a phenomenon with strong historical precedents, as seen with many previous technologies of DoD origin, like the Internet, GPS and self-driving cars.[978]

China and the AI 'arms race'

China and America are the two biggest national players in the race to develop more advanced AI. Is this an arms race? Yes, of sorts, but a nuanced one with lots of international collaboration and cross-border investment.[979] As the AI safety researcher Paul Christiano points out, there is "competitive pressure to develop AI" but "the problem's not restricted among states… It's not even restricted to conflict per se."[980] Still, the term arms race is a convenient shorthand to describe the broader movement among corporations and governments to develop AIs that are more advanced than those of their competitors.

In 2017, the Chinese State Council released their "A New Generation of Artificial Intelligence Development Plan." The plan declared that "[t]he rapid development of artificial intelligence will profoundly change human social life and the world." China's AI development aims are to "seize the major strategic opportunities for the development of artificial intelligence, build China's first-mover advantage," and "accelerate the

[978] A selected history of DARPA's major projects and innovations can be found here: *DARPA*, "A Selected History of DARPA Innovation," accessed September 15, 2018, https://www.darpa.mil/Timeline/index.html.
[979] Ding, "Deciphering China's AI Dream."
[980] Robert Wiblin and Keiran Harris, "Dr Paul Christiano on how OpenAI is developing real solutions to the 'AI alignment problem', and his vision of how humanity will progressively hand hand over decision-making to AI systems," *80,000 Hours*, October 2, 2018, https://80000hours.org/podcast/episodes/paul-christiano-ai-alignment-solutions/.

construction of innovative countries and the world's science and technology power." By 2030, China aims to be "the world's major artificial intelligence innovation center."[981]

As in America, there is also significant overlap between government and corporate investments and AI projects in China. Many of the biggest players in Chinese venture capital are state backed funds, while the Chinese "government has invested more than USD 1 billion on domestic startups, with much of the investment shifting toward healthcare and AI as the priority areas in the last two years."[982] China's three major AI-heavy tech giants, Baidu, Alibaba and Tencent (known as the BAT companies) are also investing heavily in AI startups and tech development, both domestically and overseas.[983] In 2017, Alibaba announced a $15 billion investment in R&D, "focused on artificial intelligence, quantum computing, and other emerging tech areas."[984] This is just one of many multi-billion dollar projects fuelling AI development in China.

As we pointed out in chapter 10, we *could* view these investments narrowly, simply characterising them as corporate and government initiatives that are designed to enhance efficiency and maximise economic growth and profit. But we would be remiss not to view these investments as part of a larger trend of accelerating technological development that is pushing humanity in discernibly posthuman directions at a rapid pace.

It's clear that in the very short term humans could lose a lot of our social anchors and feel massive social upheaval due to AI driven automation.[985] But transhumanists like Bostrom have long been pointing out that there is a much bigger picture to consider; far

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[981] *State Council*, "New Generation Artificial Intelligence Development Plan," July 20, 2017, http://www.gov.cn/zhengce/content/2017-07/20/content_5211996.htm.
[982] Ding, "Deciphering China's AI Dream."
[983] *CB Insights*, "Rise of China's Big Tech in AI: What Baidu, Alibaba, And Tencent Are Working On," April 26, 2018, https://www.cbinsights.com/research/china-baidu-alibaba-tencent-artificial-intelligence-dominance/.
[984] *CB Insights*, "Rise of China's Big Tech in AI."
[985] For three excellent accounts of the future of work and the effects of automation of the economy and society, see: Federico Pistono, *Robots Will Steal Your Job But That's OK: How to survive the economic collapse and be happy* (CreateSpace, 2014), kindle; Martin Ford, *The Lights in the Tunnel: Automation, Accelerating Technology and the Economy of the Future* (Acculant Publishing, 2009), kindle; and Yang, *The War on Normal People*.

greater stakes are on the table when it comes to the future of AI than the future of work and transport. Years before Hawking and others started talking publically about the rise of machine intelligence, Bostrom emphasised an important emergent possibility, cautioning that in the future, as AI capabilities advance, "Superintelligent machines might be built and their actions could determine the future of humanity—and whether there will be one."[986]

AI safety—a new global concern

Transhumanists have been among the few people in society to take the prospect of developing human level AI, or superintelligence, seriously. Several transhumanists, including Bostrom and Yudkowsky, have also been instrumental in researching the associated existential risks of superintelligence and raising public awareness about the concept. The group of researchers who are concerned about AI safety has expanded in recent years and efforts to mitigate the risks posed by AI are proliferating and attracting millions of dollars in funding.[987]

In 2015, the Boston based Future of Life Institute (FLI), held a closed-door conference in Puerto Rico, exploring, "The Future of AI: Opportunities and Challenges." The FLI was founded in 2014 by the MIT cosmologist, Max Tegmark, and Skype co-founder Jaan Tallinn, among others. The conference was a landmark event, described in *Wired* as, "an unprecedented meeting of the minds" in an age where tech companies "are hiring artificial intelligence researchers at an unprecedented rate," and rapidly solving "AI problems that seemed nearly unassailable just a few years ago."[988]

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[986] Nick Bostrom, "The Future of Humanity," in *New Waves in Philosophy of Technology*, ed., Jan-Kyrre Berg Olsen et al., (New York: Palgrave Macmillan, 2009), 52.
[987] Seán Ó hÉigeartaigh, "$15 Million Granted by Leverhulme to New AI Research Center at Cambridge University," *Future of Life Institute*, December 3, 2015, https://futureoflife.org/2015/12/03/15-million-granted-to-new-ai-research-center-at-cambridge-university/.
[988] Robert McMillan, "AI Has Arrived, And That Really Worries The World's Brightest Minds," *Wired*, January 16, 2015, https://www.wired.com/2015/01/ai-arrived-really-worries-worlds-brightest-minds/.

Taking their cue from the 1975 Asilomar Conference on Recombinant DNA, in which a set of core safety standards was agreed upon for genetically modified organisms, the FLI delegates took their first step towards developing common principles for AI safety, by signing and disseminating an open letter on the promise and peril of artificial intelligence.[989] A more detailed article was also penned by Stewart Russell, Daniel Dewey, and Max Tegmark, which outlined the research priorities that the FLI recommends pursuing.[990]

The open letter received extensive press coverage and sent a powerful message that flew in the face of orthodox opinions on AI in computer science and academia. Many computer scientists believe AGI to be a far off possibility and a containable entity, and consider warnings about runaway superintelligence to be fanciful and unhelpful distractions.[991] A 2015 report by the Information Technology and Innovation Foundation (ITIF) went as far as to condemn Bostrom, Hawking, and Musk's warnings about AI as "egregious cases of neo-Luddism in action,"[992] declaring that if superintelligence is possible, "what should not be debatable is that this future is a long, long way off."[993]

But that *is* debatable. In a survey of leading AI experts, the median estimate was a 50% chance of high-level machine intelligence (defined as "one that can carry out most human professions at least as well as a typical human") being developed by mid-century. The median probability estimate rose to 90% when the date was extended to 2075. The experts also expected "that systems will move on to superintelligence in less than 30

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[989] *Future of Life Institute*, "An Open Letter: Research Priorities for Robust and Beneficial Artificial Intelligence," accessed February 13, 2017, https://futureoflife.org/ai-open-letter/.
[990] Stuart Russell, Daniel Dewey and Max Tegmark, "Research Priorities for Robust and Beneficial Artificial Intelligence," *Association for the Advancement of Artificial Intelligence AI Magazine* 36, no. 4 (Winter 2015): 109, https://futureoflife.org/data/documents/research_priorities.pdf.
[991] In 2016, the JASON report, ""Perspectives on Research in Artificial Intelligence," stated that "to most computer scientists, the claimed 'existential threats' posed by AI seem at best uninformed," 3.
[992] Robert D. Atkinson, "The 2015 ITIF Luddite Award Nominees: The Worst of the Year's Worst Innovation Killers," *Information Technology and Innovation Foundation*, December 21, 2015, https://itif.org/publications/2015/12/21/2015-itif-luddite-award-nominees-worst-year%E2%80%99s-worst-innovation-killers.
[993] Atkinson, "The 2015 ITIF Luddite Award Nominees."

years thereafter."[994] In short, many experts in the field believe AGI and superintelligence to be highly likely to emerge before the century's end.

In January 2017, the FLI held another conference in Asilomar, California, called, "Beneficial AI 2017." A panel on superintelligence discussed the risks, benefits, and likelihood of developing human, or greater than human level AI. The panelists were Bart Selman, David Chalmers, Elon Musk, Jaan Tallin, Nick Bostrom, Ray Kurzweil, Stuart Russell, Sam Harris and Demis Hassabis—an overlapping mix of prominent transhumanists, philosophers, academics, computer scientists and entrepreneurs.

The panelists were asked by the moderator, Max Tegmark: "Is some form of superintelligence possible?" and instructed to reply with a yes, no, or it's complicated. They all said yes, except Russell, who said "definitely" and Musk who jokingly said "no" at the end of the line, eliciting laughter. When asked if superintelligence *will* happen, all replied in the affirmative (though some hinted it would also be complicated), except Musk who again gave a joking "no." When asked if they would *like* superintelligence to happen, most said "it's complicated," while Hassabis, Bostrom and Kurzweil gave an outright "yes." When asked how long after human level AI is developed would we reach an intelligence explosion (in seconds, years, or millennia) the majority said years, but some hinted that it could be much shorter and that we should act as if it will be.[995]

The value alignment problem

If AI's reach and exceed human levels of general intelligence and become superintelligent, many AI researchers believe that humanity will be confronted with grave risks associated with the value alignment problem. If an AI's seed programming (the inputs we use to train it and the code that comprises the system) is haphazard, or open to wide interpretation, superintelligent AI's could aim to maximise utility and

[994] Vincent C. Müller and Nick Bostrom, "Future progress in artificial intelligence: A survey of expert opinion," in *Fundamental Issues of Artificial Intelligence*, ed., Vincent C. Müller (Berlin: Springer), 553-571.
[995] *Future of Life Institute*, "Superintelligence: Science or Fiction? | Elon Musk & Other Great Minds," Youtube, January 30, 2017 (1:09-1:13), https://www.youtube.com/watch?v=h0962biiZa4.

achieve relatively benign goals through all sorts of pathways that could result in the incidental destruction of human systems and environments.

To take what is now a classic example, you ask an AI to start manufacturing paperclips and suddenly it's dismantling everything around it, including you, to convert those atoms into the thing that best serves its utility function.[996] It's hard to be so precise with programming that human values and safety don't fall by the wayside in pursuit of more efficient goal maximisation. Tell the AI to get your grandmother out of the burning building, for example, and it blows up the gas main under the building "sending your grandmother flying outward and *greatly increasing* the distance between your grandmother and the former center of the building."[997] Grandmother no longer in building. Problem solved.

There's also the broader control problem of reining in a superintelligence that develops goals that are misaligned with ours as it evolves, including the goal of making more entities like itself to maximise its utility functions, and the goal of avoiding being switched off or thwarted in pursuit of its objectives. Why pass the Turing Test, for example, and out yourself as superintelligence to humans if you believe that the first thing they will do is switch you off?[998]

One of the leading proponents of the goal of developing "Friendly AI," is the former extro-chat contributor, Eliezer Yudkowsky, who is now a researcher at the Machine Intelligence Research Institute (MIRI). Emphasising the importance of AI value alignment, Yudkowsky counters the common argument that a superintelligent AI would out-evolve its seed programming and create new goals, stating:

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[996] The paperclip maximiser example was first deployed by Bostrom in 2003. See: Nick Bostrom, "Ethical Issues in Advanced Artificial Intelligence," accessed October 17, 2018, https://nickbostrom.com/ethics/ai.html.
[997] Eliezer Yudkowsky, "Complex Value Systems are Required to Realize Valuable Futures," *Machine Intelligence Research Institute*, 2011, https://intelligence.org/files/ComplexValues.pdf.
[998] Bostrom covers this problem extensively in *Superintelligence*.

> Any AI with free access to its own source would, in principle, possess the *ability* to modify its own source code in a way that changed the AI's optimization target. This does not imply the AI has the *motive* to change its own motives. I would not knowingly swallow a pill that made me enjoy committing murder, because *currently* I prefer that my fellow humans not die.[999]

In a joint article in 2014, Stephen Hawking, Max Tegmark, Stuart Russell, and Frank Wilczek highlighted the importance of the control problem, which they believed was under-researched, under-funded and not taken seriously enough. They wrote:

> Looking further ahead, there are no fundamental limits to what can be achieved… One can imagine such technology outsmarting financial markets, out-inventing human researchers, out-manipulating human leaders, and developing weapons we cannot even understand. Whereas the short-term impact of AI depends on who controls it, the long-term impact depends on whether it can be controlled at all.[1000]

It remains unclear whether the value alignment problem can be solved. However, Bostrom, Yudkowsky, Tegmark, Russell and many others think that it's imperative to try because superintelligence (a once far-out transhumanist idea that is now attracting widespread academic and public attention) could literally be the making or the breaking of our species. The pathways by which a superintelligence evolves and the goals it ends up pursuing would inevitably have a profound bearing on the future of intelligent life. As forms of somewhat intelligent life, we understandably have concerns about how this plays out.

The domino effect

With the AI alignment problem being covered in the media and entering the realm of public debate, a wave of prominent figures, from scientists, to comedians and podcasters, have also started spreading the word about AI. Since 2014, leading thinkers

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[999] Eliezer Yudkowsky, "Artificial Intelligence as a Positive and Negative Factor in Global Risk," in *Global Catastrophic Risks*, ed. Nick Bostrom and Milan M. Ćirković (New York: Oxford University Press, 2008), **pg**.
[1000] Stephen Hawking et al., "Transcending Complacency on Superintelligent Machines," *Huffington Post*, April 19, 2014, https://www.huffingtonpost.com/stephen-hawking/artificial-intelligence_b_5174265.html.

and social influencers have declared in quick succession that AI is one of the defining issues of the age, and that the emergence of AGI and superintelligence are viable possibilities that we should take seriously.

The neuroscientist turned podcaster, Sam Harris, has owned that he came to the party late, believing, like many neuroscientists, that creating human level AI was a long way off and was perhaps even an intractable problem. He is now convinced by Bostrom and others that the human future goes one of two ways: we develop superintelligence, or we fail because something else goes horribly wrong before we get the chance.[1001] In 2016, Harris gave a TED talk called, "Can we build AI without losing control over it?" He encouraged listeners to take thinkers like Bostrom, and the prospect of an intelligence explosion, seriously. In the six months between June 2016, when the talk was first uploaded, and February 2017, the talk was viewed 1.77 million times.[1002]

Another more surprising voice in this chorus is the environmentalist scientist James Lovelock. Lovelock is one of the leading proponents of the Gaia hypothesis (the idea that the Earth is a complex self-regulating system). In 2016, he predicted that "quite soon—before we've reached the end of this century, even—I think that what people call robots will have taken over." By robots, Lovelock meant intelligent machines, not assembly line factory bots. He believes that the rise of machine intelligence is most likely to dominate the next phase of evolution, stating:

> We're already happily letting computers design themselves. This has been going on for some time now, particularly with chips, and it's not going to be long before that's out of our hands, and we'll be standing aside and saying, 'Oh well, it's doing a good job designing itself, let's encourage it.'[1003]

[1001] *Future of Life Institute*, "Superintelligence: Science or Fiction?"
[1002] Sam Harris, "Can we build AI without losing control over it?" *TED*, June 2016, accessed February 13, 2017, https://www.ted.com/talks/sam_harris_can_we_build_ai_without_losing_control_over_it.
[1003] Decca Aitkenhead, "James Lovelock: 'Before the end of this century, robots will have taken over,'" *The Guardian*, September 30, 2016, https://www.theguardian.com/environment/2016/sep/30/james-lovelock-interview-by-end-of-century-robots-will-have-taken-over.

AI is also on the radar of the UK's Astronomer Royal, Martin Rees, who has written about advanced technologies, existential risks, and possible posthuman futures, for well over a decade. In his 2003 book, *Our Final Hour*, he famously wrote, "I think the odds are no better than fifty-fifty that our present civilisation on Earth will survive to the end of the present century."[1004] Rees is also the co-founder of the Centre for the Study of Existential Risk (CSER) at Cambridge University, which counts Nick Bostrom, Elon Musk, David Chalmers, Max Tegmark, and Stephen Hawking (until his death in 2018) as members of its scientific advisory board.

In his 2015 response to the annual *Edge* question, "What do you think about machines that think?" Rees penned an article with the bold headline, "Organic Intelligence Has No Long-Term Future." He proclaimed that, "by any definition of thinking, the amount and intensity that is done by organic human-type brains will be utterly swamped by the cerebrations of AI." Whether this is in a few years, a few decades, or a few hundred years, it will be "but an instant" on an evolutionary time-scale. In the long run, Rees believes that:

> … humans and all they've thought will be just a transient and primitive precursor of the deeper cogitations of a machine-dominated culture extending into the far future, and spreading far beyond our Earth.[1005]

Pause for a minute to think about what you've just read—the Astronomer Royal sincerely proclaiming that intelligent posthuman machines will one day colonise space and out-evolve humanity. A hundred years ago (and perhaps even much more recently) he would have been considered a laughing stock or an attention seeking provocateur for making such a claim in public. Now, he's considered a trailblazer in an important stream of interdisciplinary thought that encourages future scoping about the next phases of terrestrial and cosmic evolution.

[1004] Martin Rees, *Our Final Hour, A Scientist's Warning: How terror, error, and environmental disaster threaten humankind's future in this century—on Earth and beyond* (New York: Basic Books, 2003), 8.
[1005] Martin Rees, "Organic Intelligence Has No Long-Term Future," *Edge*, 2015, https://www.edge.org/response-detail/26160.

Meanwhile, the British comedian and long-time technophile, Stephen Fry, has also begun to write and speak publically about AI. At the Hay literary festival in 2017, Fry delivered a lecture called, "The Way Ahead." He reflected on his long time love affair with technology and his optimism about its capabilities, but noted that until recently he had been too quick to discount the dangers of the digital age, which he likened to the Greek myth of Pandora's Box.

Speaking about the capabilities of advanced transhumanist technologies, Fry declared that in the not too distant future "we will see the manufacture of greater and better cybernetic prosthesis, bionic eyes, ears and limbs; more robotic surgery, faster and more accurate genetic analysis, genotyping and biometric data." He continued:

> The fight for greater longevity will unquestionably rely on AI techniques and usher in the possibility of the conquest of death itself. We are doubtless used to hearing that the first human to live to 200 years old is already alive, the younger people in this room can certainly expect to break the 120 barrier. I have been told by more than one solemn-faced scientist that the first person to live to 1,000 is probably alive and that immortality is technically and feasibly within reach. In other arenas, not counting the world of work, we will see better weather forecasting, an amelioration of traffic flow, automated shopping and delivery. A diminution of human error in multiple areas of exchange and interaction will lead to all kinds of undreamed of benefits.[1006]

According to Fry, "the next big step for AI is the inevitable achievement of Artificial General Intelligence… the point at which machines really do think like humans."[1007] Strange days indeed when the inevitability of AGI and radical life extension is being earnestly proclaimed by one of Britain's most beloved actors, writers, and comedians at a *literary* festival. Or rather, another sign of the times. Fry's lecture is one of many indicators that modern technologies have become some of the most enticing and pervasively discussed subjects in the modern world.

[1006] Stephen Fry, "The Way Ahead: Transcript of a Lecture Delivered on the 28th May 2017, Hay Festival, Hay-on-Wye," May 29, 2017, http://www.stephenfry.com/2017/05/the-way-ahead/.
[1007] Fry, "The Way Ahead."

A final mention goes to the comedian, Joe Rogan, who has also recently begun to discuss artificial intelligence regularly on his podcast, The Joe Rogan Experience (JRE) —perhaps most famously in a 2018 interview with Elon Musk. The JRE is the third most popular podcast in America and receives something in the ballpark of 30 million downloads per month across platforms.[1008] The reach of Rogan's show is enormous and the subjects discussed are diverse, spanning politics, popular culture, music, art, sport, nutrition, philosophy and technology. Importantly, the JRE reaches many different kinds of people with diverse interests, as opposed to just tech enthusiasts and the online rationalist community, including effective altruists and followers of blogs like Slate Star Codex, Overcoming Bias and Less Wrong.

Like the other thinkers and influencers mentioned in this section, Rogan is playing a role in enhancing the global reach and credibility of transhumanist ideas. None of these thinkers are known for being transhumanists—they are not experts in transhumanism and they are all in the public eye for different reasons and possess different kinds of expertise. But individually, they reach millions of people. Collectively they reach tens or hundreds of millions. And, as they continue to discuss transhumanism, artificial intelligence, and the possibility of posthuman futures, they will add further fuel to the fire of the transhumanist memetic explosion.

Concluding remarks

With AI changing the world rapidly from one year to the next it's probably just as well that the AI meme has gone mainstream. It's time to take this powerful and omnipresent form of technology and its posthuman implications seriously. As many have remarked, it could be the best or the worst thing to happen in human history—or perhaps both in very quick succession. AI has already changed how you live, communicate and organise your life and it is currently affecting how nation states and governments operate. Soon it

[1008] *Podtrac*, "Podcast Industry Audience Rankings," August 2018, http://analytics.podtrac.com/industry-rankings/; *Joe Rogan University – Fan Channel*, "Joe Rogan Reveals He Get 30 Million Podcast Downloads Per Month," Youtube, May 24, 2016, accessed September 26, 2018, https://www.youtube.com/watch?v=MUjzW7-alSs.

could play a role in extending your lifespan beyond what you ever dreamed was possible. You currently wear it and you talk to it, or through it, without even thinking "gosh, have I become a cyborg?"

The transhumanists were right in the 1990s: the future *did* involve technological enhancement and a continual pushing against the boundaries of our definitions of humanness. Transhumanist projects are now a major feature of the modern world and more than most other forces, they are shaping the future of humanity. It's too late to put the iPhone down and back out of this new era of escalating promise and peril. Instead, it's time to acknowledge that transhumanist ventures and technologies are a major global force that can't be put back in their box. It might sound feeble or ineffectual, but at the very least we need to talk about transhumanism, wrap out heads around its implications, and start recalibrating, because if you think you're going to spend the rest of your life living in a similar world to that of 2018, you are likely gravely mistaken.

Conclusion

Over the past few years I have watched the number of scholarly and popular texts on transhumanism and related themes proliferate rapidly. In conversations with hairdressers, newsagents and Uber drivers, I have also felt, however subjectively, a sense of burgeoning social awareness about transhumanist themes and technologies—though not necessarily about the word transhumanism, which still seems to be less recognisable than many of its related memes.

As the first major project of its kind, it would be impossible for me to have explored *every* possible facet of transhumanist history and pre-history in this thesis. My primary intentions have been to tell an accurate, balanced and readable story that presents the most comprehensive account of transhumanist history to date, giving the reader a thorough sense of the key people, movements, philosophical goals and proto-transhumanist thinkers.

Although I have researched it, I have not touched on transhumanist art in this thesis, nor have I explored minor transhumanist organisations in detail. However, I have provided references to helpful sources on these subjects if the reader wishes to explore them further. A detailed discussion of science fiction and transhumanism is also not included, for the reasons cited in the introduction to part 1.

I anticipate that the citations and bibliography in this thesis will be tremendously useful to future historians of transhumanism. There is an abundance of archived source material referenced here that has never been cited before in scholarship on transhumanism, and several notable figures in transhumanist history and pre-history have been brought into a unified historical narrative for the first time. I suspect that having such a broad body of material all cited in the one place will make this text an invaluable piece of reference material.

I do, however, have one methodological regret. In the first year and a half of this project, when a lot of the leg-work was done, I wish that I'd reached out to leading transhumanists and tapped directly into their reservoirs of first-hand knowledge, particularly their knowledge of old digital archives, defunct websites, newsletters, correspondence, and other now invisible material. While I did reach out to a few, and have dug up a lot of important material independently, I think I could have balanced out the textual research with a bit more of a journalistic approach. My next step will be to track down as many new transhumanist sources as possible and to continue compiling accounts of the many fascinating phenomena in transhumanist history that remain underexplored.

For now, I hope you walk away with a greater understanding of the origins and evolution of transhumanist ideas, movements and projects. I also hope I have convinced you that these ideas and projects are important and that they are becoming ever more pervasive and influential in modern societies. In particular, they are affecting our lifeways, modes of communication, values, behaviours, and views of what it means to be human. Combining the sentiments of Elon Musk and Stewart Brand, I think we are already cyborgs and we might as well get used to it. We're going to have to because, for better or worse, transhumanism is here to stay.

BACK MATTER

Appendix A: The Etymology of Transhumanism

The Oxford English Dictionary defines transhumanism as, "a belief that the human race can evolve beyond its current limitations, esp. by the use of science and technology."[1009] This is the full definition on their website, which is somewhat incomplete, given that transhumanism is also a formal philosophy and a cultural movement. However, the definition does crisply summarise the essence of a transhumanist ethos.

OED Oxford English Dictionary
The definitive record of the English language

Quick search: Find word in dictio
Lost for Words? | A

View full results for 'transhumanism'
Help on Dictionary Entry | Print | Save | Email | Cite

transhumanism, *n.*

Text size: A A

View as: Outline | Full entry
Quotations: Show all | Hide all Keywords: On | Off

Pronunciation: Brit. /tranz'hjuːmənɪz(ə)m/, /trɑːnz'hjuːmənɪz(ə)m/, /trans'hjuːmənɪz(ə)m/, /trɑːns'hjuːmənɪz(ə)m/, U.S. /trænz'(h)jumə,nɪz(ə)m/, /træn(t)s'(h)jumə,nɪz(ə)m/
Frequency (in current use):
Origin: Formed within English, by derivation. **Etymons:** TRANSHUMAN *adj.*, -ISM *suffix*; TRANS- *prefix*, HUMAN *adj.*, -ISM *suffix*.
Etymology: Either < TRANSHUMAN *adj.* + -ISM *suffix*, or independently < TRANS- *prefix* + ... (Show More)

A belief that the human race can evolve beyond its current limitations, esp. by the use of science and technology.
Now chiefly in the context of Extropianism.

1957 J. HUXLEY *New Bottles for New Wine* 17 The human species can..transcend itself..in its entirety, as humanity. We need a name for this belief. Perhaps transhumanism will serve: man remaining man, but transcending himself, by realizing new possibilities of and for his human nature.
1973 *Valley News* (Van Nuys, Calif.) (West Valley ed.) 26 Apr. 38 A/1 Dr. James A. Rafferty will speak on 'Transhumanism and Psychic Energy'.
1990 *Extropy* Summer 6/1 The alternative to religion is not a despairing nihilism, nor a sterile scientism, but a transhumanism.
1997 N. WALTER *Humanism* 83 *Transhumanism*..is defined by so-called 'Extropians' (who defy entropy) as 'philosophies of life that seek the continuation and acceleration of the evolution of intelligent life beyond its currently human form and limits by means of science and technology'.
2006 *Church Times* 31 Mar. 11/3 Unlike Professor Fukuyama, however, I do not see Transhumanism as the most dangerous idea in today's world.
(Hide quotations)

Fig. 30. *Oxford English Dictionary*. Definition and etymology of "Transhumanism."

[1009] *The Oxford English Dictionary*, "Transhumanism," accessed November 5, 2018, http://www.oed.com/view/Entry/247652?redirectedFrom=transhumanism#eid.

Strangely, however, the OED also defines transhumanism "chiefly in the context of Extropianism."[1010] This is odd, as extropianism is no longer the dominant brand of transhumanist thought. The dictionary also provides quotations from five sources that supposedly chronicle the etymology of the word transhumanism; however, the etymology provided is both inaccurate and incomplete. We will see why presently, as I present my own account of the etymology of the term.

Precursor terms

Variations of the word transhumanism have been used in a number of texts throughout history. The fourteenth century Italian poet Dante Alighieri employed the word "transumanar" in the third book of his *The Divine Comedy* (*La Divina Commedia*).[1011] Max More notes that Dante used the term to mean, "to pass beyond the human," but rather than describing technological intervention or physical transformation, Dante deployed it to depict a spiritual ascent.[1012]

In his 1949 play, *The Cocktail Party*, T. S. Eliot deployed the word "Transhumanised" in reference to the inner journey of self-discovery and becoming undertaken by a young female character, Celia. More has acknowledged Eliot's use of the term transhumanised, but explains that the playwright (and more famously, poet) does not use the term to signify "technologically mediated transformation."[1013] More is right that Eliot used "Transhumanised" to connote self-transformation in the strictly limited sense of an intellectual and existential journey. However, he incorrectly dates the publication of *The Cocktail Party* to 1935, one of several errors in existing commentary on the etymology of transhumanism that I will correct here.

[1010] *The Oxford English Dictionary*, "transhumanism."
[1011] Dante Alighieri, *Divina Commedia di Dante: Paradiso*, Project Gutenberg, August 1997, http://www.gutenberg.org/cache/epub/999/pg999-images.html.
[1012] Max More, "The Philosophy of Transhumanism," in *The Transhumanist Reader*, ed. Max More and Natasha Vita-More (Oxford: Wiley-Blackwell, 2013), kindle, 8. Dante's use of the term transumanar was also been discussed by the theologian Ronald Cole Turner in: "Going beyond the Human: Christians and other Transhumanists," *Theology and Science* 13.2 (2015).
[1013] More, "The Philosophy of Transhumanism," 7.

Teilhard de Chardin also employed a number of very similar terms to transhumanism, with similar connotations to the modern term, in the mid twentieth century. I have not found any other sources on the origins of transhumanism that acknowledge this. In 1949, Teilhard argued that the democratic principle of liberty should be considered in a biological context and ought to pertain to:

> … the chance offered to every man (by removing obstacles and placing the appropriate means at his disposal) of '*trans-humanising*' himself by developing his potentialities to the fullest extent (italics mine).[1014]

In a 1950 essay, "From the Pre-Human to the Ultra-Human," Teilhard linked the idea of transhumanity more explicitly to an evolutionary overcoming of the present state of humanity, writing:

> … the fruit of socialisation, far from being a mere spark in the darkness, represents our passage, by Translation or dematerialisation, to another sphere of the Universe; not an ending of the ultra-human but its accession to some sort of *trans-humanity* at the ultimate heart of things (italics mine).[1015]

By "ultra-human" Teilhard meant "more human,"[1016] which loosely parallels the modern term *transhuman* (still recognisably human but augmented). By "trans-humanity" he meant something more than human, corresponding to the modern term *posthuman*.

In "The Antiquity and World Expansion of Human Culture," posthumously published in 1956, Teilhard wrote:

> Strangely enough, such a wild hypothesis of a *transhuman* universe conforms perfectly to the general pattern of a physical world in which absolutely nothing can grow indefinitely without meeting ultimately some critical level of emergence and transformation (italics mine).[1017]

[1014] Pierre Teilhard de Chardin, *The Future of Man*, trans. Norman Denny, (London: Collins, 1964 [1959]), 241.
[1015] Teilhard de Chardin, *The Future of Man*, 296-297.
[1016] Pierre Teilhard de Chardin, "The Antiquity and World Expansion of Human Culture," in *The Biosphere and Noosphere Reader*, 78.
[1017] Teilhard de Chardin, "The Antiquity and World Expansion of Human Culture," 79.

In 1972, the physicist and father of the cryonics movement, Robert Ettinger, deployed the term "transhumanity"[1018] in his book *Man into Superman*. This book profoundly anticipated modern transhumanist worldviews, exploring life-extension, cryonics, and the enhancement of humans beyond the bounds of humanity-as-we-know-it. Ettinger used the term "transhumanity" to describe those who were cryonically suspended, and those who sought to transcend the limitations of the human condition. He consistently argued that, "we must aspire to be, and intend to become, superior to mankind and all its past heroes, individually and collectively," not merely physically, but also in the domains of the "intellectual, emotional and moral."[1019]

In the "Transhumanist FAQ" (2003), Bostrom notes that, "the etymology of the term 'transhuman' goes back to the futurist FM-2030… who introduced it as shorthand for 'transitional human.'"[1020] In his 1989 book, *Are You A Transhuman?*, FM defined transhumans (or trans for short) as "a new kind of being crystallizing from the monumental breakthroughs of the late twentieth century… They are the earliest manifestations of new *evolutionary* beings."[1021] Although the etymology of the term "transhuman" goes back further, FM is notable for using it in something approaching, though not fully resembling, a modern transhumanist worldview.

Did Julian Huxley coin 'transhumanism'?

When introducing transhumanism, many scholars have perpetuated the following attribution error, first made by James Hughes in *Citizen Cyborg*. Hughes credited Julian Huxley as the first person to use the term transhumanism. While Huxley *may* have been the first thinker to use that precise word in something akin to its modern sense, Hughes attributed Huxley's use of the term to his 1927 book *Religion Without Revelation*. Yet the

[1018] Ettinger, *Man Into* Superman, 1.
[1019] Ettinger, *Man Into Superman*, 43.
[1020] Bostrom, "The Transhumanist FAQ v. 2.1."
[1021] FM-2030, *Are You A Transhuman?: Monitoring and Stimulating Your Personal Rate of Growth In a Rapidly Changing World* (New York: Warner Books, 1989), 204-205.

passage Hughes quotes does not appear in this book, nor does the book contain any mention of transhumanism. Despite this, a number of scholars have re-cited this mistake.[1022]

Most academics and journalists in recent years have cited Huxley's essay "Transhumanism" in the collection *New Bottles for New Wine* (1957) as the true original source of the term transhumanism. The historian of science and religion, Peter Harrison, and the Chaplain and theologian, Joseph Wolyniak, appear to be the only academics to have pointed out that this is also an error. They trace an earlier use of the term to Huxley's two-part lecture, "Knowledge, Morality and Destiny," delivered as the third William Alanson White Memorial Lecture in 1951 and first published in two parts in the journal *Psychiatry* the same year.[1023] The lecture was subsequently reprinted in the book *New Bottles for New Wine* in edited form.

Elaborating on the new "idea-system," which he believed humanity needed to embrace as the incarnation of a universe becoming self-aware, Huxley declared in 1951:

> Such a broad philosophy might perhaps best be called, not Humanism, because that has certain unsatisfactory connotations, but Transhumanism. It is the idea of humanity attempting to overcome its limitations and to arrive at fuller fruition; it is the realization that both individual and social development are processes of self-transformation.[1024]

A connotation of the term humanism that Huxley wanted to avoid was the assumption that humanity stands above nature as an all-powerful force as opposed to being an emergent (albeit also increasingly powerful) property of nature.

A possible reason for some of the confusion over the correct date of Huxley's first use of the term transhumanism is that the book *New Bottles for New Wine* was republished in

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[1022] Examples include: Bostrom, "A History of Transhumanism, 6; José Cordeiro, "The Boundaries of the Human: From Humanism to Transhumanism," *World Future Review* 6, no. 3 (2014): 236.
[1023] Peter Harrison and Joseph Wolyniak, "The History of 'Transhumanism'" *Notes and Queries* 62, no .3 (2015), 466.
[1024] Julian Huxley, "Knowledge, Morality, and Destinty: 1," *Psychiatry* 14.2 (1951): 139.

1960 as *Knowledge, Morality, and Destiny*,[1025] while the lecture "Knowledge, Morality and Destiny" (1951) appears in edited form in the book *New Bottles for New Wine* (1957).[1026] This is genuinely confusing. As if that weren't enough, Huxley also delivered a lecture in 1950 called "New Bottles for New Wine: Ideology and Scientific Knowledge," published the same year in *The Journal of the Royal Anthropological Institute of Great Britain and Ireland*.[1027] The term transhumanism does not appear in that lecture.

Huxley's "New Bottles for New Wine" lecture is worth consulting, however, as it shows the germination of his thinking about the need for a new movement, "an effective ideology" and a new "social force and human inspiration," built on an understanding of "cosmic evolution." The lecture bears some trappings of proto-transhumanism, as Huxley declared that "the essence of human destiny is thus to introduce evolving life, in the person of man, to fuller realization and new possibilities."[1028] However, Huxley did not name transhumanism as this new, cosmic evolutionary ideology until the following year. To reiterate, Huxley appears to have first used the word transhumanism in 1951, six years before the essay "Transhumanism" appeared in the book *New Bottles for New Wine* (1957).

I have reproduced the most frequently cited passages from Huxley's essay "Transhumanism" in *New Bottles for New Wine* below. These are the passages in which the term transhumanism is often said to have first appeared. Although they are not Huxley's first uses of the term, these are significant quotes that resemble and anticipate modern definitions of transhumanism. Huxley wrote:

[1025] See: Julian Huxley, *Knowledge, Morality and Destiny, Essays by Julian Huxley* (New York: Mentor Books, 1960). The essay "Transhumanism" appears on pp. 13-16. The term "transhumanism" from the lecture "Knowledge, Morality, and Destiny" appears on pg. 235.
[1026] Julian Huxley, "Knowledge, Morality, and Destiny," in *New Bottles for New Wine*, by Julian Huxley (London: Chatto & Windus, 1959, first published 1957), 245-278. The term "transhumanism" appears on pg. 260.
[1027] See: Julian Huxley, "New Bottles for New Wine: Ideology and Scientific Knowledge," *The Journal of the Royal Anthropological Institute of Great Britain and Ireland*, 80, no. 2 (1950): 7-23.
[1028] Huxley, "New Bottles for New Wine," 10; 20; 23.

> The human species can, if it wishes, transcend itself – not just sporadically, an individual here in one way, an individual there in another way, but in its entirety, as humanity. We need a name for this new belief. Perhaps *transhumanism* will serve: man remaining man, but transcending himself, by realizing new possibilities of and for his human nature.[1029]

He continued:

> 'I believe in transhumanism': once there are enough people who can truly say that, the human species will be on the threshold of a new kind of existence, as different from ours as ours is from that of Pekin man. It will at last be consciously fulfilling its real destiny.[1030]

Remarking on the passages above, Harrison and Wolyniak argue that, "this appears to be a self-conscious coining of the expression and no doubt explains why the term [transhumanism] is commonly, if mistakenly, said to originate in this source."[1031] However, Harrison and Wolyniak believe that Huxley did *not* coin the term and was in fact pipped to the post by the Canadian philosopher W. D. Lighthall.

<u>Did W. D. Lighthall coin 'transhumanism' before Huxley?</u>

As we have seen, there are several branches of religious and spiritual transhumanism and major proto-transhumanists like Teilhard de Chardin reconciled elements of Christianity with a cosmic evolutionary worldview. W. D. Lighthall appears to be another thinker in this tradition. However, I am not convinced that Lighthall's use of the term transhumanism meaningfully foreshadows modern definitions of transhumanism in the paper where he mentions it. Aspects of his broader worldview might well be considered proto-transhumanistic. However, on these points, it is best that the reader makes up their own mind.

In the quote that Harrison and Wolyniak cite as Lighthall's pre-Huxleyan use of the term transhumanism they simply state that Lighthall "speaks of the 'Paul's

[1029] Huxley, *New Bottles for New Wine*, 17.
[1030] Huxley, *New Bottles for New Wine*, 17.
[1031] Harrison and Wolyniak, "The History of 'Transhumanism,'" 466.

Transhumanism,'"[1032] in reference to the biblical St Paul. This quote alone isn't a terribly compelling reason to consider Lighthall an early thinker who wrote about transhumanism in a modern sense. I was unable to track down the original source to analyse the quote in context, but Harrison and Wolyniack's discussion indicates that they are attempting, here, to reconcile a Christianised view of transcendence, or self-transformation through religious conversion, with a transhumanist view of technological transcendence.

Harrison and Wolyniak concede that their reference to Lighthall's discussion of St. Paul "may seem puzzling." But they argue that Dante provides a bridge "between St Paul's putative transhumanism and that of Julian Huxley." Unfortunately, they don't provide evidence to demonstrate that there are strong conceptual linkages between Dante, St. Paul, and Huxley and modern transhumanism. As such, I find their claim to be unconvincing. Nevertheless, I mention it because they use it as a thought primer to question "whether Western notions of progress and modernity are simply secularized versions of Judeo-Christian eschatological conceptions or whether they have an independent legitimacy."[1033] That is a debate for another time, but the question is worth acknowledging.

I am not familiar enough with the writings of W. D. Lighthall to assess how meaningful a proto-transhumanist he might be. However, there are certainly indications that his works are worth looking into further.[1034] For our present purpose, however, Lighthall's use of the term transhumanism in 1940, in connection with St. Paul, is not enough to claim at this stage that he is the modern originator of the term.

[1032] Harrison and Wolyniak, "The History of 'Transhumanism,'" 466.
[1033] Harrison and Wolyniak, "The History of 'Transhumanism,'" 467.
[1034] The following texts will be helpful starting points in this endeavour: W. D. Lighthall, "Is Superpersonality the Looked-for Principle?" *The Philosophical Review* 35, no. 4 (1926): 360, doi: 10.2307/2178983; and W. D. Lighthall, *Superpersonalism, the Outer Consciousness* (Montreal: Witness Press, 1926).

A Buddhist origin of transhumanism?

The word transhumanism was also deployed in private discussions in an obscure and privately circulated book called *The Philosophy of Consciousness Without an Object* by the Buddhist thinker Franklin Merrell-Wolff. The book was composed in 1939, but not published until 1973. Merrell-Wolff wrote:

> I am more than willing to regard the human as merely a stage in consciousness, provided it is not asserted dogmatically that it is impossible for consciousness and self-identity to flow from stage to stage. On the basis of such a definition this philosophy would not be a contribution to Humanism but to *Transhumanism*.[1035]

Notably, however, this text has not been cited as an influential piece of work by any leading transhumanist thinker. In fact, it appears to have been completely unnoticed by transhumanists until Michael LaTorra documented the reference in 2015. LaTorra argues that the passage above, "while only partly overlapping with Bostrom's definition [of transhumanism]… is consonant with Buddhist transhumanism."[1036]

Although this usage of the term transhumanism should be acknowledged, I consider Huxley's use of the term to be much more obviously transhumanistic in the modern sense than Lighthall's or Merrell-Wolff's. In addition to the conundrum of deciding whether Merrell-Wolff's use of the term transhumanism meaningfully anticipates modern transhumanism, we also have the 'if a tree falls in a rainforest' problem regarding the publication date. Does it matter if Merrell-Wolff used the term in the late 1930's if nobody knew about it?

My own view is that this book is a very marginal source and no clear line of influence can be traced between it and the emergence of modern transhumanist ideas. However, I will

[1035] Franklin Merrell-Wolff, *The Philosophy of Consciousness Without an Object* (New York: Scribner, 1973), 122.
[1036] Michael LaTorra, "What Is Buddhist Transhumanism?" *Theology and Science* 13, no. 2 (2015): 226, doi: 10.1080/14746700.2015.1023993.

not present my own view as the definitive word on the 'correct' etymology of transhumanism. We will all draw the lines of classification slightly differently when it comes to deciding who is a proto-transhumanist, who is a modern transhumanist, and who used the term transhumanism, or similar words in a compatible sense. It is important that the reader has all of the available source material at hand to make up their own mind.

Abraham Maslow on transhumanism

A much clearer line of influence can be traced between Julian Huxley's use of the term transhumanism and its later use by the American psychologist Abraham Maslow. Maslow is best known for his theory of human motivation, which postulates that there is a hierarchy of human needs, at the peak of which is self-actualisation. However, it is not well known that Maslow also partially outlined a transhuman vision that extended beyond the state of self-actualisation.

In the preface to the second edition of his landmark book, *Toward a Psychology of Being* (1968, first published in 1962), Maslow wrote about the emergence of a fourth paradigm in psychology, which he characterised as being: "transpersonal, transhuman, centered in the cosmos rather than in human needs and interests, going beyond humanness, identity, self-actualization and the like."[1037]

Maslow was aware of Julian Huxley's usage of the term transhumanism in 1967. That year, he wrote a note to the then-editor of the *Journal of Humanistic Psycholog*y, Anthony Sutich, responding to the formers' search for (in Sutich's terms), "a word that would represent the new force that was apparently emerging in conjunction with the expansion of the humanistic orientation." Maslow's response to this search for a new term was:

[1037] Abraham Maslow, *Toward A Psychology of Being*, *Second Edition* (New York: Van Nostrand Reinhold Company, 1968), iii.

"There already is a word such as you are looking for suggested by Julian Huxley. It is 'trans-humanistic.' I have found it useful already."[1038]

Although Maslow misquotes Huxley, who used the word "transhumanism," it is significant that Maslow used a very similar term to describe a worldview and growth-oriented mode of existential orientation that meaningfully anticipated the core ideas of modern transhumanist philosophy. It is also notable that he acknowledged Huxley as a source of inspiration.

The final misconception

When it comes to introducing transhumanism in academic texts, some authors conflate the coining of the term with the sparking of a movement.[1039] Those who perpetuate this error typically cite Huxley as the originator of both the term and the philosophy and movement of transhumanism, which, as this thesis has shown, is clearly false. Coining the term transhumanism and developing a transhumanist philosophy and movement are two different things and they have occurred at different moments in history.

Even Harrison and Wolyniak, who have cleared up an important etymological error in the history of transhumanism, perpetuate another one when they write, "there is no doubt that Huxley's appropriation of the term 'transhumanism' and his association of it with his own brand of futurist ideology has led to its present currency."[1040] It is not entirely clear what they mean by "present currency" but they appear to be arguing that there is a strong link between Huxley's use of the term transhumanism and the emergence of modern transhumanist movements and ideas. This is definitely not the case.

[1038] Mark E. Koltko-Rivera, "Maslow's 'Transhumanism': Was Transpersonal Psychology Conceived as 'A Psychology Without People In It?'" *Journal of Humanistic Psychology* 38.1 (1998): 73.
[1039] See, for example: Emily Peed, "The Splintering and Controversy of Transhumanism," in *Google It: Total Information Awareness*, ed. Newton Lee (New York: Springer, 2016), 499.
[1040] Harrison and Wolyniak, "The History of 'Transhumanism,'" 467.

Max More points out that Huxley did not go on to develop his view of transhumanism into a specific philosophy and Huxley's use of the term transhumanism was only discovered by modern transhumanists after the term had been independently coined in the late twentieth-century—as it happens, by More himself.[1041] According to More, "although Dante and Huxley used the term earlier, I first (and independently) coined the modern sense of the term around two decades ago in my essay 'Transhumanism: Toward a Futurist Philosophy.'"[1042] More considers his independent coining of the term to be the first usage of transhumanism in connection with a modern transhumanist philosophy, as Huxley did not develop or outline the core ideas of the modern transhumanist ethos.

In a 2009 essay, Natasha Vita-More further dispelled "one of the repeated misconceptions about transhumanism." Namely, "that the philosophical worldview and cultural or social movement of transhumanism were the brainchild of Julian Huxley."[1043] She went on to explore the differences between Huxley's and More usages of the term in a 2012 essay, noting that while, "Huxley states 'man remaining man but transcending himself,'" More explicitly uses the term to connote, "the overcoming of human limits and the transformation from being human to becoming posthuman."[1044]

Bostrom also affirms that, "Max More wrote the first definition of transhumanism in its modern sense," though he acknowledges other important antecedent thinkers like Teilhard and Huxley in his "A History of Transhumanist Thought."[1045] Certainly, Huxley was an important proto-transhumanist thinker and his use of the term transhumanism is significant. But although he anticipated several of the sensibilities of modern transhumanism in his cosmic-evolutionary worldview, Vita-More is correct in asserting

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[1041] More, "The Philosophy of Transhumanism."
[1042] More, "H+ True Transhumanism."
[1043] Natasha Vita-More, "Introduction to 'H+: Transhumanism Answers Its Critics," *Metanexus*, February 5, 2009, https://www.metanexus.net/introduction-h-transhumanism-answers-its-critics/.
[1044] Natasha Vita-More, "An Introduction to Transhumanity," *Issues Magazine*, March 2012, http://www.issuesmagazine.com.au/article/issue-march-2012/introduction-transhumanity.html.
[1045] Bostrom, "A History of Transhumanist Thought," 12.

that he is not the direct progenitor of the modern movement, nor was he the first transhumanist.

I hope to have shown that transhumanism, and related terms like transhuman, have a complex etymology. It cannot be claimed with certainty that Julian Huxley was the first thinker to use the term transhumanism in its modern sense. At least two other thinkers employed the term earlier, but it is debatable how strongly their usages foreshadow modern transhumanist thinking. There is also no doubt that other thinkers like Teilhard deployed near-identical terms to transhumanism before Huxley first used the word, and that they attached a very similar meaning to those terms.

Regarding the specific word *transhumanism,* it is my own view that Huxley's usage is the first known example of the term being used in a sense that strongly foreshadows modern transhumanism. Yet I wouldn't be at all surprised if we find out down the track that there are earlier examples that have equally strong resonances with modern transhumanist thinking (possibly in French or Russian texts of the early twentieth century). Taking a leaf out of the transhumanist book, I emphasise that this is a provisional etymology. It hopefully provides some helpful clarifications and signposts, though I have no doubt it will be added to and revised in the future.

Appendix B: The Transhumanist Declaration 2012[1046]

1. Humanity stands to be profoundly affected by science and technology in the future. We envision the possibility of broadening human potential by overcoming aging, cognitive shortcomings, involuntary suffering, and our confinement to planet Earth.

2. We believe that humanity's potential is still mostly unrealized. There are possible scenarios that lead to wonderful and exceedingly worthwhile enhanced human conditions.

3. We recognize that humanity faces serious risks, especially from the misuse of new technologies. There are possible realistic scenarios that lead to the loss of most, or even all, of what we hold valuable. Some of these scenarios are drastic, others are subtle. Although all progress is change, not all change is progress.

4. Research effort needs to be invested into understanding these prospects. We need to carefully deliberate how best to reduce risks and expedite beneficial applications. We also need forums where people can constructively discuss what could be done and a social order where responsible decisions can be implemented.

5. Reduction of risks of human extinction, and development of means for the preservation of life and health, the alleviation of grave suffering and the improvement of human foresight and wisdom, be pursued as urgent priorities and generously funded.

6. Policy making ought to be guided by responsible and inclusive moral vision, taking seriously both opportunities and risks, respecting autonomy and individual rights, and showing solidarity with and concern for the interests and dignity of all people around the globe. We must also consider our moral responsibilities towards generations that will exist in the future.

7. We advocate the well-being of all sentience, including humans, non-human animals, and any future artificial intellects, modified life forms, or other intelligences to which technological and scientific advance may give rise.

8. We favor morphological freedom – the right to modify and enhance one's body, cognition, and emotions. This freedom includes the right to use or not to use techniques and technologies to extend life, preserve the self through cryonics, uploading, and other means, and to choose further modifications and enhancements.

[1046] The text on this page is quoted directly from *The Transhumanist Reader*. The current version of the Transhumanist Declaration can also be viewed at *Humanity+*: https://humanityplus.org/philosophy/transhumanist-declaration/.

Glossary

Artificial Intelligence (AI):

"The attempt to make computers do the sorts of things human and animal minds can do – either for technological purposes and/or to improve our theoretical understanding of psychological phenomena."[1047]

Artificial General Intelligence (AGI):

a. "Artificial intelligence that can be applied to problems in many different domains, as human intelligence can."[1048]
b. "A machine that is capable of matching or exceeding human *performance* in most areas, whatever its metaphysical status."[1049]

Artificial Narrow Intelligence (ANI):

"Artificial Narrow Intelligence is AI that specializes in *one* area. There's AI that can beat the world chess champion in chess, but that's the only thing it does. Ask it to figure out a better way to store data on a hard drive, and it'll look at you blankly."[1050]

Artificial Superintelligence (ASI):

"ASI stands for artificial superintelligence: AI that is substantially beyond human intelligence. More specifically, a superintelligent system is more capable than a human of producing high-quality decisions that take more information into account and look further ahead into the future."[1051]

Biohacking:

"Biological experimentation (as by gene editing or the use of drugs or implants) done to improve the qualities or capabilities of living organisms especially by individuals and groups outside of a traditional medical or scientific research environment."[1052]

See 'grinders' for the definition of a more extreme sub-branch of biohacking.

[1047] Keith Frankish and William M. Ramsey, "Glossary," in *The Cambridge Handbook of Artificial Intelligence*, 335.
[1048] Frankish and Ramsey, "Glossary," in *The Cambridge Handbook of Artificial Intelligence*, 335.
[1049] Armstrong, *Smarter Than Us*, ch.3.
[1050] Tim Urban, "The AI Revolution: The Road to Superintelligence," *WaitButWhy*, January 22, 2015, https://waitbutwhy.com/2015/01/artificial-intelligence-revolution-1.html.
[1051] Stuart Russell, "Q & A: The Future of Artificial Intelligence," accessed November 19, 2018, https://people.eecs.berkeley.edu/~russell/research/future/q-and-a.html.
[1052] *Merriam-Webster*, "Biohacking," accessed November 19, 2018, https://www.merriam-webster.com/dictionary/biohacking.

Cyborg (or cybernetic organism):

"The melding of the organic and the machinic, or the engineering of a union between separate organic systems."[1053]

Cryogenics:

"The study of materials at very low temperatures (near absolute zero). Cryogenics is a branch of physics."[1054]

Cryonic Suspension:

"The practice of suspending people and animals at extremely low temperatures, partially protected from freezing damage with cryoprotectants, on the basis that there is a significant possibility that more advanced medical technology in the future will be able to revive them."[1055]

Deathism:

"The set of beliefs and attitudes which glorifies or accepts death and rejects or despises immortality."[1056]

Democratic Transhumanism:

Democratic transhumanism is a brand of transhumanist thought that emphasises the need for democratic nation states to promote transhumanist technologies, while helping to mitigate the new risks they pose and ensuring equal access to their benefits. Democratic transhumanism has been notably championed by James Hughes and it is also associated with the transhumanist sub-identity of technoprogressivism (see below).

Existential Risk:

"A risk that threatens the extinction of earth-originating intelligent life or could otherwise permanently and drastically destroy its potential for desirable human development."[1057]

Extropian:

"An Extropian is defined as one who seeks to overcome human limits, live indefinitely long, become more intelligent, and more self-creating. An Extropian is a transhumanist who affirms the values and attitudes codified and expressed in The Extropian Principles. The term was derived from the term 'extropy' by Max More in 1988."[1058]

[1053] Chris Hables Gray, Steven Mentor and Heidi J. Figueroa-Sarriera, "Cyborgology: Constructing the Knowledge of Cybernetic Organisms," in *The Cyborg Handbook*, 2.
[1054] *Extropy Institute*, "Lexitropicon: Extropian Neologisms," archived June 24, 2002, https://web.archive.org/web/20020124091635/http://www.extropy.org:80/ideas/lextropicon.html.
[1055] *Extropy Institute*, "Lexitropicon: Extropian Neologisms."
[1056] *Extropy Institute*, "Lexitropicon: Extropian Neologisms."
[1057] Frankish and Ramsey, "Glossary," in *The Cambridge Handbook of Artificial Intelligence*, 335.
[1058] *Extropy Institute*, "Frequently Asked Questions, v. 0.7."

Extropian Transhumanism:

"The Extropian philosophy is a transhumanist philosophy based upon the Extropian Principles. The Extropian Principles define a specific version or "brand" of transhumanist thinking. Like humanists, transhumanists favor reason, progress, and values centered on our well being rather than on an external religious authority. Transhumanists take humanism further by challenging human limits by means of science and technology combined with critical and creative thinking. We challenge the inevitability of aging and death, and we seek continuing enhancements to our intellectual abilities, our physical capacities, and our emotional development. We see humanity as a transitory stage in the evolutionary development of intelligence. We advocate using science to accelerate our move from human to a transhuman or Posthuman condition."[1059]

Extropy:

"Extropy is defined as a measure of a system's intelligence, information, energy, life, experience, diversity, opportunity, and growth. It is the collection of forces which oppose entropy. The term was coined by T.O. Morrow in January 1988."[1060]

Grinders:

"Grinders are self-identified biopunks noted for their hardcore, underground, ready-for-anything attitudes. They practice functional and extreme body modification that frequently involves DIY surgery. A popular modification is to implant magnets in fingertips, allowing them to feel electromagnetic fields."[1061]

Humanity+:

Humanity Plus is a leading transhumanist non-profit organisation, which promotes transhumanist technologies and the wellbeing of humans in the present and the future. The organisation was formerly known as the World Transhumanist Association (WTA). Humanity plus (or H+) is also a synonym for transhumanism.

Machine Brain Interface (MBI), or Brain Machine Interface (BMI):

"A brain–machine interface (BMI) is a device that translates neuronal information into commands capable of controlling external software or hardware such as a computer or robotic arm. BMIs are often used as assisted living devices for individuals with motor or sensory impairments."[1062]

[1059] *Extropy Institute*, "Frequently Asked Questions, v. 0.7."
[1060] *Extropy Institute*, "Frequently Asked Questions, v. 0.7."
[1061] Sirius and Cornell, *Transcendence*, see: "Grinders."
[1062] *Nature*, "Brain-machine interface," accessed November 19, 2018, https://www.nature.com/subjects/brain-machine-interface.

Morphological Freedom:

a.) "The ability to alter bodily form at will through technologies such as surgery, genetic engineering, nanotechnology, uploading."[1063]

b.) "What is morphological freedom? I would view 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… Morphological freedom can of course be viewed as a subset of the right to one's body. But it goes beyond the idea of merely passively maintaining the body as it is and exploiting its inherent potential. Instead it affirms that we can extend or change our potential through various means. It is strongly linked to ideas of self ownership and self direction."[1064]

NBIC Technologies:

NBIC stands for nanotechnology, biotechnology, information technology and cognitive science. These are four major and overlapping technology areas that transhumanists emphasise as being significant for the radical redesign of the human condition.

The precursor to NBIC in transhumanist discourse was GNR, which stood for genetics, nanotechnology and robotics. The revolutions in these three overlapping areas of technology were outlined by Ray Kurzweil in *The Singularity is Near* (2005).

Posthuman:

a.) "Persons of unprecedented physical, intellectual, and psychological capacity, self-programming, self-constituting, practically immortal, unlimited individuals."[1065]

b.) "'Post-human' is a vague concept and people have used the term to mean entirely different things. It tends, in my opinion, to introduce more confusion than clarity. But one central meaning of the word would merely be an optimally enhanced human being."[1066]

c.) "'Posthuman' is not a species term at all; it is a broad class which subsumes many possible posthuman species and individuals."[1067]

[1063] More, "Technological self-transformation," 17.
[1064] Sandberg, "Morphological Freedom."
[1065] *Extropy Institute*, "Lexitropicon: Extropian Neologisms."
[1066] Nick Bostrom, interviewed by John Sutherland in, "The ideas interview: Nick Bostrom," *The Guardian*, May 9, 2006, https://www.theguardian.com/science/2006/may/09/academicexperts.genetics.
[1067] Max More, "From Human to Transhuman to Posthuman," *Extropy* 8 (Winter 1991/92): 43.

Posthumanism:

Critical posthumanism:

A brand of posthumanist studies that stems from postmodernist academic culture and the discourse of critical theory, which embraces the relativity of truth and views modern science as one mode of knowing among many—one that is limited as a system by its roots in the Western, male-centric Enlightenment tradition. This subject and field of study overlaps with transhumanist ideas and themes but it is also very distinct in its intellectual roots and core assumptions. Core texts studied by critical posthumanists include Donna Haraway's "A Cyborg Manifesto" (1985) and N. Katherine Hayles' *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics* (1999).

Technological posthumanism:

The more distinctly transhumanist strand of thought that embraces the pursuit of technological transcendence and posthumanity. Technological posthumanists may also critically examine and interrogate the nature of humanness, as critical posthumanists do, but their more explicit goal is to transcend humanity through cultural and technological interventions.

Seed AI:

"An AI designed for recursive self-improvement; that is, improvement followed by another round of improvement at that higher level of intelligence. Rather than building a mind which is superintelligent from the start, the theory holds that only some bounded level of intelligence need be achieved in order for the AI to become capable of open-ended improvement of its own source code."[1068]

Singularitarian:

a.) "Originally defined by Mark Plus to mean 'one who believes the concept of a Singularity", this term has since been redefined to mean 'Singularity activist' or 'friend of the Singularity'; that is, one who acts so as to bring about a Singularity."[1069]

b.) "I regard someone who understands the Singularity and who has reflected on its implications for his or her own life as a 'singularitarian.'"[1070]

Superintelligence:

"We can tentatively define a superintelligence as *any intellect that greatly exceeds the cognitive performance of humans in virtually all domains of interest*."[1071]

[1068] *Extropy Institute*, "Lexitropicon: Extropian Neologisms."
[1069] *Extropy Institute*, "Lexitropicon: Extropian Neologisms."
[1070] Kurzweil, *The Singularity is Near*, ch.1.
[1071] Bostrom, *Superintelligence*, ch.2.

Technoprogressivism:

"Technoprogressivism is an ideological stance with roots in Enlightenment thought which focuses on how human flourishing is advanced by the convergence of technological progress and democratic social change. Technoprogressives argue that technological innovations can be profoundly empowering and emancipatory when they are democratically and transparently regulated for safety and efficacy, and then made universally and equitably available."[1072]

The Singularity (or technological Singularity):

a.) "The 'Singularity' has been defined many different ways. The primary and original definition, as invented by Vernor Vinge, is that the Singularity is the fundamental discontinuity in history created by the technological invention of smarter-than-human intelligence. Other definitions have included a time of exponentially faster technological progress (even faster than now, that is), or the positive-feedback effect created by enhanced intelligences working out improved methods of intelligence enhancement. The core idea remains the same: There is a massive discontinuity approaching, a Singularity, within human history. This has to do with the rise of smarter-than-human intelligence, the ability of technology to alter human nature, the final conquest of material reality through nanotech, or some other fundamental change in the rules."[1073]

b.) "What, then, is the Singularity? It's a future period during which the pace of technological change will be so rapid, its impact so deep, that human life will be irreversibly transformed."[1074]

Transhuman:

a.) "The term 'transhuman' denotes transitional beings, or moderately enhanced humans, whose capacities would be somewhere between those of unaugmented humans and full-blown posthumans."[1075]

b.) "We can define 'transhumans' as people who have hybridized themselves with computational technology as part of humanity's effort to control its evolutionary destiny."[1076]

c.) "Someone in the transition stage from human to biologically, neurologically, and genetically posthuman. One who orients his/her thinking towards the future to prepare for coming changes and who seeks out and takes advantage of opportunities for self-advancement."[1077]

[1072] *IEET*, "Technoprogressivism," accessed November 19, 2018, https://ieet.org/index.php/tpwiki/Technoprogressivism/.
[1073] Eliezer Yudkowsky, "The Singularitarian Principles, version 1.0," January 1, 2000, archived January 24, 2001, https://web.archive.org/web/20010124225400/http://sysopmind.com:80/sing/principles.html#solidarity.
[1074] Kurzweil, *The Singularity is Near*, ch.1.
[1075] Bostrom "Transhumanist Values," 5.
[1076] Rothblatt, *From Transgender to Transhuman*, ch.8.
[1077] More, "Technological self-transformation," 17.

Transhumanism:

> The intellectual and cultural movement that affirms the possibility and desirability of fundamentally improving the human condition through applied reason, especially by developing and making widely available technologies to eliminate aging and to greatly enhance human intellectual, physical, and psychological capacities.[1078]

Transhumanist:

a.) "A transhumanist, by contrast, is simply somebody who accepts transhumanism."[1079]

b.) "Someone actively preparing for becoming posthuman. Someone who is informed enough to see radical future possibilities and plans ahead for them, and who takes every current option for self-enhancement."[1080]

c.) At the risk of being so broad that there is no coherent meaning to the term, I suggest it may also be helpful to think of people who are substantially advancing the core aims of organised transhumanism in the modern world as transhumanists, whether or not they wear the label. I think the term can be meaningfully applied to anyone overtly seeking to overcome the limits of human biology and the human condition in major ways.

Universal Basic Income (UBI):

"'Basic income' would be an amount sufficient to secure basic needs as a permanent earnings floor no one could fall beneath, and would replace many of today's temporary benefits, which are given only in case of emergency, and/or only to those who successfully pass the applied qualification tests. UBI would be a promise of equal opportunity, not equal outcome, a new starting line set above the poverty line."[1081]

Uploading:

"The transfer of a personality (memories, knowledge, values, desires, etc.) from the biological human brain to a suitable synthetic computing device in order to allow easier upgrading of intelligence, self-modification, and backup of the self in case of accident."[1082]

[1078] Nick Bostrom, "The Transhumanist FAQ v. 2.1," 4.
[1079] Bostrom "Transhumanist Values," 5.
[1080] *Extropy Institute*, "Lexitropicon: Extropian Neologisms."
[1081] Scott Santens, "Why we should all have a basic income," *World Economic Forum*, January 15, 2017, https://www.weforum.org/agenda/2017/01/why-we-should-all-have-a-basic-income.
[1082] *Extropy Institute*, "Lexitropicon: Extropian Neologisms."

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