

Copyright © 2021 Gideon Ip Kei Lee

All rights reserved. The Southern Baptist Theological Seminary has permission to reproduce and disseminate this document in any form by any means for purposes chosen by the Seminary, including, without limitation, preservation or instruction.

BORN HUMAN AGAIN: A CHRISTIAN RESPONSE TO
TRANSHUMANISM BASED ON THE APOLOGETIC
APPROACH OF FRANCIS SCHAEFFER

A Dissertation
Presented to
the Faculty of
The Southern Baptist Theological Seminary

In Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

by
Gideon Ip Kei Lee
May 2021

APPROVAL SHEET

BORN HUMAN AGAIN: A CHRISTIAN RESPONSE TO
TRANSHUMANISM BASED ON THE APOLOGETIC
APPROACH OF FRANCIS SCHAEFFER

Gideon Ip Kei Lee

Read and Approved by:

James Parker III (Chair)

Timothy K. Beougher

Timothy Paul Jones

Date _____

This dissertation is dedicated to my father, Rev. Wai Chi Lee,
who taught me the first principle of theology:
This is my Father's world: O let me ne'er forget
That though the wrong seems oft so strong, God is the Ruler yet.

TABLE OF CONTENTS

	Page
LIST OF ABBREVIATIONS.....	x
PREFACE.....	xi
Chapter	
WORLDVIEW APOLOGETICS AND TRANSHUMANISM	1
Introduction	1
Worldview Apologetics.....	5
Rethinking Traditional Evangelism.....	10
Escape from Reason	11
The Worldview Apologetics of Schaeffer	18
True Truth.....	26
A Worldview Apologetic Engagement.....	28
A Contest of World Visions	31
A Y-Juncture Engagement.....	33
The Organization of This Study	41
A Historical Overview of Transhumanism	45
Key Sub-movements of Transhumanism.....	62
Key Ideas of Transhumanism	83
Transhumanist Forerunners	95
Leading Advocates of Transhumanism	97
Ideologies Related to Transhumanism.....	113
Humanism.....	113
Humanism and Transhumanism	116

Chapter	Page
Marxism and Transhumanism	119
Existentialism and Transhumanism.....	120
Anti-humanism	121
Nietzsche and Transhumanism	122
Posthumanism.....	126
Posthumanism and Transhumanism	128
Transhumanism as Secularist Faith	129
Radical Feminism	132
Postgenderism.....	133
Objections to Transhumanism.....	136
Religious Objections.....	136
Ethical Objections.....	140
Scientific Objections.....	149
Christian Engagements with Transhumanism.....	150
Materialist Bias	151
Criteria of Love.....	151
Transhumanism as a Christian Concept	153
Posthumanism in the Bible	155
Feminist Posthumanism.....	155
Ethics of Technology.....	156
Anthropocentric Preoccupation	157
Systemic Transformation.....	157
Metaphysical Questions.....	158
Summary	159
A WORLDVIEW ANALYSIS OF TRANSHUMANISM.....	162

Chapter	Page
Introduction to Chapter 2	162
The Transhumanist Moral Perspective.....	163
Morphological Freedom	164
Hedonistic Imperative.....	166
A Utilitarian Case for Enhancement.....	171
Sin as Deficiency of Genetic Virtue	175
Posthuman Dignity	176
Existential Risks	178
The Transhumanist Epistemological Perspective	180
Pragmatism	180
Pancritical Rationalism.....	184
Anthropic Bias.....	187
Status Quo Bias.....	191
The Transhumanist Metaphysical Perspective.....	195
Multiple Realizability	195
Personal Identity	198
Simulation Hypothesis.....	201
The Transhumanist Eschatological Perspective.....	205
Techno-millennialism	206
Technological Singularity.....	209
Cosmological Awakening.....	214
Summary	217
ARGUMENTS AGAINST TRANSHUMANISM	219
Introduction to Chapter 3	219
Arguments from Moral Philosophy	221
Multiple Human Classes.....	221

Chapter	Page
Inconsistent Moral Values	223
Commoditization of Body Parts	226
Posthuman Values	226
Scientific Materialism.....	228
Hypomania.....	230
Pride and Ingratitude.....	231
Arguments from Science and Epistemology.....	235
The Implausibility of Life Extension.....	235
The Misnomer of Directed Evolution.....	243
Depreciating Motherhood.....	245
Unnatural Birth	247
Epistemological Incoherence.....	249
Epistemic Arrogance	252
Arguments from the Philosophy of Mind	254
Infeasibility of Mind Uploading	255
AI Is Not Human	257
Computational Theory of Mind Issues	259
Consciousness from Nowhere	261
Arguments from the Fermi Paradox.....	264
Hurdles of Evolution.....	265
A Response to the Fermi Paradox	266
The Great Silence	270
Three Scenarios	271
Summary	275
CHRISTIAN TRANSHUMANISM OR RE-HUMANISM?	278

Chapter	Page
Introduction to Chapter 4	278
Christian Transhumanism: Genetic Virtue Project	280
Virtues Cannot be Engineered	284
Only Moral Behavior or Traits	286
Only Enhancement, Never Holiness.....	288
Don't Underestimate Fallenness!	288
Biological Enhancement Unnecessary for <i>Theosis</i>	292
Christ is Fully Human.....	293
<i>Theosis</i> Is through Christ.....	295
Dangers of Paradise Engineering.....	295
Co-Creators Accountable to the Creator.....	296
Biological Enhancement Not Mandated.....	297
<i>Theosis</i> Is Kenotic and Communal	299
Neither Back to Eden Nor to the Cross	300
<i>Theosis</i> Requires Human Limitations.....	300
<i>Theosis</i> Requires Humility	301
Mangodhood Is Not Godmanhood	301
What Role Does God Play in <i>Theosis</i> ?	302
Maintenance of Covenantal Relationship.....	302
The Revelation of the Truth.....	303
Salvation by Grace through Faith	304
Fathering New Humanity from the Above	304
Sustaining and Cultivating Virtue	305
An Alternative: Test Anthropodicy.....	305
A Taxonomy of Anthropodicy.....	307
Life Is a Trial	309

	Page
Christian Re-humanism.....	314
Summary	317
Conclusion	318
BIBLIOGRAPHY.....	320

LIST OF ABBREVIATIONS

DSM *Diagnostic and Statistical Manual of Mental Disorders*

PREFACE

I am grateful to my dissertation advisor, Dr. James Parker, and the research doctoral office for granting me the opportunity to integrate some of my long-running research interests in this dissertation project. I would like to express my appreciation to Dr. Timothy Beougher and Dr. Timothy Paul Jones for serving on my dissertation committee. I am much honored to have Dr. Brent Waters as my external reader.

My doctoral study would have been impossible without the support of my wife, Irene. Her unconditional sacrifice is more than anything I deserve. I am forever indebted to our children, our parents, and our extended families for their prayer and practical support. I would like to acknowledge especially my dear friends Dr. Ernie Beevers, Dr. Kai Pak Chan, Rev. Michael Dean, Rev. John Frazier, Dr. Paul Kim, Rev. Dan Szatkowski, Rev. Sam Taylor, and Dr. Peter Wu. All of them have given me much-needed intellectual and emotional encouragement. Apologetics is lived out in practical ministry. I am thankful for brothers and sisters in Christ who give me the opportunities to serve at Cambridgeport Baptist Church, the Chinese Bible Church of Greater Lowell, and the Crosspoint Church of Silicon Valley while conducting this doctoral study.

Gideon I. Lee

San Jose, California

May 2021

CHAPTER 1

WORLDVIEW APOLOGETICS AND TRANSHUMANISM

Introduction

Transhumanism, as explained by its proponents, is a philosophical and cultural movement that affirms the possibility and desirability of improving the human condition by modifying what it means to be human using science and technology.¹ The transhumanist technological agenda is multifaceted and ambitious, including for example the enhancement of human cognitive capacity, slowing down aging, assisting reproduction, and simulating intelligence artificially.² In recent years, transhumanism has captured much public attention through popular science writings and sci-fi movies.³ In the USA, a transhumanist political party was formed and named a presidential candidate

¹ Sean A. Hays, *Encyclopedia Britannica*, s.v. “Transhumanism,” last modified June 12, 2018, <https://www.britannica.com/topic/transhumanism>. See also Peter Harrison and Joseph Wolyniak, “The History of ‘Transhumanism’,” *Notes & Queries* 62, no. 3 (2015): 33–46. Steve Fuller and Veronika Lipinska, “Transhumanism for the Encyclopedia of Ethics, Science, Technology and Engineering,” *h+ Magazine*, March 30, 2014, <https://hplussmagazine.com/2014/03/30/transhumanism-for-the-encyclopedia-of-ethics-science-technology-and-engineering/>.

² European External Action Service, “What Is Transhumanism?” accessed August 4, 2019, <https://whatistranshumanism.org/>.

³ Some sci-fi movies dealing with transhumanist themes with notable blockbuster success include Paul Verhoeven, dir. *Robocop*. Orion Pictures, 1987. José Padilha, dir. *Robocop*. Columbia Pictures, 2014. James Cameron, dir. *The Terminator*. Orion Pictures, 1984. Andrew Niccol, dir. *Gattaca*. Columbia Pictures, 1997. Robert Zemeckis, dir. *Contact*. Warner Bros., 1997. Chris Columbus, dir. *Bicentennial Man*. Buena Vista Pictures, 1999. Lana Wachowski and Lilly Wachowski, dir. *The Matrix*. Warner Bros., 1999. Alex Proyas, dir. *I, Robot*. Twentieth Century Fox, 2004. James Cameron, dir. *Avatar*. Twentieth Century Fox, 2009. Neil Burger, dir. *Limitless*. Relativity Media, 2011. Jon Favreau, dir. *Iron Man*. Paramount Pictures, 2008. Paul Johansson, dir. *Atlas Shrugged*. Atlas Productions, 2011. Alex Garland, dir. *Ex Machina*. Universal Pictures, 2014. Brad Bird, dir. *Tomorrowland*. Walt Disney Pictures, 2015. Andy Wachowski and Lana Wachowski, dir. *Jupiter Ascending*. Warner Bros., 2015. Luc Besson, dir. *Lucy*. EuropaCorp, 2014.

in 2016.⁴ As it stands, transhumanism is a fringe movement because the substantive science to allow meaningful discussion of the transhumanist technological objectives remains flimsy.⁵ Nonetheless, the plausibility and feasibility of transhumanism are conceivable to some from the perspective of naturalism, which remains the *de facto* dogma in academia.⁶ In claiming the possibility and the right to redefine the meaning of being human anyway they see fit, transhumanists merely take Neo-Darwinism and secular humanism to a conceivable logical end.⁷ As a philosophy with far-reaching implications, transhumanism calls for responses from a Christian perspective.

According to Max More, a founder of the transhumanist movement,

Transhumanism is both a reason-based philosophy and a cultural movement that affirms the possibility and desirability of fundamentally improving the human condition by means of science and technology. Transhumanists seek the continuation and acceleration of the evolution of intelligent life beyond its currently human form and human limitations by means of science and technology, guided by life-promoting principles and values.⁸

More sees multiple ways to define transhumanism. In 1990, he defined transhumanism as a practical philosophy guided by life-promoting principles and values.⁹ The 1998 version of *The Transhumanist Declaration* broadens the definition of transhumanism to include both a cultural-intellectual movement and an academic

⁴ Andrew Marantz, “The Transhumanists’ Nominee for President,” *New Yorker*, November 6, 2016, <https://www.newyorker.com/magazine/2016/11/14/the-transhumanists-nominee-for-president>. See also Humanity+, “U.S. Transhumanist Party Platform,” accessed August 21, 2019, <http://transhumanist-party.org/platform/>.

⁵ Roberto Manzocco, *Transhumanism – Engineering the Human Condition: History, Philosophy and Current Status* (Cham, Switzerland: Springer, 2019), 36–37.

⁶ Phillip E. Johnson, *Reason in the Balance: The Case Against Naturalism in Science, Law & Education* (Downers Grove, IL: InterVarsity Press, 1995), 7–8.

⁷ Charles T. Rubin, *Eclipse of Man: Human Extinction and the Meaning of Progress* (New York: Encounter Books, 2014), 158–59.

⁸ Max More, “H+: True Transhumanism,” *Metanexus*, February 5, 2009, <http://www.metanexus.net/essay/h-true-transhumanism>.

⁹ Max More, “The Philosophy of Transhumanism,” in *The Transhumanist Reader: Classical and Contemporary Essays on the Science, Technology, and Philosophy of the Human Future*, ed. Max More and Natasha Vita-More (Chichester, UK: Wiley-Blackwell, 2013), 3–5.

discipline studying the benefits and risks of applying technologies to overcome human limitations.¹⁰ Transhumanism is described as a practical nonreligious philosophy of life that emphasizes reason, science, progress, and the value of existence while rejecting faith, worship, and the supernatural. More observes that transhumanism can be interpreted either as “trans-humanism” or “transhuman-ism.” Transhumanism as “trans-humanism” is an ideology that builds on the Enlightenment legacy of traditional humanism, which tends to see the progress of human civilization as inevitable. Trans-humanists see the progress of human civilization as possible and desirable, although not inevitable. Transhumanism as “transhuman-ism” goes beyond traditional humanism in means and ends. Traditional humanism has relied primarily on education and cultural refinement as its means to improve human civilization. Transhuman-ism advocates instead the enhancement of human anatomy. The Enlightenment optimism for the unstoppable progress of human civilization has long been fading among humanists, leading many to embrace a more pessimistic outlook towards human civilization and more critical forms of humanism. Transhuman-ism shares the same pessimistic outlook towards the progress of human civilization via education and cultural refinement. Nonetheless, transhuman-ism holds out hope for great leaps of human civilization via redefining what human nature entails.

More sees transhumanism as a nonreligious philosophy of life that emphasizes ethics and meanings instead of symbolic expressions of faith. Encapsulating a complex worldview, much like secular humanism and Confucianism, transhumanism may be described as a eupraxsophy in the vision of Paul Kurtz.¹¹ Nathan Bupp explains Kurtz’s concept of eupraxsophy as a nonreligious, humanistic, and natural approach to life that

¹⁰ *H+Pedia*, s.v. “Transhumanist FAQ,” last modified December 30, 2016, https://hpluspedia.org/wiki/Transhumanist_FAQ.

¹¹ Nathan Bupp ed., *Meaning and Value in a Secular Age: Why Eupraxsophy Matters – The Writings of Paul Kurtz* (Amherst, NY: Prometheus Books, 2012), 13.

finds conceptual root in the practical deliberation of wisdom in Aristotle and the pursuit of happiness in Schopenhauer.¹² Some other examples of eupraxsophy include Marxism, social democracy, and the pragmatic non-utopian meliorism advocated by John Dewey.¹³ Kurtz sees secular humanism as a new type of eupraxsophy that eschews religion and spirituality but draws its inspiration from science, ethics, philosophy, and the arts.

Following Immanuel Kant, humanists have traditionally assumed that the human body and mind are parts of a universal human nature.¹⁴ Transhumanists believe in contrast that the capacity of both the human body and mind can be radically enhanced.¹⁵

While the general direction of transhumanism as More has defined might seem conceivable, the technological goals of immortality, superintelligence, mind uploading, and non-biological existence as envisioned by many leading figures in the transhumanist community seem more like materials of science fiction. Thus far, mainstream scientific academia has mostly dismissed transhumanism as a fantastic pseudo-science. For example, MIT's *Technology Review* announced a \$20,000 prize in 2005 for molecular biologists who could scientifically refute the anti-aging proposals of the transhumanist biogerontologist Aubrey de Grey. Surprisingly, no submission was deemed successful by the judging panel. Insufficient scientific basis existed to support de Grey's proposals. However, de Grey's proposals were so distanced from the reach of today's science that the conclusive scientific evidence to refute his proposals did not exist either.¹⁶ From the perspective of mainstream science, aging is both a fact and a mystery.

¹² Bupp, *Meaning and Value in a Secular Age*, 13.

¹³ Bupp, *Meaning and Value in a Secular Age*, 296.

¹⁴ Patrick R. Frierson, *What Is the Human Being?* (New York: Routledge, 2013), 70, 150, 227, 290.

¹⁵ More, "The Philosophy of Transhumanism," 4.

¹⁶ Jason Pontin, "The SENS Challenge," *MIT Technology Review*, July 28, 2005, <http://www.technologyreview.com/view/404453/the-sens-challenge/>. See also Jason Pontin, "Is Defeating Aging Only a Dream?" *MIT Technology Review*, July 11, 2006, <http://www2.technologyreview.com/sens/>.

Popular scientific publications and sci-fi literature in the last decade have helped inject transhumanism into popular consciousness.¹⁷ Ray Kurzweil inspired much popular imagination through his 2005 bestseller *The Singularity is Near*.¹⁸ On February 21, 2011, *Time* magazine graced its cover with the article title “2045: The Year Man Becomes Immortal.”¹⁹ On September 30, 2013, another cover story asked “Can Google Solve Death?”²⁰ Wildly discussed technological ideas often seem more technologically plausible and less morally repugnant over time, even if they initially inspired dystopian tales in the popular imagination. Transhumanism seems likely to become more culturally mainstream in the years to come.

Worldview Apologetics

This study is carried out as a work in the fields of worldview analysis and apologetics. Worldview analysis is a helpful tool for understanding people and culture.²¹ Disciplines ranging from anthropology, sociology, and missiology make use of worldview analysis.²² Christian apologetics is a branch of theology that focuses on explaining the rationale for the Christian faith.²³ Numerous Christian thinkers in the early church including Justin Martyr, Clement of Alexandria, and Tertullian could be identified

¹⁷ Some notable examples can be found at Nanotechnology Now, *nanotech-now.com*, s.v. “Extropian & Transhumanist Books,” last modified April 20, 2015, <https://www.nanotech-now.com/transhuman-books.htm>.

¹⁸ Ray Kurzweil, *The Singularity Is Near: When Humans Transcend Biology* (New York: Viking, 2005).

¹⁹ Lev Grossman, “2045: The Year Man Becomes Immortal,” *Time* 177, no. 7 (2011).

²⁰ Harry McCracken and Lev Grossman, “Google vs. Death,” *Time* 182, no. 14 (2013).

²¹ Paul G. Hiebert, *Transforming Worldviews: An Anthropological Understanding of How People Change* (Grand Rapids: Baker Academic, 2008), 13–29.

²² Ninian Smart, *Worldviews: Crosscultural Explorations of Human Beliefs*, 3rd ed. (Upper Saddle River, NJ: Prentice Hall, 2000), 2.

²³ William Lane Craig, *Reasonable Faith: Christian Truth and Apologetics*, 3rd ed. (Wheaton, IL: Crossway, 2008), 15. See also Douglas R. Groothuis, *Christian Apologetics: A Comprehensive Case for Biblical Faith* (Downers Grove, IL: InterVarsity Press, 2011), 44–45.

as apologists.²⁴

Different approaches can be identified within the field of Christian apologetics, e.g. classical apologetics, evidential apologetics, presuppositional apologetics, fideist apologetics, etc.²⁵ Here I characterize worldview apologetics as an apologetic approach with a strong emphasis on worldview analysis. Pradeep Tilak describes worldview apologetics as arguing both negatively and positively. On one hand, worldview apologetics examines non-Christian worldviews and highlight “the foundational errors of unbelief that are untenable.” On the other hand, worldview apologetics defends biblical theology with evidence and reason. In particular, the creation-fall-redemption meta-narrative provides many connecting points for Christian apologists to converse with their interlocutors.²⁶

David K. Naugle identifies Abraham Kuyper as the founding father of modern worldview apologetics. Kuyper believes that “apologetic warfare must be conducted at the more basic level of underlying worldviews.” He “showed that human reason is not neutral in its operation, but functions under the influence of a set of antecedent assumptions that condition all thinking and acting.”²⁷ The modern ideal of scientific neutrality and objectivity is subjected to critical examination in worldview apologetics.

Worldview apologetics may be seen as belonging to the bigger school of

²⁴ Avery Dulles, *A History of Apologetics* (New York: Corpus, 1971), 22. See also Bernard L. Ramm, *Varieties of Christian Apologetics* (Grand Rapids: Baker Book House, 1962), 12–13.

²⁵ Kenneth D. Boa and Robert M. Bowman Jr., *Faith Has Its Reasons: Integrative Approaches to Defending the Christian Faith* (Downers Grove, IL: InterVarsity Press, 2001), 21.

²⁶ Pradeep Tilak, “A Christian Worldview Apologetic Engagement with Advaita Vedanta Hinduism,” (PhD diss., The Southern Baptist Theological Seminary, 2013), 2, 14–15. See also Bryan Billard Sims, “Evangelical Worldview Analysis: A Critical Assessment and Proposal,” (PhD diss., The Southern Baptist Theological Seminary, 2006), 20.

²⁷ David K. Naugle, *Worldview: The History of a Concept* (Grand Rapids: W. B. Eerdmans, 2002), 24.

cultural apologetics.²⁸ Worldview is a cultural aspect that missiologists observe in putting forth an effective evangelistic strategy.²⁹ Missiologists Charles H. Kraft and Paul G. Hiebert recognize worldview as “the deep level of culture, with surface-culture subsystems of a culture radiating out from it.” They see worldview as providing “cognitive foundations in terms of which to explain, provide emotional security, validate our deepest cultural norms, integrate our culture and monitor culture change.”³⁰

Both Naugle and Kraft recognize Michael Kearney’s model of “world view” as one of the most comprehensively defined. According to Kearney, a world view can be explained from multiple perspectives. First, a world view is a way of perceiving reality that comprises of the Self and everything that is not-Self.³¹ Second, a world view is an integrated combination of concepts such as time, causality, and knowledge.³² Third, a world view is an internally consistent system that shows logical and structural regularities.³³

Worldview apologetics as a general strategy is widely practiced in both popular and academic apologetics. Worldview apologetics has notably been exemplified by the apologetics works of Francis A. Schaeffer, who advocates a “total cultural apologetic” training for Christians that requires the contribution of every type of Christian

²⁸ Paul M. Gould, “What Is Cultural Apologetics? Effective Apologetics Today Requires a Genuine Missionary Encounter,” *Christianity Today*, April 15, 2019, <https://www.christianitytoday.com/ct/2019/april-web-only/what-is-cultural-apologetics-paul-gould-excerpt.html>. See also Paul M. Gould, *Cultural Apologetics: Renewing the Christian Voice, Conscience, and Imagination in a Disenchanted World* (Grand Rapids: Zondervan, 2019), 19–24, 206.

²⁹ For example, the missiological work of Paul Hiebert employs worldview analysis extensively. A. Scott Moreau, “Paul G. Hiebert’s Legacy of Worldview,” *Trinity Journal* 30, no. 2 (2009): 223–33.

³⁰ Charles H. Kraft, *Worldview for Christian Witness* (Pasadena, CA: William Carey Library, 2008), 117–19.

³¹ Michael Kearney, *World View* (Novato, CA: Chandler and Sharp, 1984), 41.

³² Kearney, *World View*, 46.

³³ Kearney, *World View*, 52.

educational and publishing organization.³⁴ Making a case for “worldview evangelism,” D. A. Carson contends that the Apostle Paul thought “worldviewishly” in 2 Cor. 10 and Acts 17.³⁵ Beyond refuting arguments and debunking excuses against the knowledge of God, Paul saw the goal of his apologetic ministries as “bringing into obedience to Christ every thought structure, every worldview, that presents opposition to his beloved Master.” Echoing the account of Paul ministering in Athens in which only “a few” men followed Paul and believed on the spot, Carson shared his personal experience holding an evangelistic meeting in Oxford. Although no one became a Christian at that meeting, eleven of the sixteen who attended became Christians within a few weeks. “That is often the pattern when part of the evangelistic strategy is to establish a worldview, a frame of reference, to make the meaning of Jesus and the gospel unmistakably plain.”

The evangelistic approach of Timothy Keller makes extensive use of worldview analysis.³⁶ Keller stresses that cultural contextualization of the gospel implies not “merely changing someone’s behavior, but someone’s worldview.” It is about uncovering the contemporary relevance of the gospel with the whole counsel of the Bible.³⁷

Worldview analysis and apologetics overlap in different ways. On one hand, apologists themselves make use of worldview analysis to understand the culture and people around them so that they can make more relevant apologetic arguments.³⁸ On the

³⁴ Francis A. Schaeffer, *The God Who Is There*, in *The Complete Works of Francis A. Schaeffer: A Christian Worldview* (Westchester, IL: Crossway, 1985), 1:192.

³⁵ D. A. Carson, “Athens Revisited,” in *Telling the Truth: Evangelizing Postmoderns*, ed. D. A. Carson (Grand Rapids: Zondervan, 2000), 384.

³⁶ Timothy Keller, “How the Gospel Changes Our Apologetics, Part 1,” *Timothy Keller* (blog), July 10, 2012, <https://timothykeller.com/blog/2012/7/10/how-the-gospel-changes-our-apologetics-part-1>.

³⁷ Timothy Keller, *Center Church: Doing Balanced, Gospel-Centered Ministry in Your City* (Grand Rapids: Zondervan, 2012), 93.

³⁸ Kraft, *Worldview for Christian Witness*, 11–22.

other hand, worldview analysis could be applied to situate the historical contexts of apologists so that their apologetic approaches may be better appreciated.³⁹

Worldview apologetics pays attention to the criteria of truth within the worldview of the interlocutor of the apologist, presupposing that different worldviews have different criteria for rationality and truth. For example, miraculous explanations might seem irrational from a certain naturalistic worldview but conceivable from a theistic worldview.⁴⁰ Therefore, worldview apologetics acknowledges that the persuasiveness of an apologetic argument is always worldview-dependent.⁴¹

Worldview apologetic engagements are especially helpful when both the apologist and the interlocutor are self-consciously aware of their respective worldviews. Self-awareness of worldview is a cultural feature.⁴² Where such awareness can be assumed, worldview apologetics brings clarity into the discussion and allows the disagreements between the apologist and the interlocutor to be more readily understood.

A Christian worldview apologetic engagement is meant to transition the interlocutor away from the original worldview and into the Christian worldview. Arguments could generally be categorized as either offensive or defensive. Offensive arguments aim at highlighting the logical or practical difficulties in the interlocutor's original worldview. Defensive arguments demonstrate how the Christian worldview leads to no such difficulties.

³⁹ Dulles, *A History of Apologetics*, 87, 221.

⁴⁰ Paul G. Hiebert, "The Flaw of the Excluded Middle," *Missiology: An International Review* 10, no. 1 (1982): 43.

⁴¹ Paul Weston, "Lesslie Newbigin: A Postmodern Missiologist?" *Mission Studies* 21, no. 2 (2004): 238–41. See also Schaeffer, *The God Who Is There*, 177.

⁴² Walter J. Ong, "World as View and World as Event," *American Anthropologist* 71, no. 4 (1969): 634–47.

Rethinking Traditional Evangelism

To explain Schaeffer's worldview apologetic paradigm, which is aptly characterized as aiming at engendering a "worldview revolution," it is helpful to first review what Schaeffer describes as the traditional paradigm of evangelistic conversion.

D. Bruce Hindmarsh observes a prodigal son paradigm in the spiritual conversion biographies that were popular in early modern England. The pattern can be described as (1) Christian upbringing, (2) youthful rebellion, (3) repentance, and (4) growing in spiritual maturity. Hindmarsh suggests that the evangelical Christians in early modern England saw their personal lives as a microcosm of the overall biblical narrative, in parallel to (1) creation, (2) fall, (3) redemption, and (4) sanctification.⁴³ As the traditional social order began to break down but had not fully run its course, most people still grew up in pious Christian homes, where a spiritual seed is planted for the return of the prodigal son after a period of youthful rebellion. This common experience became rare later in England as fewer were raised as Christians. However, the prodigal son paradigm continues to be popular through revivalism in the United States due to a stronger culture of church attendance.⁴⁴

Schaeffer argues that the traditional evangelistic conversion paradigm is no longer effective because most modern non-believers in the west do not grow up in churches.⁴⁵ Reflecting the shift of modern western culture away from its historic Christian roots, the modern western people typically hold a worldview that stands opposed to the Christian worldview in its metaphysical, moral, epistemological, and eschatological outlooks. They can no longer relate to the Christian meta-narrative of creation, fall, redemption, and sanctification that gives intelligibility to the prodigal son

⁴³ D. Bruce Hindmarsh, *The Evangelical Conversion Narrative: Spiritual Autobiography in Early Modern England* (New York: Oxford University Press, 2007), 283–85, 322–25.

⁴⁴ Hindmarsh, *The Evangelical Conversion Narrative*, 73.

⁴⁵ Francis A. Schaeffer, *He Is There and He Is Not Silent*, in *The Complete Works of Francis A. Schaeffer: A Christian Worldview* (Westchester, IL: Crossway, 1985), 1:277.

paradigm. Instead, most western people need to be “pre-evangelized” using the kind of worldview conversion methods developed by cross-cultural missionaries before the gospel could even begin to make sense to them.

Escape from Reason

Schaeffer thought the modern westerner has lost the biblical self-image of freedom, morality, rationality, and dignity that was once held as part of a common western worldview.⁴⁶ The modern westerner sees the human being as the sum of its pieces that are partly mechanical and partly ethereal. The two parts coexist separately, resembling the garage and the loft of a two-story building. Schaeffer saw the root cause of this alienation to be philosophical, although the idea had spread through art, music, and general culture to theology.⁴⁷

In *Escape from Reason*, Schaeffer paints in broad brush the major philosophical paradigm shifts that led to the modern view of the human being.⁴⁸ Just as western philosophy went through multiple paradigm shifts in metaphysics, morality, epistemology, and spirituality to arrive at the present human view, Schaeffer holds that the counteractive paradigm shifts must happen before a modern westerner can be restored to find the Christian worldview acceptable.⁴⁹ Explaining Schaeffer’s approach, Scott R. Burson and Jerry L. Walls write,

After the roof is removed and the person moves to an open position, Schaeffer thought three things need to be understood before one can become a Christian: real truth, real guilt, and real history. These points correspond to what Schaeffer often called the three bows: the metaphysical bow, the moral bow, and the epistemological bow. In other words, we must realize God is really there, that our problem is not just

⁴⁶ Bruce A. Little ed., *Francis Schaeffer: A Mind and Heart for God* (Phillipsburg, NJ: P&R Publishing, 2010), 39.

⁴⁷ Schaeffer, *The God Who Is There*, 8.

⁴⁸ Francis A. Schaeffer, *Escape from Reason*, in *The Complete Works of Francis A. Schaeffer: A Christian Worldview* (Westchester, IL: Crossway, 1985), 1:207–354.

⁴⁹ Schaeffer, *The God Who Is There*, 138–39.

guilt feelings but true moral guilt, and that faith is rational and based on objective truth – it is not a mystical, subjective leap in the dark.⁵⁰

Schaeffer attributes the beginning of the two-story view of humanness to an emphasis on “particulars” since the late medieval period.⁵¹ With a popular audience in his mind, Schaeffer illustrates in art and cultural terms what philosophers would characterize as the medieval problem of universals. He maintains that it was the scholars in the late medieval period who made a sharp turn away from the “Byzantine” view of reality and began an intellectual journey that ends up with the modern worldview where reality is seen in terms of two independent stories of faith and reason.⁵² According to Schaeffer, Thomas Aquinas helped usher in such a movement with the embrace of Aristotelianism, which holds to a more moderate realism in comparison to Platonism.⁵³ Not a few evangelical scholars have criticized Schaeffer for misreading Aquinas.⁵⁴ While I agree that Schaeffer lacked precision in his characterization of Aquinas, my opinion is that Schaeffer deserves recognition for identifying the medieval discussion of universals as the origin of the paradigm shifts in subsequent western philosophy. In his synthesis of Christian theology and Aristotelian philosophy, Aquinas postulates a dichotomy where he maintained a realist view for the universals in the spiritual realm while allowing a moderate conceptualist view for the universals in the natural realm. The dichotomy is somewhat ambiguous and leads inevitably to questions about universals that exist in both

⁵⁰ Scott R. Burson and Jerry L. Walls, *C.S. Lewis & Francis Schaeffer: Lessons for a New Century from the Most Influential Apologists of Our Time* (Downers Grove, IL: InterVarsity Press, 1998), 287.

⁵¹ Schaeffer, *Escape from Reason*, 210, 240. See also Schaeffer, *He Is There and He Is Not Silent*, 103–5.

⁵² Schaeffer, *Escape from Reason*, 210.

⁵³ Schaeffer, *Escape from Reason*, 209–11.

⁵⁴ Ronald H. Nash, “The Life of the Mind and the Way of Life,” in *Francis A. Schaeffer: Portraits of the Man and His Work*, ed. Lane T. Dennis (Westchester, IL: Crossway, 1986), 53–69. Nash noted that Schaeffer’s view on Aquinas adhered to the traditional Reformed perspective while Schaeffer’s view on Kierkegaard reflected older understandings. Nash suggested that the Enlightenment (instead of Aquinas) and Nietzsche (instead of Kierkegaard) might be better exemplars for the paradigm shifts Schaeffer sought to illustrate.

realms, e.g. humanness.⁵⁵ The ambiguity creates a fault line upon which religion and philosophy eventually part their ways.⁵⁶

The increasingly nominalist metaphysical view championed by the late medieval thinkers took place while the interest in propositional logic was gaining ground. Anicius Manlius Severinus Boethius had characterized rationality as the substance of human nature.⁵⁷ But reason was increasingly conceptualized through systems of syllogistic propositions in the late medieval period. The nominalism championed by thinkers such as Peter Abelard played an important role in the rise of rationalism, humanism, and naturalism.⁵⁸ These philosophical movements provide the background for what Schaeffer portrayed as “autonomous reason,” a “new” kind of reasoning that has freed itself from biblical revelations.⁵⁹

Schaeffer sees Kant as standing at the apex of natural and autonomous reason.⁶⁰ His assessment of Kant is relatively non-controversial and has attracted less critical attention. Indeed, John M. Frame contends that Kant was even more influential in shaping the self-image of the modern person than Schaeffer might have recognized.⁶¹

⁵⁵ For a critical but sympathetic assessment of Schaeffer’s philosophical view, see Ronald W. Ruesegger, “Francis Schaeffer on Philosophy,” in *Reflections on Francis Schaeffer*, ed. Ronald W. Ruesegger (Grand Rapids: Zondervan, 1986), 112–15.

⁵⁶ See comment from Gregory Alan Thornbury in SBJT Forum, “Dimensions of Schaeffer’s Life and Thought,” *The Southern Baptist Journal of Theology* 6, no. 2 (2002): 68–78.

⁵⁷ Leonard Geddes, *The Catholic Encyclopedia*, s.v. “Person,” (New York: Robert Appleton Company, 1911), vol. 7, accessed August 21, 2019, <http://www.newadvent.org/cathen/11726a.htm>.

⁵⁸ Richard M. Weaver, *Ideas Have Consequences* (Chicago: University of Chicago Press, 1984), 3. See also Paul M. Gould, “Aquinas, Schaeffer, Nominalism & the Demise of the Western World,” *Brilliant and Beautiful* (blog), March 19, 2014, <http://www.paul-gould.com/2014/03/19/aquinas-schaeffer-nominalism-the-demise-of-the-western-world/>.

⁵⁹ Schaeffer, *Escape from Reason*, 217–24.

⁶⁰ Schaeffer, *Escape from Reason*, 227–29.

⁶¹ John M. Frame, “Some Thoughts on Schaeffer’s Apologetics,” *John Frame and Vern Poythress* (blog), June 5, 2012, <http://www.frame-poythress.org/some-thoughts-on-schaeffers-apologetics/>. See question 3. Ruesegger agreed with Frame that Kant’s influence was more pivotal. Ruesegger, “Francis Schaeffer on Philosophy,” 117.

Before Kant, both René Descartes and David Hume had raised doubts against the adequacy of human reason. Descartes was skeptical of the reliability of the sensory inputs to the mind.⁶² Hume doubted the correctness of human logical reasoning, including the reality of apparent causality.⁶³ Kant sought to put out their doubts by essentially asserting that the mind is as good as it gets for us human beings. Kant's defense for autonomous reason is that reason could do no better than what people naturally are. Whatever ways the mind is scientifically discovered to work, that is the highest reach of rationality.⁶⁴ In effect, Kant seizes the reasoning faculty from the hands of the metaphysical speculators and gives it to the scientists. Moreover, he denies any higher norm of reason above human reasoning. Hence, he moves completely away from the late-medieval two-story hybrid realism and adopts conceptualism completely, making the human mind the ultimate basis for reason. In place of a two-story metaphysics, Kant proposes a two-story epistemology with two types of reason, the pure-scientific and the practical-moral. God, free will, and the immortality of the soul are presupposed because Kant needed them as practical moral incentives.⁶⁵ But they cannot be known to exist scientifically. In effect, the mind lost its window to spiritual reality under Kant. The mind is not allowed to doubt

⁶² René Descartes, *Meditations on First Philosophy: In Which the Existence of God and the Distinction of the Soul from the Body Are Demonstrated*, ed. Andrew Bailey, trans. Ian Johnson (Peterborough, Ontario: Broadview Press, 2013), 13–16.

⁶³ David Hume, *Enquiries Concerning the Human Understanding and Concerning the Principles of Morals*, 3rd ed., ed. L. A. Selby-Bigge and P. H. Nidditch (Oxford: Clarendon Press, 1975), 76–77, 415. See also David Hume, *A Treatise of Human Nature*, 2nd ed., ed. L. A. Selby-Bigge and P. H. Nidditch (New York: Oxford University Press, 1978), 10–13, 73–78. David Hume, *An Enquiry Concerning Human Understanding*, ed. Peter Millican (New York: Oxford University Press, 2007), 18–28. David Hume, *An Enquiry Concerning the Principles of Morals*, ed. J. B. Schneewind (Indianapolis: Hackett, 1983), 13–16.

⁶⁴ Immanuel Kant, *Critique of Pure Reason*, trans. Norman Kemp Smith (London: Macmillan, 1929), 189–94, 300–304.

⁶⁵ Benjamin J. Bruxvoort Lipscomb and James Krueger ed., *Kant's Moral Metaphysics: God, Freedom, and Immortality* (Berlin: De Gruyter, 2010), 10, 11, 178, 192. See also Paul Guyer, review of *Kant's Moral Metaphysics: God, Freedom, and Immortality*, edited by Benjamin J. Bruxvoort Lipscomb and James Krueger, *Notre Dame Philosophical Review: An Electronic Journal*, April 25, 2012, <https://ndpr.nd.edu/news/kant-s-moral-metaphysics-god-freedom-and-immortality/>.

even the validity of its reasoning.

Schaeffer views G. W. F. Hegel as standing at the threshold of “the line of despair,” beneath which the Boethian notion of rationality as the substance of a person completely disappears.⁶⁶ For Hegel, the world is forever *becoming*. He sees universals as existing in the “world soul,” in parallel to Kant’s view that the universals exist conceptually in the individual human mind. As Kant argues for the necessary rationality of the mind, Hegel argues that the world’s becoming is guided by the rationality of the world soul. However, while Kant thinks of universals as transcendentally immutable for all human minds, the Hegelian world soul is forever becoming.⁶⁷ Schaeffer makes a startling observation that “antithesis” disappears in Hegel.⁶⁸ Schaeffer seems to be saying that antithetical differences have no meaningful permanence if the meanings for universals could continue to change. For example, when the meaning of humanness keeps changing, it is rather ephemeral to claim whether a being is human or not.⁶⁹ The same can be said of any universals that are still in the process of “becoming” in the world soul, whether the universal in question is truth, marriage, or divine knowledge. Truth claims become short-lived to the point of uselessness when the meanings of universals are perpetually open to revision. As Schaeffer concludes, people might become operationally “rationalistic” at any given moment, but they are schizophrenically irrational in totality.⁷⁰

Schaeffer distinguishes clearly between rationality and rationalism. Rationality

⁶⁶ Francis A. Schaeffer, *How Should We Then Live?* in *The Complete Works of Francis A. Schaeffer: A Christian Worldview* (Westchester, IL: Crossway, 1985), 5:180–94.

⁶⁷ G. W. F. Hegel, *The Phenomenology of Spirit*, trans. and ed. Terry P. Pinkard (Cambridge: Cambridge University Press, 2018), 18–19, 118, 138, 434, 462.

⁶⁸ Schaeffer, *Escape from Reason*, 232. See also Schaeffer, *The God Who Is There*, 14, 43.

⁶⁹ Schaeffer, *Escape from Reason*, 232. See also Ruegsegger, “Francis Schaeffer on Philosophy,” 115. Ruegsegger agreed with Schaeffer that Hegel made thought synthetic. But he disagreed with Schaeffer’s claim that relativism originated from Hegel. According to Ruegsegger, the trend began already with Kant.

⁷⁰ Schaeffer, *The God Who Is There*, 16.

is rooted in the reality of the human mind, which is created by God. Part of that rationality is thinking in terms of antithesis. But Schaeffer insists that recognizing rationality as part of reality does not make him a rationalist. As the designation is commonly understood, a rationalist believes that one can come to true conclusions of truth, ethics, and reality by human rationality and observations of nature alone. But as a bible-believing Christian, Schaeffer insists that the revelations of God are necessary for human rationality to reach sound conclusions of truth and reality.⁷¹

Schaeffer seems to be illustrating Hegelianism through the lens of Marxism and Darwinism, which is not surprising because Marxism and Darwinism were two of the most dominating ideologies among his immediate audience when Schaeffer communicated his ideas. It is also unsurprising that Schaeffer sees both Marxism and Darwinism as antithetical to the Christian view of humanness. In Marxism, humanness is seen as a measurement of human society, which is always progressing through dialectical struggles. With a strong collectivist conceptualization of humanness, an individual becomes human only when he accepts the social reason and becomes subservient to his society. But personal freedom is forfeited.⁷² In Darwinism, humanness is reduced to the description of a stage in the evolution of a biological bloodline that arose purely out of chance. There is nothing inherently worthy of humanness. The divinely endowed dignity of humankind is surrendered.⁷³

Descended under the line of despair and faced with the loss of freedom and

⁷¹ Schaeffer, *The God Who Is There*, 184.

⁷² Francis A. Schaeffer, *A Christian Manifesto*, in *The Complete Works of Francis A. Schaeffer: A Christian Worldview* (Westchester, IL: Crossway, 1985), 5:427–50.

⁷³ Francis A. Schaeffer, *Back to Freedom and Dignity*, in *The Complete Works of Francis A. Schaeffer: A Christian Worldview* (Westchester, IL: Crossway, 1985), 1:357–84. See also Jacques Monod, *Chance and Necessity: An Essay on the Natural Philosophy of Modern Biology*, trans. Austryn Wainhouse (New York: Knopf, 1971), 112–13.

dignity, the modern person sought to “escape from reason” by a “leap of faith.”⁷⁴ When Schaeffer conjured up those idiosyncratic phrases, the existentialism of Jean-Paul Sartre was the most fashionable alternative to the Christian worldview among young people in Europe.⁷⁵ Schaeffer traces the origin of existentialism to Søren Kierkegaard, whom he refers to as the first man under the line of despair.⁷⁶ Kierkegaard spoke against the church of his day for its lack of spiritual vibrancy. Carefully reasoned doctrines and ethics were taught but people were lukewarm in their faith commitment. Kierkegaard called for a leap of faith, the kind of faith demonstrated by Abraham in offering Isaac, that transcends the rational and moral stage. Schaeffer sees Kierkegaard’s leap of faith as opening the door for Karl Barth, whose acceptance of the authority of God’s special revelation sounds very much like a leap of faith with little use of reason.⁷⁷ Some evangelical scholars have rejected Schaeffer’s characterization of Kierkegaard as leaning towards mysticism or irrationalism.⁷⁸ Still, Schaeffer’s portrayal of Barth as a fideist seems to be an opinion shared by other evangelical scholars.⁷⁹

The big lesson for Schaeffer in the history of the development of the modern western mind is that “an autonomous lower story will always eat up the upper.”⁸⁰ Although Aquinas and Barth might seem to stand at two poles of a spectrum in their

⁷⁴ Schaeffer, *Escape from Reason*, 233–37.

⁷⁵ Schaeffer, *The God Who Is There*, 17–19.

⁷⁶ Schaeffer, *The God Who Is There*, 14–16.

⁷⁷ Schaeffer, *The God Who Is There*, 16, 53.

⁷⁸ Gavin Ortland, “Was Kierkegaard an Irrationalist?” *Soliloquium* (blog), January 18, 2008, <https://gavinortland.com/2008/01/18/was-kierkegaard-an-irrationalist/>. See also John Depoe, *Rejuvenating Apologetics in the Twenty-First Century: Taking Hints from Søren Kierkegaard* (Waco, TX: Baylor University, 2002), 2. Gregory Alan Thornbury, “Why We Still Need Kierkegaard,” *Christianity Today*, March 18, 2016, <https://www.christianitytoday.com/ct/2016/april/why-we-still-need-kierkegaard.html>.

⁷⁹ Schaeffer, *Escape from Reason*, 122–27. See also J. Gresham Machen, “Karl Barth and ‘The Theology of Crisis’,” *Westminster Theological Journal* 53, no. 2 (1991): 216–17. Bruce L. McCormack, *The Epistle to the Romans* (Oxford: Oxford University Press, 1968), 10.

⁸⁰ Schaeffer, *Escape from Reason*, 231.

perspectives of human reason, Schaeffer sees a parallel in the two. “Aquinas opened the door to an independent man downstairs” by encouraging approaches of natural theology and philosophy that become eventually autonomous from biblical revelations. Barth is left with the assumption that the independent man downstairs no longer has any rational means to find faith in God. Barth must resort to asking the modern man to leap by irrational faith to get to the upper story.⁸¹

The Worldview Apologetics of Schaeffer

To understand the worldview apologetic paradigm of Schaeffer, it is helpful to draw a parallel with the historiography of scientific revolutions as observed by Thomas S. Kuhn. A seemingly perennial competition between deductive and inductive methodologies occupied much recent history of the philosophy of science. As a scientist-turns-philosopher of science, Kuhn was less drawn to prescribing a norm and more interested in describing how scientific revolutions historically happened. In his seminal work, *The Structure of Scientific Revolutions*, Kuhn observes that there have been periods when science proceeded more deductively, which he called periods of normal science. But there were also periods when science proceeded more inductively, which began with anomalies, accumulated into crises, and eventually causing worldview revolutions characterized by paradigm shifts.⁸²

A similar debate between the presuppositional and the classical apologists has occupied the recent history of Christian apologetics. Presuppositionalists, following Cornelius Van Til to various degrees, hold that true knowledge is obtainable only when

⁸¹ Schaeffer, *Escape from Reason*, 263.

⁸² Thomas S. Kuhn, *The Structure of Scientific Revolutions* (Chicago: University of Chicago Press, 1970), 35–76.

the biblical truths are accepted as the starting point.⁸³ Biblical truths are internally consistent and correspond to experience. However, biblical truths cannot be proven inductively from natural knowledge of the world.⁸⁴ In contrast, classical apologists insist that some truths about God and the world are evident from nature.⁸⁵

Lane T. Dennis notices that Schaeffer's conversion reveals some notable similarities with Kuhn's observations of the historical structures of scientific revolutions.⁸⁶ Kuhn was influenced by Michael Polanyi.⁸⁷ Schaeffer also cited the work of Polanyi approvingly.⁸⁸ Viewing Schaeffer's apologetic strategy through Kuhn's conception of the paradigm shift, it can be seen as a three-step process. First, worldview analysis of the unbelieving interlocutor inspires the apologist to engage in biblical-theological reflection. Second, the reflection leads to renewed witnessing of the biblical truth in words and deeds, highlighting contradictions and the unlivable reality of the interlocutor's worldview. Third, renewed witnessing attracts the interlocutor to try viewing reality through the Christian worldview.

John S. Feinberg classifies Schaeffer as a presuppositionalist alongside Van Til, who taught Schaeffer at Westminster Theological Seminary.⁸⁹ Kenneth C. Harper

⁸³ Cornelius Van Til, "Apologetics," Westminster Theological Seminary (unpublished class notes), 1963: 59–75. See also John M. Frame and Cornelius Van Til, *Cornelius Van Til: An Analysis of His Thought* (Phillipsburg, NJ: P&R Publishing, 1995), 136–37. Greg L. Bahnsen, *Van Til's Apologetic: Readings and Analysis* (Phillipsburg, NJ: P&R Publishing, 1998), 194–217.

⁸⁴ Van Til, "Apologetics," 47, 89.

⁸⁵ R. C. Sproul, John H. Gerstner and Arthur Lindsley, *Classical Apologetics: A Rational Defense of the Christian Faith and a Critique of Presuppositional Apologetics* (Grand Rapids: Zondervan, 1984), 17–18, 21–22.

⁸⁶ Lane T. Dennis, "Conversion in an Evangelical Context: A Study in the Micro-Sociology of Religion," (PhD diss., Northwestern University, 1980), 125–49.

⁸⁷ Steve Fuller, *Thomas Kuhn: A Philosophical History for Our Times* (Chicago: University of Chicago Press, 2000), 140–49.

⁸⁸ Schaeffer, *The God Who Is There*, 20.

⁸⁹ John S. Feinberg, *Can You Believe It's True? Christian Apologetics in a Modern and Postmodern Era* (Wheaton, IL: Crossway, 2013), 272–80.

calls Schaeffer an “inconsistent presuppositionalist.”⁹⁰ Schaeffer himself regards his apologetic approach as consistent with Van Til’s presuppositionalism but postulates that a subset of biblical truths could be thought of as constituting a worldview, which the non-believers could comprehend and be persuaded to adopt as working assumptions.⁹¹

It is perhaps best to explain Schaeffer as attempting an integration of the two apologetic approaches by pivoting around the notion of worldview revolution. As the Apostle Paul observes in Romans 1, every human being is born with an innate knowledge of God and moral law even though human beings hate and suppress that innate knowledge because of the human sinful nature.⁹² The first step of the worldview revolution is to expose that self-delusion to the unbelievers themselves. And that would mean the apologist must often argue in the form of *reductio ad absurdum* from within the unbeliever’s worldview. Explaining Schaeffer’s approach, Jerram Barrs notes,

if the unbeliever were consistent to his or her make-believe world, then he/she would be driven to meaningless, amorality, and irrationality . . . Therefore, we are to focus on the tension, helping the unbeliever to see that all that is good and true and beautiful comes from God and that God's world and gifts are his true home, while also exposing the inadequacy of the worldview or idol to which the unbeliever has given mind and heart.⁹³

Naugle observes that countless Christians in the second half of the twentieth century “cut their worldview teeth on Schaeffer’s writings” and this particular approach seems to be pivotal.⁹⁴ Thomas V. Morris explains Schaeffer as contending that “non-Christians would have a difficult time of consistently working out their presuppositions as they lived in the context of their own and the external world.” Eventually, that

⁹⁰ Kenneth C. Harper, “Francis A. Schaeffer: An Evaluation,” *Bibliotheca Sacra* 133, no. 530 (1976): 138.

⁹¹ Schaeffer, *The God Who Is There*, 175–87.

⁹² Sproul, Gerstner and Lindsley, *Classical Apologetics*, 52, 62–63.

⁹³ Jerram Barrs, “Francis Schaeffer: His Apologetics,” in *Francis Schaeffer: A Mind and Heart for God*, ed. Bruce A. Little (Phillipsburg, NJ: P&R Publishing, 2010), 47.

⁹⁴ Naugle, *Worldview*, 6.

discrepancy leads to a crisis of faith for the non-Christian worldview, which could accumulate into a paradigm shift or worldview revolution.⁹⁵

Within the Reformed tradition to which Schaeffer belongs, two kinds of critical questions were often raised against Schaeffer's practice of worldview apologetics: first, whether such a worldview revolution could be achieved, and second, whether it should be attempted.

Reasoning from a post-foundationalist viewpoint, Morris was skeptical that people would abandon their worldview when inconsistencies are demonstrated. Modern people seem quite capable of overlooking inconsistencies by compartmentalizing their lives. Among postmodern people, Morris was skeptical that any inconsistencies could even be meaningfully demonstrated at all.⁹⁶

Responding from the presuppositionalist perspective, Van Til and Greg L. Bahnsen express skepticism that Schaeffer's apologetic approach would work.⁹⁷ They contend that Schaeffer's approach is practically the same as the classical approach, only with different semantics. From Van Til's perspective, the pragmatic verificationism of Schaeffer made Schaeffer's epistemology indistinguishable from the epistemology of Edward Carnell, which Van Til regarded as classical.⁹⁸

Gordon R. Lewis, a student of Carnell, was unsurprisingly supportive of Schaeffer.⁹⁹ Notably, some classical apologists such as R. C. Sproul, John Gerstner, and

⁹⁵ Thomas V. Morris, *Francis Schaeffer's Apologetics: A Critique* (Grand Rapids: Baker Books, 1987), 21–22.

⁹⁶ Morris, *Francis Schaeffer's Apologetics*, 101–9.

⁹⁷ Greg L. Bahnsen, *Presuppositional Apologetics: Stated and Defended*, ed. Joel McDurmon (Powder Springs, GA: American Vision, 2008), 248–52. See also Cornelius Van Til, "The Apologetic Methodology of Francis A. Schaeffer," a collection of reflections on various Schaeffer texts in Westminster Theological Seminary (unpublished), 1974: 1, 35–36, 49–50.

⁹⁸ William Edgar, "Two Christian Warriors: Cornelius Van Til and Francis A. Schaeffer Compared," *Westminster Theological Journal* 57, no. 1 (1995): 57–80.

⁹⁹ Gordon R. Lewis, *Testing Christianity's Truth Claims: Approaches to Christian Apologetics* (Lanham, MD: University Press of America, 1990), 296–300.

Arthur Lindsay support Schaeffer's method, even though Schaeffer had mixed feelings for their hero Aquinas.¹⁰⁰ They claim that Schaeffer, not being an academic, simply misunderstood Aquinas.¹⁰¹

Schaeffer indeed makes verifiability a criterion for "true truth" and insists that biblical-theological truth claims can be demonstrated in reality.¹⁰² Schaeffer believes that there is "no final conflict" between biblical revelations and scientific discoveries.¹⁰³ More importantly, biblical truths are witnessed by living witnesses of Christians.¹⁰⁴

Max Harrison Sotak has produced more recently a dissertation-length analysis of the apologetic methodology of Schaeffer using Frame's tri-perspectival analysis.¹⁰⁵ Frame views truths as knowable through the normative, situational, and existential perspectives. Sotak concludes that Frame's tri-perspectivalism is useful in understanding Schaeffer's apologetic approach and that Schaeffer emphasizes particularly the existential perspective.¹⁰⁶ Complementing the normative perspective, the existential perspective directs the apologist to ask: who would this specific interlocutor acknowledge as an authority on this matter? Complementing the situational perspective, the existential perspective directs the apologist to consider what type of evidence and reasoning would convince this specific interlocutor. The existential perspective also pays attention to the

¹⁰⁰ Sproul, Gerstner and Lindsley, *Classical Apologetics*, 126–28.

¹⁰¹ R. C. Sproul, "The Christian and Science (Part 2)," May 14, 2014, <http://www.ligonier.org/learn/articles/christian-and-science-part-2/>.

¹⁰² Schaeffer, *The God Who Is There*, 104, 143, 163, 174. See also Schaeffer, *Escape from Reason*, 218–19, 312–13.

¹⁰³ Francis A. Schaeffer, *No Final Conflict*, in *The Complete Works of Francis A. Schaeffer: A Christian Worldview*, 2nd ed. (Westchester, IL: Crossway, 1985), 2:139.

¹⁰⁴ Francis A. Schaeffer, *The Church Before the Watching World*, in *The Complete Works of Francis A. Schaeffer: A Christian Worldview* (Westchester, IL: Crossway, 1985), 4:115–16.

¹⁰⁵ Max Harrison Sotak, "Apologetic Evangelism and Personal Rectitude: The Existential Perspective in Francis Schaeffer's Trilogy," (PhD diss., North-West University, 2012), 125–46.

¹⁰⁶ Sotak, "Apologetic Evangelism and Personal Rectitude: The Existential Perspective in Francis Schaeffer's Trilogy," 7.

personal credibility of the apologist and the presence of the Holy Spirit.¹⁰⁷

In a conception comparable to Frame, David J. Hesselgrave sees missiology as drawing its data from revelation, research, and reflection.¹⁰⁸ Both Frame and Hesselgrave acknowledge the influences of Schaeffer in their apologetic approaches.

Schaeffer was speaking primarily to young people enamored by the existentialism of the 1960s. His practical emphasis on the existential perspective could be due mainly to the original audience he was addressing. He highlights the logical inconsistencies of the existentialists and argues for the undesirability of living out such existentialist philosophy.¹⁰⁹

Sotak cites a comparative study done by David R. Leigh in which Leigh argues that even Van Til did not reject verification, only qualified its use. Leigh based his argument on certain early course syllabi in a course taught by Van Til that Schaeffer would have read.¹¹⁰ Van Til seems to fault the traditional verification methods as failing to take Christian presuppositions into account. From Van Til's perspective, only God is the ultimate source of verification. God verifies prophetic truths by fulfilling them.

Schaeffer demonstrates two distinctive approaches in verification. First, he employs a "livability test" to show the impossibility of living consistently under any non-Christian worldview.¹¹¹ William Lane Craig sees the pragmatic test as Schaeffer's most

¹⁰⁷ Sotak, "Apologetic Evangelism and Personal Rectitude: The Existential Perspective in Francis Schaeffer's Trilogy," 51, 88.

¹⁰⁸ David J. Hesselgrave and Earl J. Blomberg, *Planting Churches Cross-Culturally: A Guide for Home and Foreign Missions* (Grand Rapids: Baker Book House, 1980), 32, 42–52, 210.

¹⁰⁹ Schaeffer, *The God Who Is There*, 58–59. See also David Baggett, Gary R. Habermas and Jerry L. Walls ed., *C. S. Lewis as Philosopher: Truth, Goodness and Beauty* (Downers Grove, IL: InterVarsity Press, 2008), 95. Schaeffer, *Escape from Reason*, 231.

¹¹⁰ David R. Leigh, *Presupposing: How to Defend the Faith: The Methods of Francis Schaeffer and Cornelius Van Til* (Fox River Grove, IL: Leighist & Grateful Pressless Press, 2012), 17–18, 31–52.

¹¹¹ Colin Duriez, *Francis Schaeffer: An Authentic Life* (Wheaton, IL: Crossway, 2008), 256. See also Craig, *Reasonable Faith*, 15.

important contribution to the field of apologetics.¹¹² Schaeffer refers to such an approach as offensive apologetic.¹¹³ The livability test drives the discussion towards the moral inconsistency of the interlocutor's worldview. Schaeffer realizes that offensive apologetic arguments might pinch but sees it as necessary to awaken people from their false sense of complacency and comfort. He pictures the offensive as "taking the roof off."¹¹⁴

Second, Schaeffer seeks to demonstrate biblical truths by internal biblical evidence and real-life Christian witnesses. The Gospel is the central presupposition of Schaeffer's positive apologetic. The historical, philosophical, and theological data in the Bible form a coherent unity pointing towards the Gospel.¹¹⁵ Christian witnesses add to the verification of the biblical truth and the reality of the Gospel. Schaeffer insists that real faith works. If something claiming to be orthodoxy does not lead to orthopraxis, maybe that orthodoxy is not that orthodox after all.¹¹⁶

Craig draws a helpful distinction between showing the truth and knowing the truth.¹¹⁷ Schaeffer could be described as a verificationist in his apologetic presentation. But it does not necessarily imply that Schaeffer is an inductivist in his epistemology. When Schaeffer applies the practical test of truth as part of a cumulative argument, he understands it as using verificationism to eliminate the incoherent alternative worldviews. Schaeffer's strategy is not unlike the process of worldview elimination as found in the much more philosophically rigorous presentation of Norman L. Geisler. Once the theistic worldview becomes the only viable remaining choice, life witnesses are employed to

¹¹² Craig, *Reasonable Faith*, 70, 78.

¹¹³ Schaeffer, *The God Who Is There*, 35.

¹¹⁴ Schaeffer, *The God Who Is There*, 140.

¹¹⁵ Schaeffer, *The God Who Is There*, 100.

¹¹⁶ Schaeffer, *The God Who Is There*, 60–61.

¹¹⁷ Craig, *Reasonable Faith*, 43.

make an appealing and cumulative case for the coherence of the Christian meta-narrative.¹¹⁸

Barrs, who became a Christian partly through listening to Schaeffer's tape and had served with the *L'Abri* Fellowship, observes:

The beginning for modern people, and even more for postmodern people, is denial or doubt about the existence of God and denial or doubt about the existence of truth. While these might seem like abstract issues... nothing is more practical, more basic than the conviction that there is truth that can be known... The more consistently people live with the loss of truth, the more their lives will fall apart, for the center does not hold. ... My own conversion bears on this... I wondered how any meaning and value can be given to human life... Is there any reason for suffering, any ultimate explanation for it, or is it meaningless in the end?¹¹⁹

The emphasis on authenticity and practical consistency in Schaeffer's thinking originated from a period where Schaeffer suffered a crisis of faith.¹²⁰ In *True Spirituality*, Schaeffer gives an account of this transformative experience, which he reckoned as the foundation of the work of *L'Abri* fellowship.¹²¹ Several years after his family moved to Switzerland in 1945, Schaeffer grew weary of the lack of compassion shown by some people in his denomination. The lack of love was irreconcilable with what Jesus told his disciples: that even the world will recognize them to be his disciples by their love (John 13:35). Schaeffer was also upset by the lack of progress in his spiritual growth. Colin Duriez suggests that the meeting he had with Karl Barth in 1950 and the scathing letter

¹¹⁸ Norman L. Geisler, *Christian Apologetics* (Grand Rapids: Baker Book House, 1988), 141–47.

¹¹⁹ Barrs, "Francis Schaeffer: His Apologetics," 39–40.

¹²⁰ Duriez, *Francis Schaeffer*, 103–10. See also Edith Schaeffer, *The Tapestry: The Life and Times of Francis and Edith Schaeffer* (Waco, TX: Word Books, 1981), 354–55. There was not any event that would mark clearly when Schaeffer's crisis began or ended. Duriez's chronology suggested that the crisis ended in 1951 after his meeting with Karl Barth. But Edith Schaeffer suggested that it had ended before 1951.

¹²¹ Edith Schaeffer, *L'abri*, new exp. ed. (Wheaton, IL: Crossway, 1992), 75–76. See also Francis A. Schaeffer, *True Spirituality*, in *The Complete Works of Francis A. Schaeffer: A Christian Worldview* (Westchester, IL: Crossway, 1985), 3:195–380.

Barth subsequently sent him contributed to his soul-searching in this period.¹²² Schaeffer told his wife Edith Schaeffer that he had to re-think his faith from the beginning. If he could not resolve it satisfactorily, he would leave Christian ministry altogether. He felt like he was wrestling with God as he strolled in the wilderness of the Alps and his small bedroom at the Chalet. Eventually, like the sun dawning on him, he found himself writing poems praising God again. He realized that there were some important biblical truths about sanctification that nobody ever taught him in his Christian walk. Out of this crisis, he became confident that Christians can live authentically and consistently. As Jesus promised, it is the living testimony of love, an anomaly in this world, which witnesses the faith to the world. Borrowing Karl Jasper's notion of final experience, Schaeffer called the living testimony the "final apologetic."¹²³

True Truth

According to James W. Sire, Schaeffer had "a passion for the God who is there, a passion for truth, a compassion for people, a passion for relevant and honest communication, and a passion for Scripture."¹²⁴ Among his five passions, Schaeffer was most expressive in defending the truth, but also perhaps least understood. In his comparative study of the positions of Van Til, Schaeffer, Carl Henry, Donald Bloesch, and Millard Erickson on the nature of truth, James Emery White argues that Schaeffer shares the weakness of Van Til's fideism in their common presuppositionalism, which accepts for granted certain doctrines such as biblical inerrancy but spends insufficient

¹²² Wyatt Houtz, "Karl Barth's Letter to Francis Schaeffer," *The PostBarthian* (blog), April 2, 2016, <https://postbarthian.com/2016/04/02/karl-barths-letter-to-francis-schaeffer/>. See also Leigh, *Presupposing*, 17, 29–30. Duriez, *Francis Schaeffer*, 95–101.

¹²³ Francis A. Schaeffer, *The Mark of the Christian*, in *The Complete Works of Francis A. Schaeffer: A Christian Worldview* (Westchester, IL: Crossway, 1985), 4:188.

¹²⁴ James W. Sire, foreword to *The God Who Is There*, by Francis A. Schaeffer, 30th anniv. ed. (Downers Grove, IL: InterVarsity Press, 1998), 10.

effort to demonstrate their truthfulness.¹²⁵ Echoing Arthur F. Holmes, White criticizes Schaeffer for conflating metaphysics and epistemology, the real and the truth, as well as the universal and the absolute.¹²⁶ The central objection White levels against Schaeffer, and perhaps by extension Schaeffer's generation of evangelical thinkers, seems to be the inadequacy of using a single correspondence theory in handling all biblical revelations as literal propositions. As Anthony C. Thiselton has said, "the understanding of truth varies according to context."¹²⁷

Schaeffer articulates his theory of truth using the rather idiosyncratic phrase "true truth." As Charles W. Colson and Timothy George observe,

Schaeffer, with laser-like precision, hit upon the most fundamental issue of our day: The denial of "true truth" was not some passing academic fad. In both its post-Kantian and postmodernist garb, this denial detaches language from reality and leads to the kind of moral and spiritual relativism that is the current coin of contemporary discourse, especially in Europe and North America.¹²⁸

Schaeffer would agree that the meaning of a literal proposition varies according to the context of the author and the intended recipients. He said the Bible sometimes makes little sense to people in the modern cultural context.¹²⁹ The philosophical premises underlying the contemporary language has changed much since the time the Bible was originally written. However, Schaeffer would see no problem in maintaining a single correspondence theory of truth because of his metaphysics. He seems to think of universals, such as humanness ("mannishness" as he called it), to be

¹²⁵ James Emery White, *What Is Truth? A Comparative Study of the Positions of Cornelius Van Til, Francis Schaeffer, Carl F. H. Henry, Donald Bloesch, Millard Erickson* (Nashville: Broadman & Holman, 1994), 62–84, 197–204.

¹²⁶ Arthur F. Holmes, *All Truth Is God's Truth* (Grand Rapids: W. B. Eerdmans, 1977), 47.

¹²⁷ Anthony C. Thiselton, *The Two Horizons: New Testament Hermeneutics and Philosophical Description with Special Reference to Heidegger, Bultmann, Gadamer, and Wittgenstein* (Grand Rapids: W. B. Eerdmans, 1980), 408–15.

¹²⁸ Charles W. Colson and Timothy George, "Flaming Truth: With Laser-Like Precision, Francis Schaeffer Hit on the Fundamental Issue of Our Day," *Christianity Today* 56, no. 2 (2012): 45.

¹²⁹ Schaeffer, *Escape from Reason*, 218–19, 313. See also Schaeffer, *He Is There and He Is Not Silent*, 312–13, 327.

real. Therefore, for Schaeffer, eternal universals exist logically before particulars.¹³⁰ For conceptualists who see universals as mental concepts, beauty is in the eye of the beholder. But Schaeffer would argue that conceptualism is an incomplete metaphysics for the Christian view of the world.¹³¹ For Schaeffer, assertions like “I am the truth” (John 14:6) or “all things work for the good of those who love God” (Rom 8:28) only makes sense if universals such as truth and good are unchangeably real. The only kind of meanings that can be rationally understood are meanings that are metaphysically, eternally, and immutably real. When a person has the correct biblical worldview, his senses of reality point him to true meanings. When a person’s worldview is detached from the biblical revelation, he could be looking at something real but still obtains a false meaning. For Schaeffer, losing the ability to see universals as real was the paradigm shift that eventually renders Christian theology nonsensical to the modern westerner.¹³²

Relating Schaeffer’s emphasis on the reality of universals with the focus of this study, transhumanism seems much more conceivable if the meaning of humanness has no universal and immutable reality. However, if humanness is a metaphysical, eternal, and immutable universal, the notion of redefining human nature is oxymoronic, if not also literally dehumanizing.

A Worldview Apologetic Engagement

Why is the worldview apologetic approach helpful in fashioning a Christian response to transhumanism? I give two main reasons. First, most transhumanists would agree that transhumanism is a worldview. Leading transhumanists themselves use the

¹³⁰ Schaeffer, *He Is There and He Is Not Silent*, 283, 305, 308–31.

¹³¹ Schaeffer, *The God Who Is There*, 107.

¹³² Ruegsegger, “Francis Schaeffer on Philosophy,” 121–22.

word “worldview” to describe transhumanism.¹³³ Second, transhumanism as a social movement is spearheaded by leaders who could be fairly characterized as evangelists and apologists of the transhumanist worldview. Few in the transhumanist community would disagree if I describe Kurzweil as an evangelist and Nick Bostrom as an apologist. Kurzweil’s evangelistic tone can hardly go unnoticed when he proclaims, “the Singularity is near!”¹³⁴ Similarly, Bostrom is practicing apologetics of some sort by titling one of his widely disseminated essays “In defense of Posthuman dignity.”¹³⁵

A strength of the worldview apologetic approach is its broader relevance beyond a narrowly defined philosophical school or social movement. For example, one does not need to be a self-identified transhumanist to subscribe to ideas in transhumanism. John Harris, who is a strong proponent for radical human enhancement, does not like to identify himself as a transhumanist. For Harris, the transhumanist label is primarily a cultural identity. To be identified as a transhumanist is like being identified as a fundamentalist Muslim or a born-again Christian, which would be an insult for him.¹³⁶ Transhumanism does not designate an ideological stand according to Harris, only membership to a pseudo-religion. Harris could be described as a non-nominal transhumanist. He agrees with the ethical reasoning of radical human enhancement but does not want to become a member of the transhumanist social movement. Although he is sympathetic to the essential ideas in transhumanism, the transhumanist movement seems like a millennialist cult to him. Harris does not believe that the world needs yet another religion called transhumanism. The worldview apologetic approach allows us to

¹³³ Max More, “The Overhuman in the Transhuman,” *Journal of Evolution & Technology* 21, no. 1 (2010): 4.

¹³⁴ Kurzweil, *The Singularity Is Near*, 21–33.

¹³⁵ Nick Bostrom, “In Defense of Posthuman Dignity,” *Bioethics* 19, no. 3 (2005): 202–14.

¹³⁶ John Harris, *Enhancing Evolution: The Ethical Case for Making Better People* (Princeton, NJ: Princeton University Press, 2007), 38.

include non-nominal transhumanists such as Harris in our discussion.

Worldview analysis as an approach is not without its critics. James K. A. Smith notably observes in *Desiring the Kingdom* that emphasizing the Christian worldview as an educational approach tends to make Christianity broad brush, ambitious, and remote from the on-the-ground reality.¹³⁷ A similar criticism could be anticipated in applying worldview apologetics to the engagement with transhumanists. Some transhumanists might be more interested in talking about specific technological challenges, such as radically enhancing longevity or intelligence, and have little interest in debating about the transhumanist worldview in general. However, for the present study, our focus is on the most vocal champions of transhumanism. And those movement leaders do tend to extrapolate from glimpses of technological breakthroughs to a highly hopeful world vision of the future.

Transhumanism is worth our time of engagement as Christians because the substantive transhumanist worldview will likely expand in mindshare subscription no matter what happens to the transhumanist social movement. Transhumanism has certainly not gone unnoticed by scholars in religion. The American Academy of Religion has formed a workgroup dedicated to transhumanism.¹³⁸ In *Why People Matter*, a recent work on human significance featuring essays from leading evangelical ethicists, transhumanism is listed alongside utilitarianism, collectivism, individualism, and naturalism as the main rivals to the Christian ethical vision.¹³⁹ Transhumanism holds tremendous real-life implications because the transhumanist worldview may quietly slip under practical solutions to various social, political, ethical, technological, psychological,

¹³⁷ James K. A. Smith, *Desiring the Kingdom: Worship, Worldview, and Cultural Formation* (Grand Rapids: Baker Academic, 2009), 17.

¹³⁸ American Academy of Religion, “Human Enhancement and Transhumanism Unit,” accessed October 28, 2018, <https://papers.aarweb.org/pu/human-enhancement-and-transhumanism-unit>.

¹³⁹ John F. Kilner ed., *Why People Matter: A Christian Engagement with Rival Views of Human Significance* (Grand Rapids: Baker Academic, 2017), 109–34.

and futuristic problems through domain experts sympathetic to transhumanism.

Transhumanists are aware that many do not subscribe to the transhumanist worldview. They recognize that it takes a worldview revolution to be converted to transhumanism. Hence, they will likely settle for incremental victories, whether the advance is rhetorical, technological, or political. The technological cultural landscape seems to be a slippery slope tilting in favor of transhumanism. Once the technological vision of transhumanism prevails as a social reality, it will much more easily prevail also as an ideology. The worldview of people inevitably changes when the world itself is changed.

A Contest of World Visions

While it would exceed the scope of this study to attempt rigorous explanations for notions such as “world,” “worldview,” “perspective,” and “world vision,” it is helpful to briefly distinguish their usage within this study. The world is reality as such. The world is what is out there, the actual world. Worldview is about how a person sees the world. Worldview is like a pair of corrective lenses. Perspective, or viewpoint, is about where a person stands and where the person looks at. With the same worldview or pair of corrective lenses, a person can still obtain different impressions of the world by having different perspectives. The person might only need to move a few yards and look in a different direction to obtain a different perspective. A world vision is the vivid imagination of a possible world. A world vision is about what the world can conceivably become.

Unlike some other types of apologetics, worldview apologetics does not consist of a toolbox of paradigmatic arguments. Instead, worldview apologetics as exemplified by Schaeffer is more accurately characterized as a meta-apologetic framework that situates the apologist and their interlocutor in the meta-narrative of a “worldview revolution.” However, it would only be a slight exaggeration to call the Christian engagement with transhumanists a “world war,” as both Christians and

transhumanists ultimately aim to change the structural reality of the world itself. Persuading more ideological conversions to transhumanism is only one tactic in their playbook. Their end game is to realize their vision of a transhumanist world.

As I already pointed out, transhumanists are apologists and evangelists of transhumanism. Like any worldview-conscious apologists, transhumanists understand that what seems reasonable to them might not seem reasonable to others before a worldview revolution takes place. Yet some of them believe that worldview changes will inevitably take place when the world is changed.

Some transhumanists seem to be convinced that the only hurdle between the present world and where they want it to be is sufficient research funding and the willingness of the states to relax their restrictive scientific research policy. Once the world has tasted what the transhumanist technology of tomorrow would offer, it would never look back. Transhumanists are confident that nobody could say no to radical life extension, super-intelligence, and freedom from all the sickness and suffering of this mortal body. As materialists in their view of the mind and body, they are confident that once people permit their bodies to be materially altered, their mental perspective about transhumanism will also change. Once the body is upgraded, the mind will be upgraded. Once the people are upgraded, the world will be upgraded. When humans become transhuman, they have no choice but to become transhumanists!

One remarkable aspect of the apologetic practice of Schaeffer was his vivid portrayal of contrasting world visions. Schaeffer does not limit himself to highlighting what is logically incoherent about a worldview and how that worldview fails to correspond to the reality of the world. He draws attention to what is undesirable or “unlivable” about a possible world. The worldview apologetic approach as exemplified

by Schaeffer could just as well be called world vision apologetics.¹⁴⁰

A Y-Juncture Engagement

This study can be fairly described as an exercise of world vision apologetics. I set out to accomplish three goals in this study and I picture the three goals as a Y-juncture engagement. My first goal is to understand the transhumanists as a community of worldview apologists. I want to know where they come from. My second goal is to respond to the transhumanists as a respectful and sympathetic interlocutor by outlining several arguments against transhumanism, centering on its practical undesirability and scientific implausibility. I want to show that they are heading towards a dead-end because some of their transhumanist beliefs contradict other humanist beliefs they still hold. My third goal is to defend the Christian view of humanity using concepts that are expressed in contradistinction with transhumanism. I want to show them a better path using a language they are more equipped to understand.

In viewing transhumanists as worldview apologists, I recognize some tactical similarities between Schaeffer and the transhumanists. Like Schaeffer, transhumanists are painting two possible worlds and they are asking people to choose one. Like Schaeffer, transhumanists are sometimes being criticized for lacking details. But if the perceived parallel with Schaeffer is correct, one might wonder if the critics of transhumanism fail to see that being vague is often part of the art of persuasion. The vagueness is sometimes intentional so that the details may be supplied by creative interpretations. Instead of dismissing the transhumanist visions as vague, a more appreciative response recognizes how such incomplete visions can be fulfilled by technological miracles that are not

¹⁴⁰ Francis A. Schaeffer, *Pollution and the Death of Man*, in *The Complete Works of Francis A. Schaeffer: A Christian Worldview* (Westchester, IL: Crossway, 1985), 5:75. See also Schaeffer, *How Should We Then Live?* 250. Francis A. Schaeffer, *Whatever Happened to the Human Race?* in *The Complete Works of Francis A. Schaeffer: A Christian Worldview* (Westchester, IL: Crossway, 1985), 5:288.

currently describable.

If Christian apologists want to respond persuasively to transhumanists, we must be willing to argue our case on the home turf of secular humanism. Schaeffer was an acknowledged master in this approach. He would push the existentialist argument to its logical end and demonstrate that even ardent advocates like Sartre could not live out their existentialist philosophy consistently if they also seek to remain humanists.¹⁴¹ Christian apologists today could take a similar existential approach by showing that a consistent application of the transhumanist beliefs leads to highly anti-humanistic consequences.

To fight fire with fire is not the same as building a positive case for biblical truths based on an unbiblical foundation. To prove theology using unbiblical presuppositions would be what Schaeffer calls “sitting on an unbeliever’s seat.”¹⁴² To construct a theology that way leads eventually to self-contradictions somewhere, if not everywhere. However, the more limited “for argument’s sake” strategy is indeed a useful apologetic tactic.¹⁴³ The *reductio ad absurdum* argument form has a long-established place in logic and mathematic reasoning. Even presuppositional apologists acknowledge that it could be rhetorically helpful to focus on situational contradictions.¹⁴⁴ Tactically, it must be exercised with caution though. It might be counterproductive to start too many fires too soon. As Morris observes, demonstrations of existential inconsistency do not guarantee personal crises of faith in the postmodern age.¹⁴⁵

¹⁴¹ Schaeffer, *The God Who Is There*, 58–59.

¹⁴² Francis A. Schaeffer, “A Review of a Review,” *The Bible Today* 43, no. 1 (October, 1948): 7–9.

¹⁴³ Cornelius Van Til, *The Defense of the Faith*, 3rd ed. (Philadelphia: Presbyterian and Reformed, 1967), 100–101.

¹⁴⁴ Bahnsen, *Van Til’s Apologetic*, 485.

¹⁴⁵ Morris, *Francis Schaeffer’s Apologetics*, 116.

Transhumanism belongs to a family of humanist philosophies. But the members of such a philosophical family do not necessarily get along with one another. While transhumanism inherits from humanism and exists in parallel with posthumanism, substantial tension exists among the three.¹⁴⁶ Both transhumanism and posthumanism agree that there are problems with humanism, but they see the source of the problems differently. Posthumanism sees the root problem in humanism itself and emphasizes the racist, sexist, and colonialist tendencies within traditional humanism. Transhumanism sees the root problem in human nature and laments the stupidity, vulnerability, and mortality of human beings. Both transhumanists and posthumanists hope for a “posthuman” future, but they understand “posthuman” differently.

About a dozen distinguishable sub-movements exist within transhumanism. While they are mostly distinguished by their emphases, incompatibilities do exist among these sub-movements. One fault line is drawn over political leaning, specifically between the libertarian wing and the social-democratic wing. Another divider is drawn over the importance of biological existence, or symbolically, between the cyborg and the upload.

A foundational premise in this study is that there exists a major conceptual “problem of human evil” for secular humanism. In her seminal work *Evil in Modern Thought: An Alternative History of Philosophy*, Susan Neiman characterizes the story of modern western philosophy as a recurring effort to wrestle with evil.¹⁴⁷ Underlying the emergence of transhumanism is an attempt to find a solution to such a problem of human evil. If the classical problem of evil poses an intellectual challenge for accepting theism, one could similarly ask: why should humanism be accepted in a godless world? Given all the manmade evils that cannot be blamed on any gods – because gods do not exist

¹⁴⁶ James J. Hughes, “Problems of Transhumanism: Introduction,” *IEET*, January 14, 2010, <https://ieet.org/index.php/IEET2/more/hughes20100105/>.

¹⁴⁷ Susan Neiman, *Evil in Modern Thought: An Alternative History of Philosophy* (Princeton, NJ: Princeton University Press, 2002), 7–14.

anyway, why should we be optimistic about tomorrow if our optimism depends primarily on the goodness and the capacity of humanity?

Historians of philosophy have generally classified the problem of human evil as skepticism. In the theistic worldview, skepticism focuses naturally on God. But in a humanistic worldview, skepticism turns towards humankind. Inciting instead of dismissing skepticism, Schaeffer turned the problem of evil around to argue against the secular humanistic worldview.¹⁴⁸ As Alvin Plantinga argues even more rigorously, why should we have so much faith in human rationality when it is merely an accidental product in an undirected random evolution?¹⁴⁹ Why do we recognize so much inherent dignity in the life of every human being? Why should we care about any social good when the naturally endowed rationality seems inherently selfish?

Just as the classical problem of evil calls for theodicy, the defense of God, the problem of human evil calls for anthropodicy, the defense of Man.¹⁵⁰ As explained by Ernest Becker,

Evil had to be explained as existing in the world apart from God's intention or justification. ... As God was gradually eliminated from science as an explanatory principle, the need for a complete theodicy also finally vanished. There could be no sensible explanation for all the evil to which life is subject, apart from a belief in God- certainly no explanation that mere mortals could attain. Consequently, man had to settle for a new limited explanation, an anthropodicy which would cover only those evils that allow for human remedy.¹⁵¹

There is a long western philosophical tradition of perceiving skepticism as an enemy of reason. From the traditional perspective, the problem of human evil calls for the

¹⁴⁸ Schaeffer, *He Is There and He Is Not Silent*, 301.

¹⁴⁹ Alvin Plantinga, *Where the Conflict Really Lies: Science, Religion, and Naturalism* (New York: Oxford University Press, 2011), 307–50.

¹⁵⁰ Frederick Sontag, "Anthropodicy or Theodicy? A Discussion with Becker's 'The Structure of Evil,'" *Journal of the American Academy of Religion* XLIX, no. 2 (1981): 267–74.

¹⁵¹ Ernest Becker, *The Denial of Death* (New York: Free Press, 1973), 18.

defense of reason, or logodicy.¹⁵² Both theodicy and anthropodicy are variant forms of logodicy. If theodicy can be described as centering on the defense of God, and if anthropodicy can be described as centering on the defense of Man, then logodicy can be described as centering on the defense of reason.

According to Neiman, the supremacy of reason was never seriously challenged until the modern period. In the Neo-platonic conception, rationality is a universal reality in a higher realm.¹⁵³ Boethius defines a person as an individual substance of a rational nature, whether the person is God, Man, or an angelic being.¹⁵⁴ Kant defends the rationality of humanity by essentially taking human reason for granted as a set of transcendental categories. In the modern period, however, naturalism undercuts the universal claim of transcendental categories. Embracing naturalism, secular humanism is stuck with the growing problem of skepticism, making anthropodicy ever more difficult.

Transhumanism could be thought of as a hope-oriented anthropodicy. For the secular humanists, “God is dead” since Friedrich Wilhelm Nietzsche.¹⁵⁵ After the two world wars, humanists are not optimistic about humanity either. Schaeffer engaged with existentialists who find hope for humanism in individual freedom through the exercise of authentic creativity.¹⁵⁶ Half a century later, transhumanists may be described as

¹⁵² Mark Larrimore, “Evil and Wonder in Early Modern Philosophy: A Response to Susan Neiman,” in *Teaching New Histories of Philosophy: Proceedings of a Conference*, ed. J. B. Schneewind (Princeton, NJ: University Center for Human Values, Princeton University, 2003), 55.

¹⁵³ Edward Moore, *Internet Encyclopedia of Philosophy*, s.v. “Plotinus,” accessed August 22, 2019, <https://www.iep.utm.edu/plotinus/>.

¹⁵⁴ Boethius, *The Theological Tractates*, trans. H. F. Stewart, E. K. Rand and S. J. Tester (Cambridge, MA: Harvard University Press, 1973), 85.

¹⁵⁵ Friedrich Wilhelm Nietzsche, *The Gay Science*, trans. Thomas Common (Mineola, NY: Dover, 2012), 108, 125, 343. See also Friedrich Wilhelm Nietzsche, *Thus Spoke Zarathustra: A Book for Everyone and No One*, trans. R. J. Hollingsworth (London: Penguin, 1961), 41, 114, 250.

¹⁵⁶ Jean-Paul Sartre, *Being and Nothingness: A Phenomenological Essay on Ontology*, trans. Hazel Estella Barnes (New York: Washington Square Press, 1984), 72. See also Richard K. Fenn, *Key Thinkers in the Sociology of Religion* (London: Continuum, 2009), 12. Walter Kaufmann, *Existentialism from Dostoevsky to Sartre*, rev. and exp. (New York: Plume, 1975), 11–55.

existentialists who are especially hopeful about the technological creativity of mankind. Transhumanists hold out hope that a better tomorrow for human civilization awaits when human nature is upgraded. When the big evils of stupidity, sickness, and death are eliminated, enhanced humanity will be able to eliminate other evils in ways that we cannot even imagine today.

To answer skepticism with hope is nothing new. John Hick identifies two main streams of theodicy in the western tradition, the soul-making defense from Irenaeus and the free will defense from Augustine.¹⁵⁷ The theodicy of Irenaeus is hope-oriented. Irenaeus observes that suffering develops human virtue. Boethius' *The Consolation of Philosophy*, the most copied secular work in the middle age, sustains this hope-oriented tradition after Rome was overtaken by the barbarians.¹⁵⁸ One could read Boethius' exile from Rome as his pilgrimage home to the Neo-Platonic higher realm. In that sense, *The Consolation of Philosophy* is a defense of philosophy.¹⁵⁹ In the modern period, Hegelianism can be categorized as a kind of hope-oriented logodicy and the Process Theology of Alfred North Whitehead provides a hope-oriented theodicy.¹⁶⁰ The natural revulsion among secular humanists against speculative metaphysics limits the attractiveness of the solutions offered by Hegel and Whitehead. As materialists, secular humanists are drawn more naturally to Karl Marx and Charles Darwin. Transhumanism is an outgrowth of the Marxist-Darwinian secular humanistic tradition.¹⁶¹ Both Marxism

¹⁵⁷ John Hick, *Evil and the God of Love* (New York: Harper & Row, 1966), 278–80.

¹⁵⁸ P. G. Walsh, introduction to *The Consolation of Philosophy*, by Boethius, trans. P. G. Walsh (Oxford: Clarendon Press, 1999), xlv–xlix.

¹⁵⁹ Pierre Courcelle, *Late Latin Writers and Their Greek Sources*, trans. Harry E. Wedeck (Cambridge, MA: Harvard University Press, 1969), 322.

¹⁶⁰ David Ray Griffin, *God, Power, and Evil: A Process Theodicy* (Philadelphia: Westminster Press, 1976), 275–311.

¹⁶¹ James Steinhoff, "Transhumanism and Marxism: Philosophical Connections," *Journal of Evolution & Technology* 24, no. 2 (2014): 1–16. See also Filip Bardziński, "Transhumanism and Evolution. Considerations on Darwin, Lamarck and Transhumanism," *Ethics in Progress* 5, no. 2 (2014): 103–15.

and Darwinism in their respective ways seek to provide answers to evil. Marx seems to genuinely believe that utopia can be socially engineered.¹⁶² Darwin views the naturally endowed instinct of good and evil as no more than a facilitating mechanism for the survival of the human species.¹⁶³

Marxist perspectives in transhumanism tend to be prescriptive while Darwinian perspectives tend to be descriptive. Two different types of Christian responses are therefore needed to show that they fail as anthropodicy. Various Christian ethicists have addressed transhumanism from the perspective of human dignity and social consequences. Other Christian theologians have put forth theological critiques of transhumanism and some related movements, such as posthumanism. Most published Christian works have tended to present arguments against the prescriptive advocacies of transhumanism. Like the way Schaeffer argued against existentialism, these works scrutinize the livability of transhumanism.

To my knowledge, fewer Christian scholars have undertaken to explore the scientific and technological implausibility of transhumanism. Nevertheless, some of the most prominent transhumanist technological agenda items lack substantive scientific support. In this study, I will outline several arguments against the plausibility of transhumanism, including an argument based on the Fermi paradox which seems to me intuitively convincing: if universal Darwinism and transhumanism are both true, we should have been visited by transhuman extraterrestrial beings long ago. Given that Great

¹⁶² Thomas Molnar, "Marxism and the Utopian Theme," *Marxist Perspectives* (1978): 153–54. See also David McCord Wright, *Democracy and Progress* (New York: Macmillan, 1948), 21. Murray N. Rothbard, *An Austrian Perspective on the History of Economic Thought* (Auburn, AL: Ludwig von Mises Institute, 2006), 364–66.

¹⁶³ Alister E. McGrath, *Darwinism and the Divine: Evolutionary Thought and Natural Theology* (Oxford: Wiley-Blackwell, 2011), 157–82. See also Cornelius Hunter, *Interdisciplinary Encyclopedia of Religion & Science*, s.v. "Evolution and Theodicy," accessed August 22, 2019, <http://inters.org/Hunter-Evolution-Theodicy>.

Silence, either universal Darwinism or transhumanism has a high probability of falsehood.

In addition to understanding and arguing against transhumanism, an apologetic response to transhumanism ought to include a defense of the Christian worldview, taking advantage of notions in transhumanist discourse that have commensurable Christian correspondences. Christian apologetics should aim more than demolishing a worldview, but instead encouraging people to adopt a Christian worldview by making intelligible the rational consistency of the biblical revelation.

Some transhumanists might try to reduce the world vision choices to two alternatives: to enhance or not. They would show us, side-by-side, a picture of the miserable present human condition and a picture of enhanced post-humanity. In the posthuman future, there is endless bliss in a virtual paradise coming soon to a living room near us. “What say you?” I say neither because it is a false dichotomy. Instead of choosing the status quo of misery or the posthuman utopia, Christians see a third alternative of restoring ourselves to fully human through Jesus Christ.

The third option made known by the gospel of Jesus Christ is to be born *human* again.¹⁶⁴ Unlike transhumanists who want to be posthuman, Christians believe that we are “posthuman” enough. What we need instead is to be restored to fully human. The Book of Genesis provides us with a cautionary tale. Transhumanism has arguably been tried long before. The serpent was the original transhumanist, promising God-like knowledge to Adam and Eve (Gen 3:4-5). In trying to become superhuman, Adam and Eve managed only to lose their humanness. As a result, all people come to the world as “posthuman” because they are spiritually dead (Gen 2:17). Christians see the misery of the world precisely as caused by our “posthuman” condition. The picture of lost humanity is certainly not desirable (Gen 3:14-19) but the transhumanist dream is not a better

¹⁶⁴ Schaeffer, *He Is There and He Is Not Silent*, 301.

choice. Christians would be quite biblically illiterate if they are not suspicious that transhumanism promises no more than another bite at the forbidden fruit. Fool me once, shame on you. Fool me twice, shame on me! What we need is not to become less human. We must be born *human* again.

When I make arguments from the Christian worldview, my apologetic goal is limited to an intelligible defense. I only seek to show my reasoning to be valid given my Christian worldview. As it stands, it is the transhumanists who have a proposal wanting my buy-in. Therefore, the burden of proof is on them to ease my suspicion. They could expect to succeed only if they could demonstrate that radical human enhancement is not another hubris attempt to become God. Ironically, some transhumanists do see becoming God as part of their agenda.

The Organization of This Study

This study is guided by two underlying theses. First, I view the emergence of transhumanism as an attempted solution to what may be called the problem of human evil. The phenomenon of evil not only poses a classical problem for the theists who believe in the goodness and greatness of God, but it also produces much skepticism against secular humanism which asserts the goodness, rationality, and self-sufficiency of humankind. Transhumanists tacitly acknowledge the failure of secular humanism in establishing an anthropodicy. But they hold out hope that many evils will be eliminated as human nature is made more perfect by natural or artificial evolution.

Second, I reject the transhumanist suggestion that deliverance from evil for humankind can be found in becoming transhuman. Genesis 3 explains the misery of the human condition: in attempting to become transhuman, humans already in a sense became posthuman. Becoming posthuman has led to sin, suffering, and death. John 3 prescribes the biblical solution: deliverance is possible only when people are born human again by the work of the Spirit. In contradistinction against the transhumanist vision, the

Christian gospel points to a different answer to evil. The answer could be expressed as a kind of re-humanism, a restoration of what humanity is meant to be: the children of God, made according to the image and likeness of God.

The two main themes are developed in four chapters. Picturing the worldview apologetic approach exemplified by Schaeffer as a Y juncture engagement, I interact with transhumanists by understanding where they came from, showing where they are going to be a dead-end, and pointing them to a better way.

To understand transhumanists as worldview apologists, we need to compare their worldview with that of the secular humanists, presumably their primary interlocutors. That is the focus of chapter 1 and chapter 2. I first summarize the historical origin of transhumanism as the story was commonly told by transhumanists. Their story presents an implicit prosecution against the failure of humanity to cope with its evils. Ten sub-movements of transhumanism will be identified. Each sub-movement implicitly prosecutes a different case against the shortcoming of humanity. Then, I seek to delineate transhumanism with posthumanism, its ideological cousin. The main difference I see between posthumanism and transhumanism is that posthumanism sees the root problem of evil in humanism while transhumanism finds it in humanity. Posthumanists are critics of the Enlightenment humanist worldview. They seek to be the “other” voice in the wilderness against the ruling secular humanism. In contrast, transhumanists seek to revolutionize the world. They proclaim and defend a technological gospel that preserves the reign of secular humanism by replacing humanity with a new race.

I will identify exemplary objections to transhumanism among those coming from a secular humanist worldview as well as others with traditional religious worldviews. Most objections portray transhumanism either as a threat to humanistic values or the existence of humanity. Some critics, such as Francis Fukuyama, denounce

transhumanism as “the world’s most dangerous idea.”¹⁶⁵ Others, such as Bill Joy, fear that “the future does not need us” if transhumanism is to prevail.¹⁶⁶

I will survey several Christian responses to transhumanism. The survey reveals that most existing Christian engagements with transhumanism deal with more specific ethical or technological issues. I see those specific issues as complementary to the big-picture worldview comparison I pursue here. The approach taken by Brent P. Waters in dissecting and responding to posthumanism is perhaps where I see the most trajectorial parallel with this engagement with transhumanism. Following Oliver O’Donovan, Waters presents a Christian response to posthumanism based on faith, hope, and love.¹⁶⁷ After analyzing posthumanism in his work *From Human to Posthuman*, Waters develops a theological response, aptly summarized by the title of his follow-up work, *From Posthuman to Human*.¹⁶⁸ Re-humanism, as captured by the title *Born Human Again* is also what I advocate here as the proper Christian contradistinctive response to transhumanism. After Eden, people are posthuman enough. What we need is to become human again.

The analysis of transhumanists as worldview apologists comes in two parts. The rest of chapter 1 describes how transhumanists, as apologists playing offense, function as prosecutors of the worldview of their primary interlocutors, the secular humanists. The bulk of chapter 2 describes how transhumanists, as apologists playing

¹⁶⁵ Francis Fukuyama, “Transhumanism,” *Foreign Policy* no. 144 (2004): 42–43.

¹⁶⁶ Bill Joy, “Why the Future Doesn’t Need Us,” *Wired*, April 1, 2000, <https://www.wired.com/2000/04/joy-2/>.

¹⁶⁷ Oliver O’Donovan, *Self, World, and Time* (Grand Rapids: W. B. Eerdmans, 2013), 105–33. See also Oliver O’Donovan, *Finding and Seeking* (Grand Rapids: W. B. Eerdmans, 2014), 24–178. Oliver O’Donovan, *Entering Into Rest* (Grand Rapids: W. B. Eerdmans, 2017), 1–23, 200–229.

¹⁶⁸ Brent P. Waters, *From Human to Posthuman: Christian Theology and Technology in a Postmodern World* (Burlington, VT: Ashgate, 2006), 40–90. See also Brent P. Waters, *Christian Moral Theology in the Emerging Technoculture: From Posthuman Back to Human* (Farnham, England: Ashgate, 2014), 4, 146–58.

defense, articulate the presuppositions of transhumanism from the perspectives of moral philosophy, epistemology, the philosophy of mind, and eschatology.

To give a quick preview of chapter 2, I identify four approaches of argumentation used by transhumanists. First, from a moral approach, transhumanists argue from the pursuit of happiness. Applying utilitarian ethics, transhumanists promise that enhanced humanity will live long and prosper. Second, from an epistemological approach, transhumanists dismiss objections against transhumanism as reflecting anthropic and status quo bias. Irrational cognitive bias is an evil they seek to eliminate. Third, from a metaphysical approach, some transhumanists argue for a non-biological form of immortality. If survival is the ultimate good, death is the ultimate evil. If defeating death means we need to become post-biological, so be it they say. Fourth, from an eschatological approach, some transhumanists argue for a cosmological purpose of existence that requires a more advanced lifeform than humanity. Hence, the succession of humanity is an advance.

In chapter 3, I picture Christian apologists as playing offense against transhumanism in the arena of secular humanism. Because of the size and scope of this study, the arguments I present in chapter 3 are sketches that need further substantiation in scientific and technological details. However, in contrast to some highly optimistic claims made by transhumanists, my arguments are based on scientific theories that most secular humanists would regard as well-established. I will outline four approaches to argue against transhumanism. First, from a moral philosophical perspective, transhumanism could lead to actions and consequences that contradict widely held humanistic values. Second, from a scientific perspective, there is little known currently to support the plausibility of radical life enhancement, while much of what is scientifically known, with the Hayflick limit as an example, seems to suggest its implausibility. Third, from a metaphysical perspective, the idea of mind uploading is based on certain assumptions about consciousness and other phenomena of the human mind that are

highly controversial. The human mind does not seem like how the transhumanists imagine at all. Fourth, from an eschatological perspective, we explore the Fermi paradox, which asks why we have not observed any extraterrestrial intelligence despite its scientific probability. The Fermi paradox may be used to argue that transhumanists are either trying something unprecedented in the observable universe or that all previous similar attempts have failed. The argument implies that transhumanism is either improbable or unwise.

Chapter 4 explains why Christians holding a thoroughly biblical worldview would not find transhumanism appealing. It presents a defense of the Christian worldview. By way of rejecting “Christian transhumanism” as a form of technologically assisted *theosis*, the traditional biblical answer to the misery of human existence is explained. The answer to evil is not found in attempting to become more than human but in becoming fully human again.

A Historical Overview of Transhumanism

Bostrom’s *A History of Transhumanist Thought* is a seminal historical survey of transhumanism.¹⁶⁹ Bostrom believes that the human desire to overcome the limitation in human life and achieve happiness by achieving new capacities is as ancient as humankind itself. He cites as examples the king who quested for immortality in the Sumerian *Epic of Gilgamesh*, explorers who look for the fountain of youth, alchemists who try to create the elixir of life, and Taoists in China who seek immortality.¹⁷⁰ However, such attempts to overcome natural confines were typically viewed with ambivalences, and the stories were told as examples of hubris. Zeus severely punished

¹⁶⁹ Nick Bostrom, “A History of Transhumanist Thought,” *Journal of Evolution & Technology* 14, no. 1 (2005): 1–25.

¹⁷⁰ Stephen Mitchell, *Gilgamesh: A New English Version* (New York: Free Press, 2004), 196. See also N. K. Sandars, *The Epic of Gilgamesh: An English Version with an Introduction* (London: Penguin, 1972), 36–37.

Prometheus for stealing fire and giving it to humans, although the human condition was much improved because of fire.¹⁷¹ Similarly, the artisan Daedalus lost his son Icarus, although his crafts expanded human capacities.¹⁷²

Bostrom sees a continuation of such ambivalence towards overcoming human limitations in medieval Christianity.¹⁷³ Augustine of Hippo seems to view alchemy as an ungodly activity, although Albertus Magnus and Thomas Aquinas approve the pursuit.¹⁷⁴ Bostrom sees the Renaissance as the period when a renewed intellectual vigor overtook Europe, leading people to rely on empirical observations and independent judgment rather than religious authorities and scholastic philosophy. *The Oration on the Dignity of Man*, written by Giovanni Pico della Mirandola in 1486, is a landmark work of the Renaissance period. The *Oration* paints a picture of Man as free, capable of shaping his form, and empowered to rise above the lower forms of life to achieve the superior orders whose life is divine.¹⁷⁵ Bostrom sees the Enlightenment as a continuation of the leaning towards empiricism and away from revelation and religious authority. During the Enlightenment, people developed greater confidence in human reason. Francis Bacon's 1620 work, *Novum Organum*, advocates the use of scientific methodology rather than *a priori* reasoning to "effect all things possible," overcoming natural challenges to improve human conditions.¹⁷⁶

¹⁷¹ William Smith, *Dictionary of Greek and Roman Biography and Mythology*, s.v. "Prometheus," (Boston: Little, Brown and Co., 1849), 3:544–45.

¹⁷² William Smith, *Dictionary of Greek and Roman Biography and Mythology*, s.v. "Daedalus," (Boston: Little, Brown and Co., 1849), 1:926–29.

¹⁷³ Bostrom, "A History of Transhumanist Thought," 2.

¹⁷⁴ William R. Newman, *Promethean Ambitions: Alchemy and the Quest to Perfect Nature* (Chicago: University of Chicago Press, 2005), 50, 82, 147.

¹⁷⁵ Giovanni Pico della Mirandola, *Oration on the Dignity of Man*, trans. A. Robert Caponigri (Chicago: Regnery Gateway, 1956), xv, 5–8.

¹⁷⁶ J. M. Robertson ed., *The Philosophical Works of Francis Bacon* (London: Routledge, 1905), 712–32. See also Francis Bacon, *The New Atlantis*, Urbana, IL: Project Gutenberg, December 1, 2000, accessed May 28, 2020, <https://www.gutenberg.org/ebooks/2434>.

Bostrom sees the root of transhumanism in the rationalistic humanism of the Enlightenment. Speculations about life extension in the eighteenth century and the nineteenth century propelled advances in medicine. Nicolas de Condorcet predicts that the limit of lifespan will be eliminated. “A time will come when death would result only from extraordinary accidents or the more and more gradual wearing out vitality.”¹⁷⁷ Condorcet even worries that life itself would become a burden when illness and accident cease to exist. Similarly, Benjamin Franklin imagined a method of embalming people so that they might be brought back to life in a more distant future. Nevertheless, Franklin lamented that he lived in a century that was still “too near the infancy of science” to see such art perfected.¹⁷⁸ Bostrom views the 1859 publication of *Origin of Species* by Darwin as making conceivable the notion of changing human nature.¹⁷⁹ After Darwin, the current stage of humanity is no longer seen as a destination of evolution. As scientific physicalism gains acceptance, the conceivability of improving the human organism by technology also increases.

Julien Offray de La Mettrie’s 1750 work, *L’Homme Machine*, pictures the human being as consisting of matters obeying the same laws of physics that govern everything else observable in the universe. Like other animal kinds, the human being is essentially a “collection of springs which wind each other up.”¹⁸⁰ However, many have resisted the mechanistic theory of everything. An anti-mechanistic thought current has run from Romanticism to the contemporary movements of postmodernism, the New Age movement, deep environmentalism, and anti-globalization. Bostrom explains those

¹⁷⁷ Jean-Antoine-Nicolas de Caritat Condorcet, *Sketch for a Historical Picture of the Progress of the Human Mind*, trans. June Barraclough (London: Weidenfeld and Nicolson, 1955), 200.

¹⁷⁸ Leonard Woods Labaree and Whitfield J. Bell ed., *Mr. Franklin: A Selection from His Personal Letters* (New Haven: Yale University Press, 1956), 29.

¹⁷⁹ Charles Darwin, *On the Origin of the Species* (New York: D. Appleton and Company, 1861), 417–25.

¹⁸⁰ Julien Offray de La Mettrie, *Man a Machine* (La Salle, IL: Open Court, 1912), 135.

resistances as the Enlightenment becoming the victim of its excesses.¹⁸¹ But the essential spirit of the Enlightenment, which is the confidence in human reason according to Kant, lives on in the modern period.

Bostrom recognizes Nietzsche as an inspiration for the transhumanist movement. In *der Übermensch*, Nietzsche challenges his readers to abandon any culturally presupposed notions of what humankind is meant to be and is meant to do. He rejects the “life-sapping slave morality of Christianity.”¹⁸² Despite surface-level similarities, Bostrom sees substantial disagreements between transhumanism and the Nietzschean vision. The emphasis on individual liberties and the humanistic concern for the benefits of all sentient beings are two places where transhumanists would part way with Nietzsche. The transhumanists have drawn as much inspiration from the utilitarian philosophy of John Stuart Mill.¹⁸³

Bostrom sees other transhumanist forerunners in the early half of the twentieth century. In his 1923 work *Daedalus, or Science of the Future*, J. B. S. Haldane argues for a eugenic agenda that promises to make society wealthier and healthier.¹⁸⁴ Haldane predicts that ectogenesis, reproduction through the artificial womb, would be possible and common one day. Challenging the cultural resistance to the idea of genetic modification, he glorifies the scientific inventors as the modern-day Prometheus willing to offend some gods and to appear as blasphemous. Bostrom sees the popularity of Haldane’s seminal work as sparking a chain of discussions about the future of humankind given the rapid growth in science and technology. In his 1919 work *The World, the Flesh, and the Devil*, J. D. Bernal speculates about space colonization, bionic improvement, and

¹⁸¹ Bostrom, “A History of Transhumanist Thought,” 4.

¹⁸² Nietzsche, *Thus Spoke Zarathustra*, Prologue.

¹⁸³ Bostrom, “A History of Transhumanist Thought,” 5.

¹⁸⁴ J. B. S. Haldane, *Daedalus, or Science and the Future: A Paper Read to the Heretics, Cambridge, on February 4th, 1923* (New York: E.P. Dutton & Company, 1924), 63–67.

mental improvements.¹⁸⁵ In his 1924 work *Icarus: the Future of Science*, Bertrand Russell warns that technology would increase our ability to hurt one another without more human kindness.¹⁸⁶ In his 1932 work *Brave New World*, Aldous Huxley depicts a dystopian caste society where children are manufactured by fertility clinics through ectogenesis and raised to conform to the caste-based societal order through indoctrination.¹⁸⁷ In *Nineteen Eighty-Four*, George Orwell imagines a police state where Big Brother controls the population through omnipresent surveillance and coercion.¹⁸⁸ Bostrom sees transhumanists inspired by such imaginative writings in two ways. On one hand, such imaginative writings give concrete illustrations of the technologies that transhumanists envision and spell out why society might want such technologies developed. On the other hand, these writings also serve as cautionary tales and help identify the societal risks if the technologies are deployed without careful examination of the consequences.¹⁸⁹

Bostrom sees transhumanist thoughts as influenced by the history of eugenic politics in the early decades of the 20th century. He explains the historical rise of the eugenic political movement as the convergence of racists, right-wing ideologues, and left-leaning social progressives who are all concerned about the quality of the human gene pool as social safety nets expand. Between 1907 and 1963, 64,000 individuals in the USA, Canada, England, Australia, Sweden, Denmark, and Switzerland were forcibly sterilized, including people who were mentally disabled, deaf, blind, epileptic, physically

¹⁸⁵ J. D. Bernal, *The World, the Flesh and the Devil: An Enquiry into the Future of the Three Enemies of the Rational Soul* (Bloomington: Indiana University Press, 1969), 61–81.

¹⁸⁶ Bertrand Russell, *Icarus, Or, the Future of Science* (New York: E.P. Dutton & Company, 1924), 61–64.

¹⁸⁷ Aldous Huxley, *Brave New World* (New York: Perennial Classics, 1998), 7–29.

¹⁸⁸ George Orwell, *1984: A Novel* (New York: New American Library, 1983), 178–94.

¹⁸⁹ Bostrom, “A History of Transhumanist Thought,” 5–7.

deformed, orphaned, and homeless. Still, the forced sterilization pales in comparison to the German eugenics program, which led to the demise of millions of people deemed inferior by the Nazis. The Rwandan genocide of 1994, which saw 800,000 slaughtered, serves as a reminder that racial hate crime remains a reality of human society. Overall, the historical lesson of eugenics inspires strong skepticism towards state-controlled social engineering.¹⁹⁰

To minimize state control, technological tools that promise to empower the users with enhanced capacity and freedom seem less risky to Bostrom. Space travel, medicine, and computers are examples of such safer technological tools.¹⁹¹ However, authoritarian states could exploit or weaponize even safer technological to tighten the grasp of the ruling class. For example, robots that are made to serve the interest of their masters could be regarded as personal technological tools. But like any tools, robots could be a power-multiplier for authoritarian states.

Robots that are endowed with a high degree of autonomy, which means obeying nobody but its program, could conceivably be a threat to human survival.¹⁹² As early as 1921, the risk of robots destroying their human creators was illustrated in the fictional play *R. U. R.* by Karel Čapek and Claudia Novack, who coined the word “robot.”¹⁹³ Still, enthusiasts of science and technology show more faith in the benevolence of robot makers than robot owners. Despite its existential risks, the idea of creating machines that can reason and act like human beings by attaining human-level artificial general intelligence (AGI) is popularly received.

In his 1950 essay “Computing Machinery and Intelligence,” A. M. Turing

¹⁹⁰ Bostrom, “A History of Transhumanist Thought,” 6.

¹⁹¹ Bostrom, “A History of Transhumanist Thought,” 12.

¹⁹² Bostrom, “A History of Transhumanist Thought,” 8.

¹⁹³ Karel Čapek and Claudia Novack, *R.U.R. (Rossum's Universal Robots)* (London: Penguin, 2004), xi–xxv.

proposes an operational definition of human-level intelligence, now known as the Turing Test.¹⁹⁴ The test requires an interview between a computer and a human interviewer via a text interface. The computer is said to pass the test if the human interviewer cannot reliably distinguish whether the other side is a computer or a human being. Bostrom observes that much discussion in the field of AI has historically revolved around the Turing Test and two related questions. First, does the Turing Test necessarily or sufficiently measure the intelligence of a machine? Second, when will the Turing Test be passed generally? On the first question, one issue with the Turing Test is that an intelligent computer answering all the questions of human interviewers correctly might seem too knowledgeable to be human. Should that count against its intelligence? On the second question, Bostrom observes that most predictions by early AI researchers turned out to be too optimistic. Nevertheless, many AI researchers still believe that human-level artificial intelligence is attainable one day. Leading transhumanists such as Marvin Minsky, Hans Moravec, Kurzweil, and Bostrom himself have predicted that human-level AGI will arrive within the first half of the twenty-first century.¹⁹⁵

Some transhumanists view the arrival of human-level AGI as a watershed moment of human civilization. The moment will be followed soon by a Singularity in history beyond which the world could not possibly continue as we know it today. Stanislaw Ulam recalled in 1958 a conversation he had with John von Neumann about such a disruptive singular event in history due to a confluence of disruptive technological innovations.¹⁹⁶ Human-level AGI is one of the several technological innovations Ulam

¹⁹⁴ A. M. Turing, "Computing Machinery and Intelligence," *Mind* 59, no. 236 (1950): 433–60.

¹⁹⁵ Marvin Minsky, "Will Robots Inherit the Earth?" *Scientific American* 271, no. 4 (1994): 108. See also Hans Moravec, *Mind Children: The Future of Robot and Human Intelligence* (Cambridge, MA: Harvard University Press, 1988), 68. Nick Bostrom, "How Long Before Superintelligence?" *International Journal of Futures Studies* 2 (1998): 1–14. Nick Bostrom, "When Machines Outsmart Humans," *Futures* 35 (2003): 759–64.

¹⁹⁶ Stanislaw Ulam, "John von Neumann 1903-1957," *Bulletin of the American Mathematical Society* 64, no. 3 (1958): 1–49.

and von Neumann discussed as related to Singularity. The direct conceptual linkage between human-level AGI and Singularity was suggested by Irving John Good in 1965 when he defined an “ultraintelligent machine” as something that can “far surpass all the intellectual activities of any man however clever.”¹⁹⁷ Since the design of ultraintelligent machines is itself a human intellectual activity, Good argues analogically that an ultraintelligent machine could have the ability to design something more intelligent than itself. He concludes that the first ultraintelligent machine is the last human invention. Following the reasoning of Good and observing the exponential growth of technologies, Vernor Vinge predicted in 1993 that superhuman intelligence will arrive in less than thirty years and will be followed soon by a “technological singularity” that will mark the end of the “human era.”¹⁹⁸

Bostrom observes that transhumanists hold different views about the possibility, the timing, and the significance of the arrival of human-level AGI. Some see the impact to be more gradually felt. Others disagree with the Singularity hypothesis.¹⁹⁹ Some follow the writings of Pierre Teilhard de Chardin and envision the emergence of a noosphere, which may be described as some sort of global consciousness made up of a worldwide web of minds.²⁰⁰ Some follow Frank J. Tipler’s prediction that an advanced civilization in the future might make use of the tremendous computational power at their disposal to bring back what happened in the universe, bringing about the virtual

¹⁹⁷ Irving John Good, “Speculations Concerning the First Ultraintelligent Machine,” in *Advances in Computers*, ed. Franz L. Alt and Morris Rubinfeld (New York: Academic Press, 1966), 6:31–88.

¹⁹⁸ Vernor Vinge, “Technological Singularity,” in *The Transhumanist Reader*, ed. Max More and Natasha Vita-More (Chichester, UK: Wiley-Blackwell, 2013), 365–75.

¹⁹⁹ Bostrom, “A History of Transhumanist Thought,” 10.

²⁰⁰ Pierre Teilhard de Chardin, *The Future of Man*, trans. Norman Denny (New York: Image Books, 2004), 149–78.

resurrection of the dead.²⁰¹ While there are small followings of such futuristic visions, Bostrom does not see them as representing the mainstream of transhumanism. These visions merely form the backdrop of big-picture questions that point transhumanists to a sober and “disinterested investigation using critical reason and best available scientific evidence.”²⁰²

Nanoscale assemblers and mind uploading are two important items on the transhumanist technological agenda. In his 1986 work *Engines of Creation*, K. Eric Drexler argues for the feasibility of nanoscale universal assemblers that can be used to arrange atoms in any imaginable ways, leading to the manufacturing of anything from more efficient fuels, stronger materials, faster computer chips, replacement materials for biological tissues, to cancer-fighting nanobots.²⁰³ In his 1992 work *Nanosystems* based on his doctoral dissertation, Drexler provides a more detailed technical analysis that further substantiated his earlier argument.²⁰⁴ Although Drexler’s universal assemblers had never be realized and were dismissed as science fiction by some of his peers, his advocacy helped popularize the concept of nanotechnology among the transhumanist community.

Mind uploading refers to the idea of transferring the human mind to a computer.²⁰⁵ Three steps are supposedly involved. First, a three-dimensional scan of a human brain is produced with the assistance of nanobots probing deep into the neural

²⁰¹ Frank J. Tipler, *The Physics of Immortality: Modern Cosmology, God, and the Resurrection of the Dead* (New York: Anchor Books, 1994), 217–40.

²⁰² Bostrom, “A History of Transhumanist Thought,” 10.

²⁰³ K. Eric Drexler, *Engines of Creation: The Coming Era of Nanotechnology* (New York: Anchor Books, 1986), 12–16, 45–54.

²⁰⁴ K. Eric Drexler, *Nanosystems: Molecular Machinery, Manufacturing, and Computation* (New York: Wiley, 1992), 469–88.

²⁰⁵ Anders Sandberg and Nick Bostrom, *Whole Brain Emulation: A Roadmap*, Technical Report #2008-3 (Future of Humanity Institute, Oxford University, 2008), 7.

networks. Second, a neural network model is constructed based on the scans and certain functional models of the neurons.²⁰⁶ Third, a sufficiently powerful supercomputer is used to emulate the operation of the neural network based on the scanned model.²⁰⁷ Many transhumanists believe all three steps to be technologically feasible someday in the future, although they hold different philosophical opinions on the utility and significance of mind emulation.²⁰⁸ Some see mind uploading as a pathway for digital personal immortality, contending that self-consciousness will emerge in the computer emulation of the human mind. Others see mind uploading as worthwhile even if it only achieves functional emulation of certain aspects of the human mind. They suggest that the emulated mind can serve as a shortcut to bring about human-level AGI, thereby hastening the arrival of Singularity.

Immortality is an essential technological objective of transhumanism. Robert C. W. Ettinger's 1962 publication of *The Prospect of Immortality* helps launched the modern cryonics movement.²⁰⁹ Since chemical reactions would stop at low temperatures, Ettinger argues that freezing a person's body in liquid nitrogen would preserve the body until technologies are advanced enough to bring the person back to life.

F. M. Esfandiary, who changed his name to FM-2030, was recognized by some as an early transhumanist. In his 1989 work *Are You a Transhuman?*, FM-2030 describes transhuman as a "transitional human" who anticipates the coming posthuman age by

²⁰⁶ Patricia S. Churchland and Terrence J. Sejnowski, *The Computational Brain* (Cambridge, MA: MIT Press, 1992), 125–39. See also Gualtiero Piccinini, "The Mind as Neural Software? Understanding Functionalism, Computationalism, and Computational Functionalism," *Philosophy and Phenomenological Research* 81, no. 2 (2010): 296–302.

²⁰⁷ Jingtao Fan et al., "From Brain Science to Artificial Intelligence," *Engineering* 6, no. 3: 248–52.

²⁰⁸ Bostrom, "A History of Transhumanist Thought," 11.

²⁰⁹ Robert C. W. Ettinger, *The Prospect of Immortality* (Garden City, NY: Doubleday, 1964), 9–59.

technology usage, cultural values, and lifestyle.²¹⁰ The traits of transhuman identified by FM-2030 are multifaceted, including anything from plastic surgery, heavy use of telecommunication, assisted reproductive technologies, to the absence of religious beliefs and rejection of traditional family values. While acknowledging FM-2030's historical influence, Bostrom suggests that most transhumanists today will go beyond FM-2030's lifestyle definition of transhuman.²¹¹

Bostrom also denies that most transhumanists would identify with the far-fetched ideas espoused by various fringe groups cataloged by Edward Regis in his 1990 work *Great Mambo Chicken and the Transhuman Condition*:

They wanted to re-create Creation. They wanted to make human beings immortal – or, failing that, they wanted to convert humans into abstract spirits that were by nature deathless. They wanted to gain complete control over the structure of matter, and they wanted to extend mankind's rightful sovereignty out across the solar system, into the Galaxy, and out into the rest of the cosmos. An imposing enterprise, to be sure, but that was the way of science and technology during these bold days of fin-de-siecle hubristic mania. Fin-de-siecle hubristic mania was the desire for perfect knowledge and total power. The goal was complete omnipotence: the power to remake humanity, earth, the universe at large. If you're tired of the ills of the flesh, then get rid of the flesh: we can do that now. If the universe isn't good enough for you, then remake it, from the ground up.²¹²

Bostrom insists that there is a clear difference between scientists pursuing research in cutting-edge engineering and backyard experimentation of psychedelic drugs. There is also a clear difference between discourses among academically trained philosophers and grassroots organizations that sprang up to promote hypothetical technologies found only in science fiction.

More coined the word extropianism and includes in its definition the emphases of boundless expansion, self-transformation, dynamic optimism, intelligent technology,

²¹⁰ FM-2030, *Are You a Transhuman? Monitoring and Stimulating Your Personal Rate of Growth in a Rapidly Changing World* (New York: Warner Books, 1989), 202–5.

²¹¹ Bostrom, “A History of Transhumanist Thought,” 14.

²¹² Edward Regis, *Great Mambo Chicken and the Transhuman Condition: Science Slightly Over the Edge* (Reading, MA: Addison-Wesley, 1990), 7.

and spontaneous order. Bostrom sees extropianism as the first definition of transhumanism in its modern sense.²¹³ The *Extropy Magazine* first published in 1988 and the Extropy Institute founded in 1992 were both established as forums to bring about serious discussion of human enhancement by technology. Other noted early extropians include Anders Sandberg, Alexander Sasha Chislenko, Hal Finney, and Robin Hanson.

In 1998, Bostrom and David Pearce co-founded the World Transhumanist Association (WTA) to make the transhumanist movement more acceptable to academia. The association was founded with two founding documents, *The Transhumanist Declaration* and *the Transhumanist F.A.Q. (v.1.0)*, which together summarize the consensus of the members of the transhumanist movement at the time.²¹⁴

Pearce also develops a strain of transhumanism based on a utilitarian ethic. Called *Hedonistic Imperative*, Pearce advocates the prioritization of paradise engineering as a transhumanist agenda, intending to eliminate all suffering using pharmaceuticals or neuro-technology.²¹⁵

With James J. Hughes joining the WTA as its secretary in 2001, WTA adopted a constitution and began building up an international network of volunteers. Within a few years, WTA grew to a membership of over 3000.²¹⁶ To address narrower issues, other related organizations have emerged. One example is the Institute for Ethics and Emerging Technologies (IEET), which is founded in 2004 to focus on the ethical use of

²¹³ Bostrom, “A History of Transhumanist Thought,” 15.

²¹⁴ *H+Pedia*, s.v. “Transhumanist Declaration,” last modified March 9, 2019, https://hpluspedia.org/wiki/Transhumanist_Declaration. See also *H+Pedia*, s.v. “Transhumanist FAQ,” last modified December 30, 2016, https://hpluspedia.org/wiki/Transhumanist_FAQ.

²¹⁵ David Pearce, *The Hedonistic Imperative* (self-pub., Amazon Digital Services, 2015), Section 1.1–1.6, 1.11–1.13, 4.27–4.35, Kindle.

²¹⁶ Bostrom, “A History of Transhumanist Thought,” 16.

technologies to enhance human capacities.²¹⁷

Bostrom sees a fair number of ethical issues related to transhumanism as falling under the rubric of bioethics. As an example, the controversy surrounding eugenics constitutes the mainstay of the transhumanist discussion of ethics. The *Nuremberg Code* in 1947 and the *Declaration of Helsinki* in 1964 supply the most significant historical backdrops of contemporary bioethics, resulting from the universally condemned experimentation of human subjects by the Nazis.²¹⁸ Other issues related to life-support, organ donation, resource allocation, abortion, consent approval, and advance directives also influenced the formation of the field of bioethics. Nevertheless, Bostrom grades the scholarship of bioethics as underwhelming as the field lacks a clear methodology.²¹⁹ Drawing theologians, legal scholars, physicians, philosophers, and various advocacy groups as its discussion participants, the field of bioethics seems to be burgeoning only because of the necessity to provide some practical guidelines to students and practitioners in the medical field. Some incoherent standards are better than no standard, if only because healthcare providers need to market a commitment to the highest ethical standards of care.

Bostrom cites works by Derek Parfit, Jonathan Glover, Peter Singer, and John Rawls as supplying a theoretical foundation for transhumanist bioethical discussion. In his 1984 work *Reasons and Persons*, Parfit articulates a personal identity theory and a foundational ethical theory.²²⁰ The question of personal identity is pertinent to modifying

²¹⁷ Nick Bostrom and James J. Hughes, "Institute for Ethics and Emerging Technologies," *IEET*, accessed August 22, 2019, <https://ieet.org/>.

²¹⁸ Evelyn Shuster, "Fifty Years Later: The Significance of the Nuremberg Code," *New England Journal of Medicine* 337, no. 20 (1997): 1436–40. See also World Medical Association, "Declaration of Helsinki: Ethical Principles for Medical Research Involving Human Subjects," *Bulletin of the World Health Organization* (2001): 373–74.

²¹⁹ Bostrom, "A History of Transhumanist Thought," 17.

²²⁰ Derek Parfit, *Reasons and Persons* (Oxford: Clarendon Press, 1984), 321–47.

human nature or mind uploading. Parfit also deals with topics such as population ethics, person-affecting moral principles, and duties to future generations that are relevant to transhumanism. Addressing technology-enabled human transformation specifically in his 1984 work *What Sort of People Should There Be?* Glover concludes that some aspects of human nature might not be worth preserving and could conceivably be candidates for modifications by technology.²²¹ Bostrom sees the analysis by Glover as “well ahead of its time.” Some transhumanists embrace and extend the “preventive principle” proposed by Singer, who sees it as the right of parents to prevent certain undesirable conditions of their newborns.²²² For example, J. Savulescu argues for “procreative beneficence” which gives prospective parents the right to select the kinds of children they could have.²²³ Allen E. Buchanan, Dan Brock, Norman Daniels, and Daniel Wikler apply the Rawlsian concept of distributive justice in their 2000 work *From Chance to Choice*, where they make it an obligation for parents to remedy disabilities in their children.²²⁴ They argue that it would not be fair for their children to be born with a disability if the parents can prevent it. Taking the idea of distributive justice even further, Gregory Stock and Harris argue that the current human nature would feel like a disability when compared to the enhanced human nature of posthuman. The biological enhancement of human nature would then be a moral imperative.²²⁵

²²¹ Jonathan Glover, *What Sort of People Should There Be?* (Harmondsworth, England: Penguin, 1984), 178–89.

²²² Peter Singer, “Shopping at the Genetic Supermarket,” in *Asian Bioethics in the 21st Century*, ed. Sang-yong Song, Young-Mo Koo and Darryl R. J. Macer (Christchurch, New Zealand: Eubios Ethics Institute, 2003), 143–56.

²²³ J. Savulescu, “Procreative Beneficence: Why We Should Select the Best Children,” *Bioethics* 15, no. 5-6 (2001): 413–26.

²²⁴ Allen E. Buchanan et al., *From Chance to Choice: Genetics and Justice* (Cambridge: Cambridge University Press, 2000), 204–303.

²²⁵ Gregory Stock, *Redesigning Humans: Our Inevitable Genetic Future* (Boston: Houghton Mifflin, 2002), 185–92. See also Gregory Stock, “The Battle for the Future,” in *The Transhumanist Reader*, ed. Max More and Natasha Vita-More (Chichester, UK: Wiley-Blackwell, 2013), 302–16. Harris, *Enhancing Evolution*, 91–96.

Bostrom believes that transhumanist advocacy would make more sense when people are willing to explore the “larger space of possible modes of being.”²²⁶ In other words, people need to realistically imagine themselves to be enhanced human beings before they can appreciate the advantages of the posthuman ways of living, thinking, feeling, and relating. Bostrom believes that it would then be sensible to speak of a broader conception of human dignity which can accommodate “posthuman dignity.” People would fail to appreciate the alternative modes of being unless they consciously work on eliminating the “status quo bias” found often in bioethics.

Eliezer S. Yudkowsky argues that simple rule-based injunctions, such as Isaac Asimov’s three laws of robotics, would be insufficient in safeguarding artificial superintelligence from making decisions that lead to deadly unintended consequences.²²⁷ Instead, artificial superintelligence needs to find the optimal goals by considering also the dynamic characteristics of what Bostrom calls “the possible modes of being” of enhanced human beings.²²⁸ Beyond the normative questions, other questions about the nature and the timing of superintelligence ought to be discussed. In his 1989 work *Mind Children* and 1999 work of *Robot*, Moravec explores some negative possibilities with the emergence of artificial superintelligence.²²⁹ Kurzweil’s 1999 bestseller *The Age of Spiritual Machines* introduces some of the issues to a wider audience.²³⁰

Doomsday scenarios could also arise as unintended consequences because of the pursuit of nanotechnology or genetic engineering. Drexler has considered scenarios

²²⁶ Bostrom, “A History of Transhumanist Thought,” 19.

²²⁷ Eliezer S. Yudkowsky, *Coherent Extrapolated Volition* (San Francisco: Machine Intelligence Research Institute, 2004), 176–201.

²²⁸ Bostrom, “A History of Transhumanist Thought,” 20.

²²⁹ Moravec, *Mind Children*, 125–46. See also Hans Moravec, *Robot: Mere Machine to Transcendent Mind* (New York: Oxford University Press, 1999), 127–62.

²³⁰ Ray Kurzweil, *The Age of Spiritual Machines: When Computers Exceed Human Intelligence* (New York: Viking, 1999), 256–57.

popularly known as “gray goo,” where self-replicating assemblers get out of control.²³¹ Robert A. Freitas Jr. and Ralph C. Merkle have further investigated the kinematics of self-replicating systems.²³² Bostrom catalogs a list of conceivable existential risks that would “either annihilate Earth-originating intelligent life or permanently and drastically curtail its potential.”²³³ In a much-cited 2000 article published on *Wired* titled “Why the Future Doesn’t Need Us,” Bill Joy warns about the risk of nanotechnology, genetic engineering, and AI.²³⁴ Joy recommends banning research and development altogether. Few responders dismiss the risks Joy identified, but some argue that a legal ban would only drive the development underground and lead to even greater risk.

Hughes sees bioethical ideologies becoming positions in biopolitics, joining cultural and economic politics as a third dimension of the social opinion space.²³⁵ He advocates democratic transhumanism, which combines transhumanist biopolitics with democratic economic politics and liberal cultural politics. He sees political opponents from the left and the right. From the left, ecofeminists are opponents to transhumanism because they view transhumanism as an extension of a patriarchal tradition that subjects mother nature and “the others” to exploitation.²³⁶ Seeing such opponents from the left as descendants of the romanticists and the Luddites, Hughes notes that other radical

²³¹ K. Eric Drexler, *Engines of Creation*, 146–47.

²³² Robert A. Freitas Jr. and Ralph C. Merkle, *Kinematic Self-replicating Machines* (Georgetown, TX: Landes Bioscience, 2004), 104.

²³³ Bostrom, “A History of Transhumanist Thought,” 21. See also Nick Bostrom, “Existential Risks: Analyzing Human Extinction Scenarios and Related Hazards,” *Journal of Evolution & Technology* 9, no. 1 (2002): 2.

²³⁴ Joy, “Why the Future Doesn’t Need Us.”

²³⁵ James J. Hughes, “Democratic Transhumanism 2.0,” *Changesurfer Consulting* (blog), accessed October 23, 2018, <http://www.changesurfer.com/Acad/DemocraticTranshumanism.htm>. See also James J. Hughes, “The Politics of Transhumanism,” *Changesurfer Consulting* (blog), 2002-03, <http://www.changesurfer.com/Acad/TranshumPolitics.htm>.

²³⁶ James J. Hughes, *Citizen Cyborg: Why Democratic Societies Must Respond to the Redesigned Human of the Future* (Cambridge, MA: Westview Press, 2004), xv.

feminists and postgenderists have nonetheless embraced transhumanism.²³⁷ From the right, most cultural conservatives view transhumanism as incompatible with the various understandings of human dignity, infringing on human limitations, equality, and exclusiveness. As a prominent representative, Leon R. Kass suggests that technological modifications of human nature are dehumanizing because they undermine the traditional meanings of being human.²³⁸ Kass sees wisdom in rejecting body modification technologies simply because of its “yuck factor,” a gut feeling of revulsion.²³⁹ Fukuyama approaches the idea of human dignity from the angle of equality. Fukuyama contends that liberal democracy stands on the assumption that all members of a democratic society share a common human nature, giving them equal moral, rational, and other capacities. The notion of equal protection before the law crumbles when that equality cannot be taken for granted.²⁴⁰ George J. Annas, Lori B. Andrews, and Rosario M. Isasi have proposed legislatures against germline modification, arguing that human dignity is exclusive to humanity.²⁴¹ They believe that germline modification would lead to the creation of a posthuman species. If germline modification results in the extinction of the current human species, then it is, by definition, a genocide and a crime against humanity. Even if germline modification does not eliminate humankind, there is no guarantee that the posthuman species will live peacefully with humanity. Posthumans might conceivably treat unenhanced humans with no more dignity than humans treat other great

²³⁷ George Dvorsky and James J. Hughes, “Postgenderism: Beyond the Gender Binary,” *IEET*, March 20, 2008, <https://archive.ieet.org/articles/dvorsky20080320.html>.

²³⁸ Leon R. Kass, “Ageless Bodies, Happy Souls: Biotechnology and the Pursuit of Perfection,” *The New Atlantis* no. 1 (2003): 9–28.

²³⁹ Leon R. Kass, “The Wisdom of Repugnance: Why We Should Ban the Cloning of Humans,” *The New Republic* 216, no. 22 (1997): 17–26.

²⁴⁰ Francis Fukuyama, *Our Posthuman Future: Consequences of the Biotechnology Revolution* (New York: Farrar, Straus and Giroux, 2002), 153–77.

²⁴¹ George J. Annas, Lori B. Andrews and Rosario M. Isasi, “Protecting the Endangered Human: Toward an International Treaty Prohibiting Cloning and Inheritable Alterations,” *American Journal of Law & Medicine* 28, no. 2-3 (2002): 155, 169–74.

apes today.²⁴²

Key Sub-movements of Transhumanism

We briefly survey ten sub-movements of transhumanism here as they are illustrative of the different emphases within the community. The categorization of transhumanism into ten sub-movements here was based on Hank Pellissier's 2015 article, "There Are [at Least] Ten Different Philosophical Categories; Which One(s) Are You?"²⁴³

Extropianism. An early version of transhumanism advocated by More through his "Principles of Extropy" seeks to codify proactive, life-affirming, and life-promoting ideas through emphasizing (1) perpetual progress, (2) self-transformation, (3) practical optimism, (4) intelligent technology, (5) open society in information and democracy, (6) self-direction, and (7) rational thinking.²⁴⁴ The emphasis of perpetual progress seeks to modify humankind physically, intellectually, and psychologically while rejecting the traditional belief that human nature should be left fundamentally unchanged to conform to what is natural or God's will. The emphasis of self-transformation aims at growth "not chained by any dogma, whether religious, political, or intellectual." Practical optimism places confidence in self-initiative and efforts, rather than passive faith in higher power and beings. Emphasizing intelligent technology means rejecting mysticism and favoring technology over prayer. Open society in information and democracy empowers free

²⁴² Lori B. Andrews, *Future Perfect: Confronting Decisions about Genetics* (New York: Columbia University Press, 2001), 130–50.

²⁴³ 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>.

²⁴⁴ The original version of the Extropian principles can be found in Max More, "The Extropian Principles," *Extropy* no. 6 (1990): 17–18. The updated (2003) version can be found in Max More, "The Principles of Extropy: Version 3.11," October 15, 2013, <https://lifeboat.com/ex/the.principles.of.extropy>. See also Ed Regis, "Meet the Extropians," *Wired*, October 1, 1994, <https://www.wired.com/1994/10/extropians/>.

individuals to take charge of their own lives through diverse values, lifestyle preferences, and approaches to solving problems. Leaning on self-direction means independent judgment in religion, politics, morals, and relationships. The emphasis of rational thinking affirms reason, critical inquiry, and intellectual independence while rejecting revelation, authority, or emotion as sources of knowledge.

Hughes describes extropianism as an earlier libertarian-leaning form of transhumanism and is exemplified by the Seasteading Institute co-founded by Peter Thiel.²⁴⁵ Bostrom observes that More has since distanced himself from the most extreme form of libertarian transhumanism, although most extropians remain staunchly libertarian.

More sees extropianism not as a comprehensive philosophy or worldview, but rather, as a context akin to a belief system, ideology, institution, or tradition.²⁴⁶ Breki Tomasson and Pellissier outline extropism, a development of extropianism, in *The Extropist Manifesto*.²⁴⁷ The acronym extropism stands for (1) endless extension, (2) transcending restricting, (3) overcoming property, (4) intelligence, and (5) smart machines.

Libertarian transhumanism. Although identifying themselves as transhumanists, most extropians continue to lean libertarian.²⁴⁸ Zoltan Istvan, a presidential candidate for the Transhumanist Party in 2016, insists that transhumanism

²⁴⁵ James J. Hughes, “The Politics of Transhumanism and the Techno-Millennial Imagination, 1626-2030,” *Zygon* 47, no. 4 (2012): 757–76. See also Patri Friedman and Peter Thiel, “The Seasteading Institute,” accessed August 25, 2019, <https://www.seasteading.org>.

²⁴⁶ Max More, “The Principles of Extropy: Version 3.11,” October 15, 2013, <https://lifeboat.com/ex/the.principles.of.extropy>.

²⁴⁷ Max More, “The Extropist Manifesto,” *The Extropist Examiner* (blog), 1998, <http://extropism.tumblr.com/post/393563122/the-extropist-manifesto>.

²⁴⁸ *H+Pedia*, s.v. “Libertarian Transhumanism,” accessed October 24, 2018, https://hpluspedia.org/wiki/Libertarian_transhumanism.

and libertarianism have much in common. Istvan believes that transhumanists today could not achieve their goals mostly due to prohibition by the government.²⁴⁹ In his 2013 novel *The Transhumanist Wager*, Istvan postulates a seasteading city called Transhumania where transhumanist scientists can pursue their research outside of political intrusion.²⁵⁰ The Seasteading Institute could be described as aiming at bringing Transhumania into the real world.²⁵¹

Critics of libertarian transhumanism inside and outside the transhumanist movement have focused on socioeconomic injustice that might emerge from human enhancement technologies, which would likely be disproportionately beneficial to the rich, a condition Bill McKibben describes as a “genetic divide.”²⁵² Roland Benedikter, Katja Siepmann, and Annabella McIntosh describe Istvan’s “teleological egocentric functionalism” as the philosophy of becoming an omnipotender, “the elite transhumanism champion, the ideal and zenith of life extension and human enhancement populace.”²⁵³ In response, libertarian transhumanists insist that such an omnipotender presents no threat to others provided that the society remains politically liberal. Ronald Bailey argues that the guarantee of equal rights for all before the law and the tolerance of individual differences serves as legal constraints for enhanced humans, who might otherwise trample on the

²⁴⁹ Zoltan Istvan, “Transhumanists and Libertarians Have Much in Common,” *HuffPost*, July 5, 2014, https://www.huffpost.com/entry/transhumanism-and-libertarianism_b_5248966.

²⁵⁰ Zoltan Istvan, *The Transhumanist Wager* (Reno, NV: Futurity Imagine Media, 2013), 1.

²⁵¹ James Anderson, “Introduction to Libertarian Transhumanism,” April 16, 2014, <https://transhumanism.liberty.me/introduction-to-libertarian-transhumanism/>.

²⁵² Bill McKibben, “Designer Genes,” *Orion Magazine*, accessed August 23, 2019, <https://orionmagazine.org/article/designer-genes/>. See also Bill McKibben, *Enough: Staying Human in an Engineered Age* (New York: H. Holt, 2004), 26, 37–38.

²⁵³ Roland Benedikter, Katja Siepmann and Annabella McIntosh, “Zoltan Istvan’s ‘Teleological Egocentric Functionalism’: A Libertarian Philosophical Basis for ‘Transhumanist’ Politics,” July 2, 2015, <https://transpolitica.org/2015/07/02/zoltan-istvans-teleological-egocentric-functionalism-a-libertarian-philosophical-basis-for-transhumanist-politics/>. See also Istvan, *The Transhumanist Wager*, 33.

rights of unenhanced humans.²⁵⁴ He observes that there have been technologically advanced groups who see other peoples as inferior savages in history. Liberal political institutions have restrained technologically superior groups from eradicating others.

Anarcho-transhumanism. Taking libertarian transhumanism to its most radical form, anarcho-transhumanism seeks to resist all types of natural or manmade limitations by distributing privileged knowledge, giving reproductive choices, freeing people from genetic inheritance, constraining government power, and abolishing public privacy.²⁵⁵

The online journal Anarcho-Transhumanism is subtitled “a journal of radical possibility & striving.”²⁵⁶ Anarcho-transhumanists apply technologies at every level to defeat the domination of socialist statist. They view democratic and progressive transhumanists as “politically naïve at best and dangerous as hell at worst.”²⁵⁷

Cryptography is a technology priority in the mind of anarchists. Blockchain, the underlying software enabling the Bitcoin crypto-currency, is an example of technologies that are well received by anarcho-transhumanists. As a currency, Bitcoin has the advantage of not being issued and controlled by a national state. As a software

²⁵⁴ Ronald Bailey, “Transhumanism: The Most Dangerous Idea? Why Striving to be More Than Human Is Human,” *Reason*, August 25, 2004, <http://reason.com/archives/2004/08/25/transhumanism-the-most-dangero>.

²⁵⁵ *H+Pedia*, s.v. “Anarcho-Transhumanism,” last modified August 9, 2018, <https://hpluspedia.org/wiki/Anarcho-transhumanism>.

²⁵⁶ Kate Mulich, Nathan B. and William Gillis ed., “Anarcho-Transhuman,” *Anarcho-Transhuman: a Journal of Radical Possibility & Striving*, accessed November 2, 2018, <http://anarchotranshuman.org/>.

²⁵⁷ Accelerating Anarchism, “What’s All This about Anarchism and Transhumanism?” An Anarcho-Transhumanist FAQ, accessed November 2, 2018, <http://blueshifted.net/faq/#1>.

platform, Blockchain provides instant verifiable information sharing.²⁵⁸

Immortalism. The extreme extension of lifespan, known as immortalism, is a key item on the transhumanist agenda.²⁵⁹ The term was introduced by the *Immortalist* journal published by the Immortalist Society and popularized by Alan Harrington’s 1997 work *The Immortalist*.²⁶⁰ The Immortalist Society, co-founded by Ettinger in 1967, was initially named the Cryonics Society of Michigan. Ettinger contended in his 1962 work *The Prospect of Immortality* that personal and physical immortality is probable because human corpses could be preserved indefinitely with essentially no deterioration at very low temperatures. Advances in medical science will fix most damages to the human body.²⁶¹ In 1976, Ettinger and others formed the Cryonics Institute to provide cryonics services to the public at an affordable cost.²⁶²

More leads the Alcor Life Extension Foundation, which claims to be the world leader in cryonics. Using ultra-cold temperature to preserve human bodies, Alcor claims that the preserved bodies “can be healed and resuscitated in the future using more advanced medical technologies.”²⁶³

Harrington argues in *The Immortalist* that “death is an imposition on the

²⁵⁸ William Gillis, “What Is Anarcho-Transhumanism?” *Human Iterations* (blog), January 6, 2012, <http://humaniterations.net/2012/01/06/what-is-anarcho-transhumanism/>. See also Antonio Regalado, “The DIY Designer Baby Project Funded with Bitcoin,” *MIT Technology Review*, February 1, 2019, <https://www.technologyreview.com/s/612838/the-transhumanist-diy-designer-baby-funded-with-bitcoin/>. Robert DeVoe, “Transhumanism and Crypto: Interview with Zoltan Istvan, Transhumanist,” *Bitsonline*, July 15, 2018, <https://bitsonline.com/zoltan-istvan-transhumanism-crypto/>.

²⁵⁹ Jason Silva, “Immortalism: Ernest Becker and Alan Harrington on Overcoming Biological Limitations,” *h+ Magazine*, September 4, 2009, <https://hplusmagazine.com/2009/09/04/immortalism-ernest-becker-and-alan-harrington-overcoming-biological-limitatio/>.

²⁶⁰ Alan Harrington, *The Immortalist* (Millbrae, CA: Celestial Arts, 1977), 3–24.

²⁶¹ Ettinger, *The Prospect of Immortality*, xii–xiii, 4, 70, 170.

²⁶² Cryonics Institute, “About Cryonics Institute,” accessed November 2, 2018, <http://www.cryonics.org/ci-landing/>.

²⁶³ Alcor Life Extension Foundation, “Frequently Asked Questions,” accessed November 2, 2018, <https://www.alcor.org/FAQs/faq01.html#cryonics>.

human race” that is “no longer acceptable.”²⁶⁴ Speculative philosophical and religious answers to the problem of death have become irrelevant for modern people. Since the beginning of recorded history, man has engaged in a “disguised drive to make himself immortal and divine” and that has been the single most important rationale for most human activities. “The time has come for men to turn into gods or perish.”²⁶⁵

In his doctoral dissertation “A History of Life-Extensionism in the Twentieth Century,” Ilia Stambler observes that the radical prolongation of human life often constitutes a “formidable, though hardly acknowledged, motivation for biomedical research and discovery.”²⁶⁶ Life extension as a scientific enterprise is adaptable to vastly different ideological attitudes towards religion, progress, human perfectibility, and ethical views.²⁶⁷

The criterion of staying forever young is important to most immortalists. Maria Konovalenko, a member of the Moscow-based Life Extension Foundation, predicts explosive growth in rejuvenating technologies. In her blog entry titled “Never-ending sex,” Konovalenko observes that more than 100 out of 200 papers related to the topic of rejuvenation published in *The Nature Journal* were dated after 2014.²⁶⁸

In his 2009 article published in the *HPlus* magazine, Jason Silva contrasts the immortalist perspective against the three traditional answers to the problem of mortality identified by Ernest Becker in *The Denial of Death*. The traditional answers can be

²⁶⁴ Harrington, *The Immortalist*, 3.

²⁶⁵ Harrington, *The Immortalist*, 24.

²⁶⁶ Ilia Stambler, “A History of Life-Extensionism in the Twentieth Century,” (PhD diss., Bar-Ilan University, Israel, 2014), 3.

²⁶⁷ Ilia Stambler, “Life Extension – a Conservative Enterprise? Some Fin-de-siècle and Early Twentieth-Century Precursors of Transhumanism,” *Journal of Evolution & Technology* 21, no. 1 (2010): 13–26.

²⁶⁸ Maria Konovalenko, “Neverending Sex,” *Maria Konovalenko* (blog), July 27, 2015, <https://mariakonovalenko.wordpress.com/2015/07/27/neverending-sex/>.

identified as (1) the religious (“God will save us”), (2) the romantic (“Love is eternal”), and (3) the creative (“My art will last forever”). The immortalists find those answers to be dissatisfactory. Religion is obsolete. Romantic love does not seem to last as evidenced by the frequency of divorces. The creative answer only exasperates the problem as creative people all die.²⁶⁹

In addition to cryonics, immortalists have become more interested in biomedical technologies that promise life extension. While waiting for immortality to arrive, immortalists would still strive for survival.²⁷⁰ They also share a common interest with other transhumanists who seek other non-biological means of achieving immortality. Proponents of mind uploading imagine a kind of digital immortality by scanning the neural network of the brain and reproducing its functionality on a non-biological substratum such as digital computers.²⁷¹ Universal immortalists imagine the “possibility and desirability of developing material technologies advanced enough to bring back to life all those who have ever lived,” employing ideas such as parallel universes, time travel, and universe simulations.²⁷²

In 2012, Pellissier conducted a poll among transhumanists about immortality. He found that 76.2 percent of transhumanists wanted immortality. Of those who did not, 4.6 percent cited overpopulation, 8.1 percent cited boredom, and 3.7 percent wanted an afterlife.²⁷³

²⁶⁹ Becker, *The Denial of Death*, 159–75.

²⁷⁰ Michael R. Rose, “Immortalist Fictions and Strategies,” in *The Transhumanist Reader*, ed. Max More and Natasha Vita-More (Chichester, UK: Wiley-Blackwell, 2013), 200–203.

²⁷¹ *H+Pedia*, s.v. “Technological Resurrection,” last modified June 22, 2018, https://hpluspedia.org/wiki/Technological_resurrection.

²⁷² M. Alan Kazlev, *Encyclopedia Galactica*, s.v. “Universal Immortalism,” accessed August 23, 2019, <http://orionsarm.com/eg-article/471fe9ed7aed2>.

²⁷³ Hank Pellissier, “Do All Transhumanists Want Immortality? No? Why Not?” *The Futurist* 46, no. 6 (2012): 65.

Survivalist transhumanism. Emphasizing personal survival and longevity, survivalist transhumanism could be described as a milder form of immortalism.²⁷⁴ Instead of trying to defeat death, they try to avoid it.²⁷⁵

Pellissier observes that survival transhumanists represent the largest sub-movement in transhumanism.²⁷⁶ De Grey, who argues that aging is a curable disease, can be described as a survivalist.²⁷⁷ Another iconic representative is Thiel, who has invested substantially in anti-aging medicine, including in a company called Ambrosia which focuses on parabiosis, transfusion of blood plasma from donors aged under 25 to participants aged over 35.²⁷⁸ Google co-founder Larry Page invested in Calico, a company founded to understand “the biology that controls lifespan” and uses that understanding “to devise interventions that enable longer and healthier life.”²⁷⁹

Democratic transhumanism. Reacting to the anarchist and capitalistic tendency of libertarian extropians, some European transhumanists with a more socialist political leaning form the WTA in the late 1990s to foster an all-options-open attitude towards political ideologies. WTA expressly allows members with political ideologies that favor more government control.²⁸⁰ The *Transhumanist Declaration* published by

²⁷⁴ *H+Pedia*, s.v. “Survivalist Transhumanism,” last modified June 28, 2018, https://hpluspedia.org/wiki/Survivalist_transhumanism.

²⁷⁵ Nick Bostrom, “Transhumanist Values,” *Journal of Philosophical Research* 30, no. Supplement (2005): 4, 9.

²⁷⁶ Pellissier, “Transhumanism: There Are [At Least] Ten Different Philosophical Categories; Which One(s) Are You?” 3.

²⁷⁷ Aubrey de Grey and Michael Rae, *Ending Aging: The Rejuvenation Breakthroughs That Could Reverse Human Aging in Our Lifetime* (New York: St. Martin's Press, 2007), 16–45.

²⁷⁸ Jeff Bercovici, “Peter Thiel Is Very, Very Interested in Young People’s Blood: The Contrarian Venture Capitalist Believes Transfusions May Hold the Key to His Dream of Living Forever,” *Inc.com*, August 1, 2016, <https://www.inc.com/jeff-bercovici/peter-thiel-young-blood.html>.

²⁷⁹ Calico, “Calico Research and Development,” accessed November 2, 2018, <http://calicolabs.com>.

²⁸⁰ Hughes, “Democratic Transhumanism 2.0,” 20–23.

WTA in 1999 differs from More's *Extropian Principles* in anticipating potentially catastrophic outcomes from dramatic technological changes.²⁸¹ While staying intentionally neutral on party politics, WTA recognizes the need to involve members of the democratic society in making responsible decisions that affect the future of humanity.²⁸² WTA leaders such as Bostrom embrace the principles of modern secular humanism and a utilitarian ethic that seeks maximal happiness for the whole of humanity.

Hughes urges the social democrats and the libertarian-leaning techno-utopians to coalesce around his brand of democratic transhumanism.²⁸³ He faults some on the political left for adopting a Luddite attitude towards human enhancement technologies. Such a Luddite attitude is not only “boring and depressing,” it fails to recognize that technology can help transcend the inequalities of power. In contrast, the libertarian transhumanists do recognize the potential of technology. However, Hughes faults the libertarian transhumanists for failing to recognize the importance of engaging with democracy to address threats associated with transhumanist technologies, including the possibility that biotechnology will exacerbate social inequality. Transhumanists need the cooperation of the democratic state to combat monopolistic practices, restrictive intellectual property law, and persecution of posthumans. Their faith ought to be placed in human reason and not in nature. Transhumanism seeks to supplant the natural with the planned. The free market concept of Hayek, which sees the optimized allocation of resources through naturally evolved and emergent phenomena without conscious guidance, is inherently inconsistent with transhumanism according to Hughes.

²⁸¹ James J. Hughes, “The Compatibility of Religious and Transhumanist Views of Metaphysics, Suffering, Virtue and Transcendence in an Enhanced Future,” *IEET*, May 8, 2007, <https://ieet.org/index.php/IEET2/more/hughes20070401>.

²⁸² George Dvorsky, “J. Hughes on Democratic Transhumanism, Personhood, and AI,” *Sentient Developments* (blog), March 28, 2012, <http://www.sentientdevelopments.com/2012/03/j-hughes-on-democratic-transhumanism.html>.

²⁸³ Hughes, “Democratic Transhumanism 2.0,” 7–8.

Techno progressivism. Hughes describes techno progressivism as a strategy to achieve the best outcome of a posthuman future by ascertaining that human enhancement technologies will be safe, widely accessible, and respectful of individual choices.²⁸⁴ He sees his advocacy of democratic transhumanism as a radical form of techno progressivism. Rooted in the Enlightenment optimism of human progress through technology and social democratization, techno progressivism seeks to balance the accumulation of technological knowledge and power with a fair and cost-effective distribution of technological knowledge and power to as many people as possible, while leaving the decision to acquire such knowledge and to exercise such power to the individuals.

Technogaianism. A sub-movement within transhumanism that emphasizes the use of nanotechnology and biotechnology to modify Earth's environment instead of the human body, technogaianism seeks to limit the unsustainable exhaustion of natural resources.²⁸⁵ Instead of seeing technology as a risk that contributes to the destruction of Earth's environment, technogaianists see technologies playing a positive role in modifying the atmosphere, temperature, and ecology to make Earth more habitable by human beings.²⁸⁶

Postgenderism. According to George Dvorsky and Hughes, "postgenderism is a diverse social, political and cultural movement whose adherents affirm the voluntary elimination of gender in the human species through the application of advanced

²⁸⁴ Adam Ford, "What Is Technoprogessivism? with James Hughes," *h+ Magazine*, November 19, 2014, <http://hplusmagazine.com/2014/11/19/technoprogessivism-james-hughes/>.

²⁸⁵ *H+Pedia*, s.v. "Technogaianism," last modified March 22, 2019, <https://hpluspedia.org/wiki/Technogaianism>.

²⁸⁶ Robert Zubrin, *The Case for Mars: The Plan to Settle the Red Planet and Why We Must* (New York: Simon & Schuster, 2011), 248–49.

biotechnology and assistive reproductive technologies.”²⁸⁷ Transhumanists who embrace radical feminism, queer theory, transgenderism, or ectogenesis would likely also identify with postgenderism. Dvorsky and Hughes identify intersexuality, hermaphrodites, homosexuality, bisexuality, castration, cross-dressing, sexology, bisexuality, third sex, essentialism, constructionism, and postgender theory as the cultural antecedents of postgenderism. Technological enablers of postgenderism include contraception, abortion, assisted reproduction, artificial wombs, sex re-assignment, designer genitals, virtual bodies, and non-gendered brains.

Postgenderism is embraced by certain self-identified “third-wave” feminists, who hold a different view of gender than the “second wave” radical feminists. In *A Cyborg Manifesto*, Donna Haraway declares that she would “rather be a cyborg than a goddess.”²⁸⁸ According to Anna Mercedes and Jennifer J. Thweatt-Bates, Haraway’s cyborg is a symbolic shorthand that embodies at once the rejection of all essentialism and a full embrace of the “plasticity and flexibility” of the posthuman.²⁸⁹ For Mercedes and Thweatt-Bates, the term “posthuman” functions as “an umbrella term, covering a span of related concepts: the genetically enhanced person, the artificial person, the downloaded consciousness, the cyborg, and the chimera (that is, the mechanistically or genetically altered person).”²⁹⁰ If Haraway’s goddess is a metaphor for pure femininity, her cyborg refers to something neuter or masculine, a technological matrix invented mostly by men.

²⁸⁷ *H+Pedia*, s.v. “Postgenderism,” last modified January 28, 2018, <https://hpluspedia.org/wiki/Postgenderism>.

²⁸⁸ Donna J. Haraway, *Simians, Cyborgs, and Women: The Reinvention of Nature* (New York: Routledge, 1991), 180–81.

²⁸⁹ Jennifer J. Thweatt-Bates, “Artificial Wombs and Cyborg Births: Postgenderism and Theology,” in *Transhumanism and Transcendence: Christian Hope in an Age of Technological Enhancement*, ed. Ronald Cole-Turner (Washington, DC: Georgetown University Press, 2011), 106.

²⁹⁰ Anna Mercedes and Jennifer Thweatt-Bates, “Bound in the Spiral Dance: Spirituality and Technology in the Third Wave,” in *Feminist Spirituality: The Next Generation*, ed. Chris Klassen (Lanham, MD: Lexington Books, 2009), 64.

Mercedes and Thweatt-Bates are influenced by Elaine L. Graham in their view of posthuman. Addressing the broader issue of transhumanism and the posthuman future, Graham advances two key themes in *Representation of Post/Human: Monsters, Aliens, and Others in Popular Culture*. First, the proliferation of cybernetic, biomedical, and digital technologies causes people to live increasingly in a cyborg-like existence.²⁹¹ Second, essentialist models of human nature have tended historically to be eclipsed by models that recognize humanity as defining itself in co-evolution with its environment, tools, and technologies. As a matter of ontology, human nature in “post/humanity” will be “inextricably bound up in relationality, affinity, and contingency.”²⁹²

An argument against sexual dimorphism cited by postgenderists focuses on the phenomena of intersexuality.²⁹³ According to Julie A. Greenberg, people with intersex bodies are numbered in the millions worldwide.²⁹⁴

Some postgenderists argue that gender-specific reproductive roles can benefit from re-definition. Ectogenetic technologies such as In Vitro Fertilization (IVF) and artificial uterus represent the best way to allow the reproduction of the next generation to take place with little gender limitation. The concept of ectogenesis was first suggested by Haldane in *Daedalus*.²⁹⁵ A. Huxley alluded to the idea in *Brave New World*.²⁹⁶ In *The Dialectic of Sex*, Shulamith Firestone argues that ectogenesis is a key technological

²⁹¹ Elaine L. Graham, *Representations of the Post/Human: Monsters, Aliens and Others in Popular Culture* (New Brunswick, NJ: Rutgers University Press, 2002), 25.

²⁹² Graham, *Representations of the Post/Human*, 223.

²⁹³ David Hester, “Intersexes and the End of Gender: Corporeal Ethics and Postgender Bodies,” *Journal of Gender Studies* 13, no. 3 (2004): 215–25.

²⁹⁴ Julia A. Greenberg, “The Roads Less Traveled: The Problem with Binary Sex Categories,” in *Transgender Rights*, ed. Paisley Currah, Richard M. Juang and Shannon Minter (Minneapolis: University of Minnesota Press, 2006), 51.

²⁹⁵ Haldane, *Daedalus, or Science and the Future*, 63–68.

²⁹⁶ Huxley, *Brave New World*, 46.

enabler of feminism, as it would bring about reproductive equality between genders.²⁹⁷ Such technologies would allow reproduction to happen safely, painlessly, and under reliable quantitative and qualitative control. Moreover, when cryogenic and ectogenesis are put to work together, people would be able to save up the sperms or eggs at a youthful age to be activated later, thereby freeing people from the pressure to get married until they are truly ready. Added to that the possibility of human cloning, asexual reproduction would then become possible. Reproduction and sex could then be completely decoupled.

In their 2015 article “Artificial wombs will spawn new freedom,” Nikki Olson and Pellissier suggest that ectogenesis might lead to better health and safety for the mother and the fetus, allowing (1) more infertile couples to have children, (2) women to skip maternity leaves, (3) balanced parental roles, (4) genetic therapy at the embryonic stage, and (5) more sexual freedom.²⁹⁸

Singularitarianism. Picturing the progress of technology in terms of a development curve, the phrase “technological singularity” refers to a period in the future when progress will become unpredictably fast.²⁹⁹ In mathematics, singularity refers to a point at which a given mathematical object is undefined. An example in physics is the gravitational singularity of a black hole, where the gravitational pull is theoretically infinite at its center. Borrowing the term for technological development, von Neuman foresees a Singularity moment beyond which the “technological progress will become

²⁹⁷ Shulamith Firestone, *The Dialectic of Sex: The Case for Feminist Revolution* (New York: Farrar, Straus and Giroux, 2003), 180–98.

²⁹⁸ Nikki Olson and Hank Pellissier, “Artificial Wombs Will Spawn New Freedoms,” *IEET*, December 20, 2011, <http://ieet.org/index.php/IEET/more/olson20110526>.

²⁹⁹ “The Best Definition of Singularity,” Singularity Symposium (forum), accessed October 23, 2018, <http://www.singularitysymposium.com/definition-of-singularity.html>. See also *H+Pedia*, s.v. “Singularitarianism,” last modified October 17, 2017, <https://hpluspedia.org/wiki/Singularitarianism>.

incomprehensively rapid and complicated.”³⁰⁰ Vinge sees technological singularity happening due to the emergence of superhuman intelligence. In his 1993 article “The Coming Technological Singularity,” he predicts that “within thirty years, we will have the technological means to create superhuman intelligence. Shortly after, the human era will be ended. . . . I think it's fair to call this event a singularity. It is a point where our models must be discarded.”³⁰¹

Good did not use the term Singularity, but he conceives of an “intelligence explosion” based on the acceleration of technological progress when ultra-intelligent machines could design even more intelligent machines themselves.³⁰²

Kurzweil gives perhaps the most quoted definition of technological singularity as:

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. Although neither utopian nor dystopian, this epoch will transform the concepts that we rely on to give meaning to our lives, from our business models to the cycle of human life, including death itself.³⁰³

In 2010, singularityweblog.com identifies “top 10 singularitarians of all time” and the list comprises Kurzweil, Vinge, Karel Čapek, Isaac Asimov, Samuel Butler, Turing, de Grey, Ted Kaczynski (“the Unabomber”), Kevin Warwick, and Charles Stross. Other honorable mentions beyond the ten include Gordon Moore, von Neumann, Good, Norbert Wiener, Manfred Clynes, Moravec, Minsky, John McCarthy, Philip K. Dick, Edsger Dijkstra, Bostrom, Kevin Kelly, Hugo de Garis, William Gibson, Yudkowsky,

³⁰⁰ “Who was John von Neumann?” Singularity Symposium (forum), accessed November 2, 2018, <http://www.singularitysymposium.com/john-von-neumann.html>.

³⁰¹ Vernor Vinge, “The Coming Technological Singularity: How to Survive in the Post-Human Era,” (paper presented at the VISION-21 Symposium, Cleveland, OH, March 30-31, 1993), 11–22.

³⁰² Good, “Speculations Concerning the First Ultrainelligent Machine,” 33–37.

³⁰³ Kurzweil, *The Singularity Is Near*, 136.

Ben Goertzel and Michael Anissimov.³⁰⁴

Religious Transhumanism. While most transhumanists are secular atheists, a significant minority considered themselves religious.³⁰⁵ According to Hughes, a quarter of WTA members have religious affiliations of some sort, including Christian (8 percent), spiritual (5 percent), Buddhist (4 percent), religious humanist (2 percent), pagans, Hindus, Jews, Muslims, and other faiths.³⁰⁶ About 15 percent of WTA members consider transhumanism to be compatible with the belief in God. About 1 percent of respondents see transhumanism as their religion. Some transhumanists identify themselves as pantheists or scientific pantheists. Others adhere to panpsychism, which views consciousness as a universal and primordial feature of all things.³⁰⁷ The interest in transhumanism among scholars of religion is significant enough that the Association of American Religion (AAR) formed a Human Enhancement and Transhumanism Unit in 2008 to “identify and critically evaluate the implicit religious beliefs underlying key transhumanist claims and assumptions.”³⁰⁸

In 2005, William S. Bainbridge conducted a pilot questionnaire study comparing the attitude towards technological transcendence between respondents who are religiously oriented and those who are not. He found that respondents holding strong

³⁰⁴ Nikola Danaylov, “Top 10 Singularitarians of All Time,” *SingularityWeblog.com* (blog), January 23, 2010, <https://www.singularityweblog.com/top-10-singularitarians/>.

³⁰⁵ *H+Pedia*, s.v. “Religious Transhumanism,” last modified April 9, 2018, https://hpluspedia.org/wiki/Religious_transhumanism. See also *H+Pedia*, s.v. “Spiritual Transhumanism,” last modified October 23, 2016, https://hpluspedia.org/wiki/Spiritual_transhumanism.

³⁰⁶ James J. Hughes, “Problems of Transhumanism: Atheism vs. Naturalist Theologies,” *IEET*, January 14, 2010, <https://ieet.org/index.php/IEET2/more/hughes20100114/>.

³⁰⁷ Transhumanism Wiki, “Order of Cosmic Engineers,” accessed November 2, 2018, http://transhumanism.wikia.com/wiki/Order_of_Cosmic_Engineers. See also *H+Pedia*, s.v. “Order of Cosmic Engineers,” last modified March 20, 2017, https://hpluspedia.org/wiki/Order_of_Cosmic_Engineers.

³⁰⁸ American Academy of Religion, “Human Enhancement and Transhumanism Unit,” accessed October 28, 2018, <https://papers.aarweb.org/pu/human-enhancement-and-transhumanism-unit>.

religious worldviews tend to see transhumanism as incompatible with their religious beliefs. For example, while 81 percent who have “no doubt God exists” agree that there should be a law against cloning human beings, only 38 percent among those “who doubt God’s existence” agree with such legal prohibition. Eighty-four percent of those who have “a great deal” of confidence in organized religion agree with such prohibition, while 46 percent among those who have “hardly any” confidence in organized religion agree with it. It is worth noting that Bainbridge’s study also reveals that regardless of their religious orientation, most people do not agree with the core transhumanist tenets of technological transcendence. On the statement “humanity is on the verge of evolving into a higher form of life,” the split is 19 to 23 percent between the religious and non-religious. On the statement “cryonics will enable people to survive fatal accidents and illness,” the split is 17 to 31 percent. On the statement “research on human cloning should be encouraged because it will greatly benefit science and medicine,” the split is 10 to 38 percent. On the statement that receives most support, “technological convergence – combining nanotechnology, biotechnology, information technology, and cognitive science – will greatly improve human abilities,” the split is 40 to 59 percent. However, agreement with the last statement does not necessarily imply support for transhumanism.³⁰⁹

Lincoln Cannon, the founder of the Mormon Transhumanist Association, argues that transhumanism leads logically to faith in God because the belief in the possibility of humanity transcending itself into something god-like implies that humanity on Earth could be created by such god-like beings from elsewhere. The website of the Mormon Transhumanist Association declares, “we are Transhumanists not despite our

³⁰⁹ William S. Bainbridge, “The Transhuman Heresy,” *Journal of Evolution & Technology* 14, no. 2 (2005): 91–100.

Mormonism, but because of our Mormonism.”³¹⁰ The Mormon Transhumanists claim that the progressive transformation of the Father God was part of Mormon theology. Robert M. Bowman Jr. observes that Joseph Smith perhaps changed his perspective of God in 1844, only months before his death. Before 1844, Joseph Smith taught that God is an unchangeable being. Since delivering the King Follett Discourse in 1844, Joseph Smith and the leadership at LDS Church have taught that God the Father became God.³¹¹

Mormon transhumanism, according to Cannon, stands for the idea that humanity should learn how to become a compassionate creator in the mode of Christ. Lincoln Cannon thinks of Mormonism as an “immersive discipleship of Jesus Christ” which encourages believers to be saviors for each other through consoling and healing as modeled by Jesus.³¹² Cannon sees Mormonism as embracing materialism that says everything is embodied, including the mind. According to Joseph Smith, God was once like today’s human beings before he became God. This world was created with an eschatology of transformation that includes turning the earth into heaven as well as humanity into God.

Cannon proposes a New God Argument that has become popular among Mormon transhumanists. His argument says that if humanity could succeed in evolving into superintelligent post-humanity without becoming extinct, then superintelligent post-humanity probably created our world out of compassion. Cannon believes that the Mormon scripture supports four relevant premises for his argument. First, God ordains certain means for people to participate in God’s work. Second, science and technology

³¹⁰ John Tvedtnes, “The King Follett Discourse in the Light of Ancient and Medieval Jewish and Christian Beliefs,” (paper presented at the FairMormon Conference, Orem, UT, 2004).

³¹¹ Robert M. Bowman Jr., “The Mormon God Has Not Always Been God,” Institute for Religious Research (forum), August 26, 2013, <http://mit.irr.org/mormon-god-has-not-always-been-god-part-1>.

³¹² Lincoln Cannon, “What Is Mormon Transhumanism?” *Theology and Science* 13, no. 2 (2015): 204.

are among the means ordained by God. Third, God wants people to attain Godhood. Fourth, an essential attribute of Godhood is an immortal body.³¹³

Christopher Benek, the founding chair of the Christian Transhumanist Association, suggests that Christian Transhumanism offers an ethical transhumanist alternative to the kind of misguided ethics of atheistic and libertarian transhumanism of Istvan.³¹⁴ According to Benek, Christian Transhumanism stands on the theology of co-creation.³¹⁵ The Bible invites humans, created in God's image, into a creative organizational process that transforms trees to chairs and grain to bread. Humans are "active participants" in the material ordering of the world.³¹⁶

Micah Redding, another Christian transhumanist, interprets transhumanism as using science and technology to transform the human condition.³¹⁷ Transhumanism would guide Christianity away from a "pervasive and creeping Gnosticism" in the form of escapism, consumerism, and apathy back to the historic Christianity which sees physical reality to be good but in need of transformation through human ingenuity.³¹⁸

Michael LaTorra locates the central teaching of Buddhism in the complete elimination of suffering using correct spiritual practice and final entry into Nirvana, the

³¹³ Cannon, "What Is Mormon Transhumanism?" 213.

³¹⁴ Christopher Benek, "Christian Transhumanism Offers an Ethical Transhumanist Alternative," *Christopher Benek* (blog), August 27, 2017, <http://www.christopherbenek.com/2017/08/christian-transhumanism-offers-an-ethical-transhumanist-alternative/>.

³¹⁵ "Faith, Technology, and the Future," *ChristianTranshumanism.org* (blog), 2013, <https://www.christiantranshumanism.org/>.

³¹⁶ Christopher Benek, "Could We, as Creators in the Image of God, Change the World with Our Beliefs?" *Christopher Benek* (blog), June 18, 2014, <http://www.christopherbenek.com/2014/06/could-we-as-creators-in-the-image-of-god-change-the-world-with-our-beliefs/>.

³¹⁷ Micah Redding, "Christian Transhumanism Is the Next Reformation," *HuffPost*, October 16, 2017, https://www.huffingtonpost.com/entry/christian-transhumanism-is-the-next-reformation_us_59e40d37e4b09e31db975a6c.

³¹⁸ Micah Redding, "Can Transhumanism Lead Us Back to Orthodoxy?" *Christ and Pop Culture*, July 18, 2016, <https://christandpopculture.com/can-transhumanism-lead-us-back-to-orthodoxy/>.

deathless state of perfect liberation. He sees transhumanists as sharing the Buddhist goal, although they pursue it through different means. Buddhist transhumanists would argue that science and technology fit the Buddhist notion of skillful means (*upāya*) when they are practical and fruitful. LaTorra sees the Buddhist concept of awakening or enlightenment (*bodhi*) as an elevation of consciousness. Human occupies a certain range in the scale of consciousness, like an octave in the scale of electromagnetic waves. In the awakened state, consciousness is raised to a higher octave and that seems to be the essence of becoming transhuman.³¹⁹

V. R. Manoj argues that eastern religious thoughts, particularly Hinduism, can complement the ideals of transhumanism. Eastern religious thoughts seek answers to two basic questions about the ends: (1) why are we here? and (2) where are we going? Because of its focus on the means, transhumanism is enriched by the questions about the ends. In turn, transhumanism forces religious people to reexamine their understanding of God. Most religious people are raised to see God as having everything people do not, including immortality, omnipresence, and physical limitations. However, a deeper examination of Hindu religious texts reveals that God desires mankind to climb higher. For example, the eleventh chapter of Bhagavad-Gita describes Lord Krishna revealing a “universal body” to his friend Arjuna. Inside the universal body, Arjuna can see anything, now or in the future at once. Manoj asserts that a posthuman existing as pure consciousness in cyberspace and detached from all physical limitations would fit the description of such a universal body.³²⁰

Religious transhumanists remain a small minority within the transhumanist movement. In a 2007 survey, Hughes asked the respondents, “do you expect human

³¹⁹ Michael LaTorra, “What Is Buddhist Transhumanism?” *Theology and Science* 13, no. 2 (2015): 219.

³²⁰ V. R. Manoj, “Spiritual Transcendence in Transhumanism,” *Journal of Evolution & Technology* 17, no. 1 (2008): 2.

progress to result from human accomplishment rather than divine intervention, grace, or redemption?” 93 percent said yes.³²¹ Bainbridge reported that a general survey in 2005 validated his hypothesis that the highly religious tend to see the power of traditional religions as being threatened by transhumanism and therefore react negatively to modes of technological transcendence.³²²

Cosmopolitan transhumanism. With its root in the Cynic schools and embraced by the Stoics, cosmopolitanism advocates the equal treatment of all people and sees everyone as living in a universal city. Cosmopolitan transhumanists reject narrow nationalistic and geopolitical interests, advocating compassion and concern for the entire humanity instead. As Diogenes of Sinope said, “I am a citizen of the world.”³²³

Cosmism. Cosmism sees the survival and flourishing of humanity as a critical factor for the universe to succeed in fulfilling its purpose of existence. Cosmists also believe that immortality and the worry-free existence of individual human beings are crucial for humanity to be guaranteed its survival.³²⁴

In his 2010 work *A Cosmist Manifesto*, Goertzel reviews transhumanists from a cosmist perspective.³²⁵ Goertzel sees cosmism as a worldview compatible with the predictions and imperatives of transhumanism. Instead of focusing on the small questions about the process, cosmism answers the big questions about the purpose. Without the

³²¹ Hughes, “Problems of Transhumanism: Atheism vs. Naturalist Theologies.”

³²² Bainbridge, “The Transhuman Heresy,” 98.

³²³ Pellissier, “Transhumanism: There Are [At Least] Ten Different Philosophical Categories; Which One(s) Are You?” See also Pauline Kleingeld and Eric Brown, *The Stanford Encyclopedia of Philosophy*, s.v. “Cosmopolitanism,” July 1, 2013, <https://plato.stanford.edu/archives/fall2014/entries/cosmopolitanism/>.

³²⁴ *H+Pedia*, s.v. “Cosmism,” last modified January 18, 2019, <https://hpluspedia.org/wiki/Cosmism>.

³²⁵ Ben Goertzel, *A Cosmist Manifesto: Practical Philosophy for the Posthuman Age* (Lexington, KY: Humanity+ Press, 2010), xii–xiii, 15–16, 326–27.

analytical complexity of academic philosophy, cosmism is also compatible with modern science. Therefore, cosmism will likely become increasingly relevant as more advanced technologies emerge.³²⁶ Goertzel writes,

By Cosmism I mean: a practical philosophy focused on enthusiastically and thoroughly exploring, understanding and enjoying the cosmos, in its inner, outer and social aspects. Cosmism advocates pursuing joy, growth and freedom for oneself and all beings ongoingly, actively seeking to better understand the universe in its multiple aspects from a variety of perspectives, taking nothing as axiomatic and accepting all ideas, beliefs and habits as open to revision based on thought, dialogue and experience.³²⁷

The Russian Christian mystic Nikolai Fyodorovich Fyodorov, regarded as the father of cosmism, advocates extending life through technologies.³²⁸ Konstantin Eduarovich Tsiolkovsky, another Russian cosmist, believes that space colonization is necessary for the continued survival of humankind.³²⁹

George M. Young sees Russian cosmism as a holistic anthropocentric worldview and a crossbreed of religious mysticism and scientific cosmism. Western transhumanism and Russian cosmism share important ideas, but a dividing ideological curtain exists because of language, culture, and other intangible differences. Cosmism is a living example of what Nikolai Berdyaev calls the “Russian soul,” the kind of all-encompassing worldview Russian thinkers are drawn to, which makes sense of “all humanity, all time, all space, all science, art, and religion.”³³⁰

The rediscovered writings of the cosmists, prohibited from publishing in the Soviet period, have become subjects of active contemporary discussion in Russian

³²⁶ George M. Young, *The Russian Cosmists: The Esoteric Futurism of Nikolai Fedorov and His Followers* (Oxford: Oxford University Press, 2012), 21.

³²⁷ Goertzel, *A Cosmist Manifesto*, 1.

³²⁸ Young, *The Russian Cosmists*, 179–80, 231–34.

³²⁹ Mikhail S. Arlazorov, *Encyclopedia Britannica*, s.v. “Konstantin Tsiolkovsky,” last modified September 15, 2018, <https://www.britannica.com/biography/Konstantin-Eduardovich-Tsiolkovsky>.

³³⁰ Young, *The Russian Cosmists*, 4.

academic institutions. According to Russian cosmism,

The world is in a phase of transition from the "biosphere" (the sphere of living matter) to the "noosphere" (the sphere of reason). During this phase the active unification and organization of the whole of humankind . . . into a single organism is said to result in a higher "planetarian consciousness" capable of guiding further development reasonably and ethically . . . changing and perfecting the universe, overcoming disease and death, and finally bringing forth an immortal human.³³¹

Pellissier sees cosmism as a “philosophically laid-back” version of transhumanism. Without committing to any cosmological explanation or worldview, cosmism seeks to infuse the human universe with joy, growth, choice, and open-mindedness. Cosmists view the current forms of science, religion, and philosophy as not necessarily helpful in understanding life, mind, society, and reality because they tend to be one-sided and argumentative.³³²

Key Ideas of Transhumanism

Morphological freedom, procreative liberty, emphatic fallibility, cybudda, mind uploading, cognitive liberty, and neurotheology are some of the key ideas put forward by transhumanists. Transhumanists are also strong advocates of nanotechnology and biotechnology.

Morphological freedom. Dale Carrico defines morphological freedom as “a right of human beings either to maintain or to modify their own bodies, on their own terms, through informed, nonduressed, consensual recourse to, or refusal of, available remedial or modification medicine.”³³³ Morphological freedom gives individual persons both (1) the right to modify their body through biomedical technology as they desire, and

³³¹ Young, *The Russian Cosmists*, 9.

³³² Pellissier, “Transhumanism: There Are [At Least] Ten Different Philosophical Categories; Which One(s) Are You?”

³³³ Dale Carrico, “The Politics of Morphological Freedom,” *IEET*, August 3, 2006, <https://ieet.org/index.php/IEET2/more/carrico20060803>. See also *H+Pedia*, s.v. “Morphological Freedom,” last modified December 15, 2018, https://hpluspedia.org/wiki/Morphological_freedom.

(2) the right to refuse the attempts made by other people to change their body without their consent. Morphological freedom entails both a negative right and a positive right. The negative right protects a person's body from external intrusion. The positive right allows one to determine the definition and usage of one's body.³³⁴

Sandberg argues that the right to morphological freedom derives from the right of one's body and the right to freedom. The two rights in turn stand on the right to live and the right to pursue happiness. Sandberg postulates that widespread human modification through biomedical technology might happen anyway even without the protection of morphological freedom. The choice is between protecting individual morphological freedom or allowing eugenic programs to be directed by state-run entities.³³⁵

Procreative liberty. Harris argues that procreative liberty, or reproductive rights, recognize the basic rights for responsible parents to decide freely (1) the how and when of their procreative activities, and (2) the utilization of technologies that affect the results, especially if it has permanent health implications of the resulting babies. He observes that two questions need to be answered whenever new reproductive technologies emerge. First, is their use unethical? Second, should their use be controlled by legislation, and if so, how? Harris advocates answers that tolerate innovation and respect individual choices. He warns against two types of actions: positive actions that change things for the worse, and negative actions that deliberately leaving things unfixed although knowing that harms might result in non-actions.³³⁶

³³⁴ Heather G. Bradshaw, "Morphological Freedom," *IEET*, November 20, 2009, <https://ieet.org/index.php/IEET2/more/bradshaw20091120>.

³³⁵ Anders Sandberg, "Morphological Freedom – Why We Not Just Want It, but Need It," in *The Transhumanist Reader*, ed. Max More and Natasha Vita-More (Chichester, UK: Wiley-Blackwell, 2013), 56–57.

³³⁶ Harris, *Enhancing Evolution*, 77–79.

Empathic fallibility. Some transhumanist thinkers advocate modifying all sentient beings, or capable of feeling, to become sapient, or capable of thinking. They advocate enhancing the brains of all sentient beings up to a level so that all sentient beings could communicate their thoughts and feelings with human beings. The freedom and dignity of all sentient beings would then be respected. If we expect beings intellectually superior to us to respect the rights of humankind in the future, human beings have better start respecting the rights of sentient beings that are intellectually inferior to us. Some identify the ability to understand and talk about counterexamples as a key testable threshold of the sapient level. They imagine that enhancing all sentient beings to that level to be technologically possible someday and ought to be part of the species-independent transhumanist moral values.³³⁷

Cyborg Buddha. The Cyborg Buddha Project (CBP) aims to foster discussion in the scientific study of consciousness, neurotheology, neuroethics, cognitive liberty, positive psychology, and virtues. Hughes, who studied Buddhism for decades and lived as a Buddhist monk, leads the project. Seeking to unite the Buddhist Enlightenment with the European Enlightenment, Hughes employs the Buddhist moral values of reducing suffering and enhancing happiness as premises for the development of human enhancement technologies.³³⁸

Woody Evans observes that while Buddhism and transhumanism may be non-

³³⁷ *The Greenwood Encyclopedia of Science Fiction and Fantasy: Themes, Works, and Wonders*, s.v. “Uplift,” (Westport, CT: Greenwood Press, 2005), 2:849–51. See also Sherryl Vint, “Animals and Animality from the Island of Moreau to the Uplift Universe,” *The Yearbook of English Studies* 37, no. 2 (2007): 96–97. See also *The Greenwood Encyclopedia of Science Fiction and Fantasy: Themes, Works, and Wonders*, s.v. “Genetic Engineering,” (Westport, CT: Greenwood Press, 2005), 1:336–38. *The Greenwood Encyclopedia of Science Fiction and Fantasy: Themes, Works, and Wonders*, s.v. “Elder Race,” (Westport, CT: Greenwood Press, 2005), 2:238–39.

³³⁸ James J. Hughes, Michael LaTorra and George Dvorsky, “Cyborg Buddha Project,” *IEET*, accessed October 24, 2018, <https://ieet.org/index.php/IEET2/cyborgbuddha>.

contradictory, there are substantive differences in their emphases.³³⁹ Reacting to the claim made by Hughes that the flexibility of Buddhism makes it a helpful catalyst for a universal cultural revolution, Evans insists that Buddhism does not prescribe making people more than human, but rather making people more human through finding greater expressions of its humanity.³⁴⁰

Mind uploading. Mind uploading, also known as mind copying, mind transfer, or brain upload, refers to an imaginary procedure of copying the mental state from the brain to a computer running a piece of Whole Brain Emulation (WBE) software.³⁴¹ Theorists of mind uploading presume that the state of a mind can be captured as an information pattern and that the neural network in a brain can be functionally simulated by computer software.³⁴²

Some transhumanists think of mind uploading as an alternative path to achieve immortality, allowing a person to disembark from the “wetware” of the neurological brain and to be reincarnated as a program running perpetually.³⁴³ However, immortalists do not necessarily recognize mind uploading as a kind of immortality. Even if mind uploading were possible, some believe that the uploaded mind does not represent the same person.³⁴⁴ That would not be useful for most immortalists as they are primarily

³³⁹ Woody Evans, “If You See a Cyborg in the Road, Kill the Buddha: Against Transcendental Transhumanism,” *Journal of Evolution & Technology* 24, no. 2 (2014): 92–97.

³⁴⁰ Javi, “On Buddhist Transhumanism,” Dhamma Wheel (forum), February 20, 2017, <https://dhammadwheel.com/viewtopic.php?t=28990>.

³⁴¹ *H+Pedia*, s.v. “Mind Uploading,” last modified May 10, 2019, https://hpluspedia.org/wiki/Mind_uploading.

³⁴² Sim Bamford, “A Framework for Approaches to Transfer of a Mind’s Substrate,” *International Journal of Machine Consciousness* 4, no. 1 (2012): 23–34.

³⁴³ Randal A. Koene, “Uploading to Substrate-Independent Minds,” in *The Transhumanist Reader*, ed. Max More and Natasha Vita-More (Chichester, UK: Wiley-Blackwell, 2013), 146–56.

³⁴⁴ Keith Wiley, *A Taxonomy and Metaphysics of Mind-Uploading* (Seattle: Alautun Press, 2014), 31–64.

interested in the immortality of themselves and not in the artificial creation of immortal souls.

Others see mind uploading as a shortcut to super-human level Artificial General Intelligence (AGI).³⁴⁵ Instead of arriving at human-level intelligence using an evolutionary learning algorithm that simulates billions of years of natural evolution, mind uploading takes a snapshot of the information pattern of a human mind as the starting point for further artificial evolution. Kurzweil is a strong advocate of mind uploading and whole brain emulation. He believes that mind uploading holds promise to shorten the time needed to reach technological Singularity.³⁴⁶

Other applications of mind uploading beyond immortality and AGI have been proposed.³⁴⁷ Michio Kaku suggests that mind uploading might enable people to be digitally teleported near the speed of light.³⁴⁸ Richard Doyle imagines that digital life forms might eventually seek to reverse engineer the mind-uploading process so that they might download themselves into the human brains to take possession of human biological bodies.³⁴⁹

Cognitive liberty. Cognitive liberty, as defined by Wyre Sententia and Richard Glen Boire, designates “the right of each individual to think independently and autonomously, to use the full spectrum of his or her mind, and to engage in multiple

³⁴⁵ Kurzweil, *The Singularity Is Near*, 260.

³⁴⁶ Kurzweil, *The Singularity Is Near*, 111–42.

³⁴⁷ Kaj Sotala and Harri Valpola, “Coalescing Minds: Brain Uploading-Related Group Mind Scenarios,” *International Journal of Machine Consciousness* 4, no. 1 (2012): 293–312.

³⁴⁸ Michio Kaku, dir. *How to Teleport: Sci Fi Science, Physics of the Impossible, Episode 4*. ITV Studios, 2009.

³⁴⁹ Richard Doyle, *Wetwares: Experiments in Postvital Living* (Minneapolis: University of Minnesota Press, 2003), 1–18.

modes of thought.”³⁵⁰ Cognitive liberty consists of freedom from interference and the freedom to self-determine. As cofounders of the Center for Cognitive Liberty and Ethics (CCLE), Sentientia and Boire urge that individuals should neither be compelled to subject themselves to any technologies that manipulate their cognitive function nor prohibited from enhancing their cognitive capacity.³⁵¹

Transhumanists show diverse opinions about psychotherapy, such as the use of conversion therapy for homosexuality or behavioral therapy for autism.³⁵² Dvorsky advocates stronger “neurodiversity” and protection of cognitive liberty. While they see a need for states to intrude sometimes, transhumanists generally tend to favor giving individuals as much autonomy as possible over their minds, bodies, and reproductive processes.³⁵³

Published scholarly opinions on whether state entities should be allowed to use psychoactive drugs and mind-controlling technologies in military and civilian interrogations have appeared regularly in the *American Journal of Bioethics* and the *Neuroethics*. For example, the CIA’s MKUltra program has sparked much ethical debate.³⁵⁴

³⁵⁰ Wrye Sentientia, “Neuroethical Considerations: Cognitive Liberty and Converging Technologies for Improving Human Cognition,” *Annals of the New York Academy of Sciences* 1013, no. 1 (2004): 221–28.

³⁵¹ Wrye Sentientia, “Freedom by Design: Transhumanist Values and Cognitive Liberty,” in *The Transhumanist Reader*, ed. Max More and Natasha Vita-More (Chichester, UK: Wiley-Blackwell, 2013), 356.

³⁵² George Dvorsky, “Cognitive Liberty and Right to One’s Mind,” *IEET*, October 20, 2009, <https://ieet.org/index.php/IEET2/more/dvorsky20091020>.

³⁵³ George Dvorsky, “Limits to the Biolibertarian Impulse,” *Sentient Developments* (blog), October 14, 2009, <http://www.sentientdevelopments.com/2009/10/limits-to-biolibertarian-impulse.html>.

³⁵⁴ History.com, “Mk-ultra,” August 21, 2018, <https://www.history.com/topics/us-government/history-of-mk-ultra>.

Neurotheology. Neurotheology seeks neurological accounts for religious experiences such as spiritual awe, ecstatic trance, and sudden enlightenment.³⁵⁵ A. Huxley coined the term neurotheology in his 1962 novel *Island*.³⁵⁶ Laurence McKinney attempts to define the scope of the field in *Neurotheology: Virtual Religion in the 21st Century*.³⁵⁷

A central goal of neurotheological research is to determine whether a “God spot” exists in the brain that is responsible for religious/spiritual/mystical experience (RSME).³⁵⁸ For example, using brain-scanning technologies, Andrew B. Newberg observes similarities of brain activities across religious traditions during prayer and meditation.³⁵⁹

J. L. Barrett sees neurotheology as an approach in the cognitive science of religion. Barrett views cultural phenomena of religion as a scientifically explainable result of ordinary cognitive actions.³⁶⁰ Representing that viewpoint, the International Association of the Cognitive Science of Religion (IACSR) was formed as an affiliate of the American Academy of Religion in 2006. Expressly not interested in validating religious doctrines with science, IACSR sees its research goal as explaining religious experiences with science.³⁶¹

³⁵⁵ Laurence O. McKinney, *Neurotheology: Virtual Religion in the 21st Century* (Cambridge, MA: American Institute for Mindfulness, 1994), 28–45.

³⁵⁶ Aldous Huxley, *Island* (New York: Harper & Row, 1962), 172.

³⁵⁷ McKinney, *Neurotheology*, 19–29.

³⁵⁸ Andrew B. Newberg and Mark Robert Waldman, *How God Changes Your Brain: Breakthrough Findings from a Leading Neuroscientist* (New York: Ballantine Books, 2009), 46–66.

³⁵⁹ Andrew B. Newberg, Eugene G. D’Aquili and Vince Rause, *Why God Won’t Go Away: Brain Science and the Biology of Belief* (New York: Ballantine Books, 2001), 173–79.

³⁶⁰ J. L. Barrett, “Exploring the Natural Foundations of Religion,” *Trends in Cognitive Sciences* 4, no. 1 (2000): 29–34.

³⁶¹ International Association for the Cognitive Science of Religion, “About the IACSR,” accessed November 2, 2018, <http://www.iacsr.com/>.

Nanotechnology. Richard P. Feynman’s talk at Caltech in 1960 titled “There’s plenty of room at the Bottom” is often cited as heralding the field of nanotechnology.³⁶² Feynman observes that nature has shown through molecular machine systems how complex and atomically precise structures can be programmed by instructions encoded in DNA. Hence, it is conceivable to build atom-scale production machinery capable of assembling atom-scale molecular components.

In his 1966 paper “Theory of Self Reproducing Automata,” von Neuman puts forth the concept of self-replicating machinery. He also formulates the idea of a universal constructor.³⁶³

In *Engines of Creation*, Drexler predicts that nanotechnology will allow the engineering of molecular computers that can self-assemble and replicate. He sees applications, particularly in medicine and space exploration.³⁶⁴ In his 2013 work *Radical Abundance*, Drexler recognized that the early vision of nanotechnology seemed like “hype gone wild.”³⁶⁵ Drexler’s enthusiastic reception by the transhumanists did not translate to reception by the scientific mainstream. The molecular assemblers postulated by Drexler were deemed impossible according to known physics. His warm reception by the transhumanist community only reinforces the impression that his ideas are closer to science fiction than real science.

Although most of Drexler’s proposed design of the molecular machine has not become reality, nanotechnology is not science fiction anymore. Organic chemists have

³⁶² Richard P. Feynman, “There’s Plenty of Room at the Bottom: An Invitation to Enter a New Field of Physics,” *Engineering and Science* 23 (1960): 22–36.

³⁶³ John Von Neumann and Arthur W. Burks, *Theory of Self-Reproducing Automata* (Urbana: University of Illinois Press, 1966), 251–96.

³⁶⁴ K. Eric Drexler, *Engines of Creation*, 85–109, 125–43, 236.

³⁶⁵ K. Eric Drexler, *Radical Abundance: How a Revolution in Nanotechnology Will Change Civilization* (New York: BBS PublicAffairs, 2013), 30–33.

built complex molecular structures with parts that resemble motors.³⁶⁶ Structural DNA nanotechnology has enabled protein engineering.³⁶⁷ Quantum methods in chemistry have allowed scientific modeling and engineering of molecules using computer algorithms.³⁶⁸ Molecular mechanics methods in chemistry can analyze the structure and dynamics of molecules reaching millions of atoms.³⁶⁹

The groundwork of nanotechnology was laid with the invention of Scanning Tunneling Microscopes (STM) by Gerd Binnig and Heinrich Rohrer.³⁷⁰ Binnig had also invented Atomic Force Microscopy (AFM).³⁷¹ The field of nanotechnology also got a jump start with the discovery of the first fullerene molecule, buckyballs or Buckminsterfullerene (C60), in 1984.³⁷² Subsequently, S. Iijima discovered carbon nanotubes in 1991, another example of fullerene.³⁷³ Fullerenes have found extensive use for biomedical applications because of their heat resistance and superconductivity.

Biotechnology. Transhumanists are strongly interested in gene-editing technologies. The discovery of clustered regularly interspaced short palindromic repeats (CRISPR) has stirred up much excitement and controversy in the field of

³⁶⁶ Kwanoh Kim et al., “Man-Made Rotary Nanomotors: A Review of Recent Development,” *Nanoscale* 8, no. 20 (2016): 10471–90.

³⁶⁷ Fei Zhang et al., “Structural DNA Nanotechnology: State of the Art and Future Perspective,” *Journal of the American Chemical Society* 136, no. 32 (2014): 11198–211.

³⁶⁸ National Research Council (US) Committee on Challenges for the Chemical Sciences in the 21st Century, *Beyond the Molecular Frontier: Challenges for Chemistry and Chemical Engineering* (Washington, DC: National Academies Press, 2003), 71–94.

³⁶⁹ Kenno Vanommeslaeghe, Olgun Guvench and Alexander D. MacKerell Jr., “Molecular Mechanics,” *Current Pharmaceutical Design* 20, no. 20 (2014): 3281–92.

³⁷⁰ G. Binnig and H. Rohrer, “Scanning Tunneling Microscopy,” *Surface Science* 126, no. 1-3 (1983): 236–44.

³⁷¹ Gerd K. Binnig, Atomic Force Microscope and Method for Imaging Surfaces with Atomic Resolution, US Patent 4,724,318, filed August 4, 1986, and issued February 9, 1988.

³⁷² H. W. Kroto et al., “C60: Buckminsterfullerene,” *Nature* 318, no. 6042 (1985): 162–63.

³⁷³ Xueshen Wang et al., “Fabrication of Ultralong and Electrically Uniform Single-Walled Carbon Nanotubes on Clean Substrates,” *Nano Letters* 9, no. 9 (2009): 3137–41.

biotechnology.³⁷⁴ CRISPR is a family of DNA sequences found within the genomes of bacteria that resemble DNA fragments from viruses. The sequence may be viewed as part of the antiviral defense system of bacteria.³⁷⁵ CRISPR and the CRISPR-associated 9 enzyme (Cas9) are part of a mechanism responsible for detecting and repairing DNA infected with viruses. The discovery of CRISPR and Cas9 lead to a new gene-editing technique. By injecting a Cas9 nuclease with a synthetic guide RNA into a cell, the cell's genome could then be cleaved at a location specified by the RNA. The existing genes could be replaced by new genes at the cleaving position.

The biomedical potential of CRISPR/Cas9 revives the bioethical debate about germline modification. In November 2018, Jankui He ignited an international uproar announcing the first genetically modified human twins, Lulu and Nana, who have undergone CRISPR/Cas9 based gene editing as embryos.³⁷⁶ Even before his experiment, Shoukhrat Mitalipov caused much controversy in using the gene-editing technique to “repair” a genetic mutation in human embryos. Mitalipov's experiment already showed that it is becoming technologically possible to genetically modify a human embryo and bringing the embryo eventually to birth. However, Mitalipov destroyed the embryos as part of the experiment.³⁷⁷

In his 2016 annual worldwide threat assessment as the CIA director, James R. Clapper includes gene editing in a list of threats posed by “weapons of mass destruction

³⁷⁴ Feng Zhang, Yan Wen and Xiong Guo, “CRISPR/Cas9 for Genome Editing: Progress, Implications and Challenges,” *Human Molecular Genetics* 23, no. R1 (2014): R40–R46.

³⁷⁵ Rodolphe Barrangou, “The Roles of CRISPR-Cas Systems in Adaptive Immunity and Beyond,” *Current Opinion in Immunology* 32 (2015): 36–41.

³⁷⁶ Marilyn Marchione, “Chinese Researcher Claims First Gene-Edited Babies,” *Associated Press*, November 26, 2018, <https://apnews.com/4997bb7aa36c45449b488e19ac83e86d>.

³⁷⁷ Hong Ma et al., “Correction of a Pathogenic Gene Mutation in Human Embryos,” *Nature* 548, no. 7668 (2017): 413–19.

and proliferation.”³⁷⁸ His report notes that regulatory standards in some countries not conforming to the ethical standards of the west might lead to the risk of harmful biological agents produced during genome editing research. His report draws attention to dual-use technology that might spread easily in a globalized economy.

A 2016 poll conducted by STAT and Harvard T. H. Chan School of Public Health found that most Americans (69 percent) have little or no awareness of germline editing. Among those who have heard about germline editing, 50 percent said it should be illegal and 41 percent said it should be legal to change the genes of unborn babies with serious diseases. 55 percent oppose government research funding of disease-related germline editing. Only 14 percent support government funding of germline editing for improving IQ and appearance.³⁷⁹

In February 2017, a panel of the National Academy of Sciences recommended for the first time that germ-line modification of human beings be allowed to prevent the birth of children with serious diseases. The panel believed that it would be years before germ-line engineering would be put into actual use. And it should only be used for disease prevention and not for enhancement.³⁸⁰

Gene editing has already been used by scientists to modify flies, worms, ferrets, and even dogs. For example, the Key Laboratory of Regenerative Biology at the Guangzhou Institutes of Biomedicine and Health reported in 2015 successfully breeding beagles with double the amount of muscle mass.³⁸¹ Another institute has developed

³⁷⁸ James R. Clapper, *Worldwide Threat Assessment of the US Intelligence Community* (Office of the Director of National Intelligence, 2016), 9.

³⁷⁹ Sharon Begley, “STAT-Harvard Poll: Americans Say No to ‘Designer Babies’,” *STAT*, February 11, 2016, <https://www.statnews.com/2016/02/11/stat-harvard-poll-gene-editing/>.

³⁸⁰ Antonio Regalado, “U.S. Panel Endorses Designer Babies to Avoid Serious Disease,” *MIT Technology Review*, February 14, 2017, <https://www.technologyreview.com/s/603633/us-panel-endorses-designer-babies-to-avoid-serious-disease/>.

³⁸¹ Antonio Regalado, “First Gene-Edited Dogs Reported in China,” *MIT Technology Review*, October 19, 2015, <https://www.technologyreview.com/s/542616/first-gene-edited-dogs-reported-in-china/>.

micropigs that weigh only 15 kilograms when mature.³⁸²

A new generation of genetically modified plants is arriving that is more resistant to high temperature and humidity.³⁸³ Using genetic engineering, Collectis Plant Sciences develops a Ranger Russet potato that lasts longer in cold storage because it does not accumulate sweet sugars.³⁸⁴ In 2015, DuPont predicted that CRISPR-modified corn and drought-resistant wheat plants would appear as early as 2020.³⁸⁵ U.S. Department of Agriculture has told companies like DuPont that they will not regulate these CRISPR-modified plants because they contain no genes from other species.³⁸⁶

Biotech companies are beginning to use CRISPR to treat inherited disorders by repairing the genes. Editas plans to use CRISPR to treat LCA 10 (Leber congenital amaurosis type 10), a rare genetic eye disease that affects 3 out of 100,000 births.³⁸⁷ CRISPR Therapeutics has begun a clinical trial of CTX001 for treating transfusion-

³⁸² David Cyranoski, “Gene-Edited ‘Micropigs’ to be Sold as Pets at Chinese Institute,” *Nature* 526, no. 7571 (2015): 18.

³⁸³ David Rotman, “Why We Will Need Genetically Modified Foods,” *MIT Technology Review*, December 17, 2013, <https://www.technologyreview.com/s/522596/why-we-will-need-genetically-modified-foods/>.

³⁸⁴ Antonio Regalado, “A Potato Made with Gene Editing,” *MIT Technology Review*, April 20, 2015, <https://www.technologyreview.com/s/536756/a-potato-made-with-gene-editing/>.

³⁸⁵ Antonio Regalado, “Dupont Predicts CRISPR Plants on Dinner Plates in Five Years,” *MIT Technology Review*, October 8, 2015, <https://www.technologyreview.com/s/542311/dupont-predicts-crispr-plants-on-dinner-plates-in-five-years/>.

³⁸⁶ USDA Animal and Plant Health Inspection Service, “Secretary Perdue Issues USDA Statement on Plant Breeding Innovation,” *USDA Bulletin*, March 28, 2018, <https://content.govdelivery.com/accounts/USDAAPHIS/bulletins/1e599ff>.

³⁸⁷ Editas Medicine, “Allergan and Editas Medicine Initiate the Brilliance Phase 1/2 Clinical Trial of AGN-151587 (EDIT-101) for the Treatment of LCA10,” (press release), July 25, 2019, <http://ir.editasmedicine.com/news-releases/news-release-details/allergan-and-editas-medicine-initiate-brilliance-phase-12>.

dependent beta-thalassemia.³⁸⁸

Transhumanist Forerunners

Teilhard, Haldane, Bernal, A. Huxley, Julian Huxley, and Arthur C. Clarke have been identified as inspirational forerunners of the contemporary transhumanist movement.

Pierre Teilhard de Chardin (1881-1955). The Jesuit paleontologist Teilhard is regarded by some as a prototypical transhumanist. David Grumett sees convergences between Teilhard’s thoughts and those of transhumanists in several key themes, including (1) the manifested purpose of biological evolution and human history, (2) the multiplying effect of the collective reflective capacity of human society which Teilhard calls the “noosphere,” (3) the mutable essence of humanity, and (4) the recognition that the evolution of humanity is entering a new phase accelerating towards what Teilhard calls “the Omega point.”³⁸⁹

Eric Steinhart also sees Teilhard as a key forerunner of transhumanism. Teilhard was among the first to think seriously about human evolution. Teilhard’s noosphere is now realized with the Internet. Teilhard’s Omega Point Theory, with its root in Christian eschatology, has been translated into the contemporary notions of Singularity by transhumanists such as John D. Barrow, Tipler, Moravec, and Kurzweil.³⁹⁰

³⁸⁸ CRISPR Therapeutics, “CRISPR Therapeutics and Vertex Announce Progress in Clinical Development Programs for the Investigational CRISPR/Cas9 Gene-Editing Therapy CTX001,” (press release), February 25, 2019, <http://www.globenewswire.com/news-release/2019/02/25/1741524/0/en/CRISPR-Therapeutics-and-Vertex-Announce-Progress-in-Clinical-Development-Programs-for-the-Investigational-CRISPR-Cas9-Gene-Editing-Therapy-CTX001.html>. See also Antonio Regalado, “CRISPR Gene Editing to be Tested on People by 2017, Says Editas,” *MIT Technology Review*, November 5, 2015, <https://www.technologyreview.com/s/543181/crispr-gene-editing-to-be-tested-on-people-by-2017-says-editas/>.

³⁸⁹ David Grumett, *Teilhard de Chardin: Theology, Humanity and Cosmos* (Dudley, MA: Peeters, 2005), 3, 27, 75, 101, 220–27. See also Pierre Teilhard de Chardin and Ursula King, *Pierre Teilhard de Chardin: Writings* (Maryknoll, NY: Orbis Books, 1999), 61–64, 82–99.

³⁹⁰ Eric Steinhart, “Teilhard de Chardin and Transhumanism,” *Journal of Evolution & Technology* 20, no. 1 (2008): 1–22.

J. B. S. Haldane (1892-1964). In his 1924 work *Daedalus, or, Science and the Future*, the British geneticist and evolutionary biologist Haldane envisioned a future where ectogenesis becomes commonplace and humanity controls its evolution.³⁹¹ The idea of achieving immortality through transcending the human body is often attributed to Haldane and the members of his circle.

J. D. Bernal (1901-1971). In his 1929 work *The World, the Flesh, and the Devil*, Bernal speculated on space colonization, cybernetic implants, enhancement of human intelligence, and longevity.³⁹²

Aldous Huxley (1894-1963). A. Huxley's 1932 novel, *The Brave New World*, typifies the dystopian nightmares related to transhumanism, especially regarding state-controlled eugenics.³⁹³ A. Huxley also coined the term neurotheology to designate the field which seeks to explain religious experiences using neurosciences.³⁹⁴

Julian Huxley (1887-1975). In his 1957 work, *New Bottles for New Wine*, the evolutionary biologist J. Huxley coined the term "transhumanism." J. Huxley wrote, "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 Peking man. It will, at last, be consciously fulfilling its real destiny." He does not seem to have in mind the contemporary sense of transhumanism.

³⁹¹ Haldane, *Daedalus, or Science and the Future*, 63–71.

³⁹² Bernal, *The World, the Flesh and the Devil*, 69–81.

³⁹³ Huxley, *Brave New World*. See also Joanne Woiak, "Designing a Brave New World: Eugenics, Politics, and Fiction," *The Public Historian* 29, no. 3 (2007): 106.

³⁹⁴ Huxley, *Island*, 164.

Instead, he seems to be speaking of the state of humanity after several thousand or million years of natural evolution.³⁹⁵

Arthur C. Clarke (1917-2008). British science fiction writer Clarke wrote extensively about the future. A recurring premise in Clarke's works is the idea that the evolution of intelligent species would eventually make them god-like beings. The idea of transcendence through evolution was founded in his 1953 novel *Childhood's End* and his 1975 fiction *Imperial Earth*.³⁹⁶ Clarke was influenced by W. Olaf Stapledon, who wrote several science fiction novels based on a similar evolutionary theme, such as his 1930 work, *Last and First Men: A Story of the Near and Far Future*.³⁹⁷

Leading Advocates of Transhumanism

Advocates of contemporary transhumanism spread across a wide spectrum of ideology and expertise. In this section, I survey the thoughts and works of some of the leading transhumanist voices.

Marvin Minsky (1927-2016). Known as one of the Fathers of AI, computer scientist Minsky deals with the issue of immortality and religious belief in an essay "Why Freud was the First Good AI Theorist." Minsky sees two ways to immortality: (1) the way of science, and (2) the "mumbo-jumbo" way of waiting for God to come down and offer eternal life. Minsky rejects the mumbo-jumbo way because "it's been a long time

³⁹⁵ Julian Huxley, *Religion without Revelation* (Westport, CT: Greenwood Press, 1979), 190–95.

³⁹⁶ Arthur C. Clarke, *Childhood's End* (New York: Ballantine Books, 1953). See also Arthur C. Clarke, *Imperial Earth* (London: Victor Gollancz, 1975).

³⁹⁷ W. Olaf Stapledon, *Last and First Men* (London: Methuen, 1930).

and [he hasn't] seen anyone get eternal life.” “If they had believed in science instead of religion 2000 years ago,” Minsky claimed, “we would all be immortal now.”³⁹⁸

According to Minsky, there is no such thing as understanding, consciousness, or intentionality. Arguments about consciousness from the likes of Penrose and John R. Searle are “silly.” Intentionality is a “bogus concept” invented by Franz Clemens Brentano. The Society of Mind, as Minsky conceives, is just “a big complicated kludge of different types of machinery which are specialized for different functions.”

FM-2030 (1930-2000). F. M. Esfandiary, later known as FM-2030, was an early advocate of the contemporary movement of transhumanism. In his 1970 work *Optimism One*, FM-2030 rejects the notion that the modern person lives in an age of alienation. He contends that optimism is the “only rational philosophical outlook for modern individuals.” He sees modern humanity as being better nourished, better cared for, and better loved than any time in the past. He predicts that the Space Age would be followed by the Time Age. During the Time Age, human beings will “at last cease to be confined to a speck in time” because they will attain immortality. People would have freedom of time and live with no pressure. He cites approvingly Ettinger’s *Prospect of Immortality* and shares the optimism expressed by Clarke in *Profiles of the Future*.³⁹⁹

In his 1989 work *Are You a Transhuman?*, FM-2030 defines transhuman as “transitional human.” Their use of technology, their way of living, and their aspirations make transitional human beings “one step closer to the future of post-humanity.” FM-2030 identifies physical immortality, space colonization, telecommunication, the network of intimacy, post-survival economics, and collaborative politics as transhuman

³⁹⁸ Marvin Minsky, “Why Freud Was the First Good AI Theorist,” in *The Transhumanist Reader*, ed. Max More and Natasha Vita-More (Chichester, UK: Wiley-Blackwell, 2013), 167–76.

³⁹⁹ F. M. Esfandiary, *Optimism One: The Emerging Radicalism* (New York: Norton, 1970), 11, 201–38.

aspirations.⁴⁰⁰

William Sims Bainbridge (1940-). In 2003, sociologist Bainbridge co-authored a report sponsored by National Science Foundation titled “Converging Technologies for Improving Human Performance, Nanotechnology, Biotechnology, Information Technology, and Cognitive Science.” The report claims that the synergistic combination of nanotechnology, biotechnology, information technologies, and new technologies enabled by cognitive science could lead to tremendous improvement in national productivity and quality of life, provided that proper attention is given to ethical issues and societal needs.⁴⁰¹

In his 2013 article “Transavatars,” Bainbridge observes that human capacities could be extended in ways other than modifying the biological body. The meaning of human capacities is relative to the surrounding environment. For people who spend most of their day operating in a virtual world, their capacity is characterized by the functionality of the avatars they own and operate. In the future, remote-controlled robots might play similar roles for people.⁴⁰²

Frank J. Tipler (1947-). While the idea of anthropic principles has been discussed among physicists since the 1960s, Barrow and Tipler popularized the idea in their 1986 work *The Anthropic Cosmological Principle*.⁴⁰³

In his 1994 work *The Physics of Immortality*, Tipler hypothesizes about a

⁴⁰⁰ FM-2030, *Are You a Transhuman?* 202–6.

⁴⁰¹ Mihail C. Roco and William S. Bainbridge ed., “Converging Technologies for Improving Human Performance: Nanotechnology, Biotechnology, Information Technology and Cognitive Science,” *NSF/DOC-Sponsored report* (2003): 1–27.

⁴⁰² William S. Bainbridge, “Transavatars,” in *The Transhumanist Reader*, ed. Max More and Natasha Vita-More (Chichester, UK: Wiley-Blackwell, 2013), 91–99.

⁴⁰³ John D. Barrow and Frank J. Tipler, *The Anthropic Cosmological Principle* (New York: Oxford University Press, 1986), 91.

distant future in which intelligent beings find ways to entertain themselves one last chance by running a simulation for “Heaven” where the dead are resurrected.⁴⁰⁴

Michio Kaku (1947-). In his 2011 work *Physics of the Future*, theoretical physicist and popular science writer Kaku catalogs potential human enhancement technologies and reflects on how such technologies may impact humankind.⁴⁰⁵

In his 2014 work *The Future of the Mind*, Kaku observes that the survival of mankind seems like a miracle. Given the history of Earth, intelligent life could have come to a dead end. Self-destruction of humanity remains a distinct possibility.⁴⁰⁶

Kaku postulates that mind uploading might enable people to be teleported across vast distances in the universe near the speed of light.⁴⁰⁷ In the television documentary *Sci-Fi Science: Physics of the Impossible*, Kaku suggests that mind uploading can be achieved with the usage of advanced MRI machines, whole brain emulation, and quantum entanglement.⁴⁰⁸

Ray Kurzweil (1948-). In his 2009 work, *The Coming Merging of Mind and Machine*, inventor and futurist Kurzweil predicts that neural implants capable of improving our sensory experience, memory, and thinking will appear by the 2020s.⁴⁰⁹ By the 2030s, people will be able to meet in a virtual reality that appears completely real and to experience business, social, and sexual interaction with anyone real or imagined.

⁴⁰⁴ Tipler, *The Physics of Immortality*, 217–65.

⁴⁰⁵ Michio Kaku, *Physics of the Future: How Science Will Shape Human Destiny and Our Daily Lives by the Year 2100* (New York: Doubleday, 2011), 378–407.

⁴⁰⁶ Michio Kaku, *The Future of the Mind: The Scientific Quest to Understand, Enhance, and Empower the Mind* (New York: Doubleday, 2014), 323–27.

⁴⁰⁷ Michio Kaku, *Physics of the Impossible: A Scientific Exploration into the World of Phasers, Force Fields, Teleportation, and Time Travel* (New York: Doubleday, 2008), 53–69.

⁴⁰⁸ Stuart Rose, dir. *Sci Fi Science: Physics of the Impossible*. ITV Studios, 2009.

⁴⁰⁹ Ray Kurzweil, “The Coming Merging of Mind and Machine,” *Scientific American*, March 23, 2009, <https://www.scientificamerican.com/article/merging-of-mind-and-machine/>.

Kurzweil believes this type of software evolution is possible because of the Law of Accelerating Returns (LOAR), as progress begets more progress at an exponentially accelerated rate. Accelerating return happens because evolution applies positive feedback on the more capable and productive technological methods, allowing them to lead the creation of the following stage. Over time, the order of information found in an evolutionary process will increase. Biological evolution follows that positive-reinforced evolutionary pattern. Kurzweil argues that the technological process also generally follows such a positive-reinforced evolutionary pattern. The key to such accelerating returns is the development of intelligent machines that could evolve themselves.⁴¹⁰

While the traditional AI approach of rule engines and evolutionary algorithms will continue to play a role, Kurzweil sees a shortcut by copying the human brain using noninvasive scanning techniques, such as Magnetic Resonance Imaging (MRI). He argues that human beings will eventually have no choice but to accept the claim made by non-biological intelligent machines that they have consciousness, assuming they make such claims. People will have no way to tell in any case. And the nonbiological intelligent machines might get mad otherwise.⁴¹¹

Kurzweil popularized the term Singularity with his 2005 book *The Singularity is Near*. He sees the emergence of nonbiological intelligence as part of a grand scheme of evolutionary history with six epochs.⁴¹² The first four epochs have already taken place. They were the epochs of (1) physics and chemistry, (2) biology and DNA, (3) brains, and (4) technology. Technological Singularity would bring about the imminent fifth epoch in

⁴¹⁰ Ray Kurzweil, “The Law of Accelerating Returns,” *Accelerating Intelligence* (blog), March 7, 2001, <https://www.kurzweilai.net/the-law-of-accelerating-returns>.

⁴¹¹ Ray Kurzweil, “Will Artificial Intelligence Become Conscious?” *Accelerating Intelligence* (blog), December 22, 2017, <https://www.kurzweilai.net/will-artificial-intelligence-become-conscious>. See also Ray Kurzweil, *How to Create a Mind: The Secret of Human Thought Revealed* (New York: Viking, 2012), 199–207.

⁴¹² Kurzweil, *The Singularity Is Near*, 7–34.

which human intelligence and technology merge. The resulting acceleration of technological advancement will lead to the sixth and the last epoch in which the universe awakens. Kurzweil writes,

Understanding the Singularity will alter our perspective on the significance of our past and the ramifications for our future. To truly understand it inherently changes one's view of life in general and one's particular life. I regard someone who understands the Singularity and who has reflected on its implications for his or her own life as a “singularitarian.”⁴¹³

In his 2004 work *Fantastic Voyage: Live Long Enough to Live Forever*, Kurzweil claims that immortality is within the grasp of mankind in the 21st century. He describes three bridges that need to be crossed. The first bridge is a longevity program that will make people healthy enough to take advantage of the second bridge. The second bridge is a biotechnology revolution that will switch off disease and aging in the human body so that people will be able to get to the third bridge. The third bridge is the nanotechnology-AI evolution that will enable people to rebuild their bodies and brains at a molecular level so that they may live forever.⁴¹⁴

John Harris (1948-). In his 1992 work *Wonderwoman and Superman*, Harris argues that any medical procedure with important enough benefits and acceptable risks should be pursued. Human enhancement technologies should be no exceptions.⁴¹⁵

In his 2007 work *Enhancing Evolution*, Harris makes his ethical case for human enhancement technologies in response to the rising buzz of transhumanism. He challenges the position of the UNESCO International Bioethics Committee, which insists that the human genome must be preserved as a common heritage of humanity. He questions the assumption that evolution is unambiguously good, with no room for

⁴¹³ Kurzweil, *The Singularity Is Near*, 7.

⁴¹⁴ Ray Kurzweil and Terry Grossman, *Fantastic Voyage: Live Long Enough to Live Forever* (Emmaus, PA: Rodale, 2004), 3–6, 14–32.

⁴¹⁵ John Harris, *Wonderwoman and Superman: The Ethics of Human Biotechnology* (Oxford: Oxford University Press, 1992), 199–235.

improvement. He suggests that evolution could make humankind worse. The precautionary principle should apply precautions to the status quo as well. If a human enhancement technology has a high probability of leading to improve life quality and expectancy and the alternative of not pursuing it is the status quo of diseases and certain death, the case for human enhancement is strong. Once germline modification is demonstrated to be safe, it should be considered the therapies of choice as it is massively more efficient.⁴¹⁶

While Harris sees nothing wrong with people wanting to be transhuman, to become something other than human is not a goal in and of itself. To say one is a transhumanist is a matter of self-identity, no different than saying one is a born-again Christian or a fundamentalist Muslim. The improvement of life quality and expectancy is the real objective most people are interested in, whatever their self-identities.⁴¹⁷

Harris observes that objections have been raised against life extension based on the argument that personal identity could not survive long existence. Hans Jonas and Walter Glannon argue that a person having a Methuselah-scale lifespan would practically be living multiple lives serially in the same body.⁴¹⁸ Harris responds by evaluating the downsides of having different persons living in the same physical body serially. It seems likely that the person occupying the body later would still inherit the memory, experience, and skill set of the earlier body tenants. Therefore, the suggestion that they are completely different persons is unsubstantiated.⁴¹⁹

Harris responds similarly to the concern of overpopulation when people live

⁴¹⁶ Harris, *Enhancing Evolution*, 1–35.

⁴¹⁷ Harris, *Enhancing Evolution*, 38.

⁴¹⁸ Hans Jonas, “The Burden and Blessing of Mortality,” *The Hastings Center Report* 22, no. 1 (1992): 34–40. See also Walter Glannon, “Identity, Prudential Concern, and Extended Lives,” *Bioethics* 16, no. 3 (2002): 266–83.

⁴¹⁹ Harris, *Enhancing Evolution*, 36.

much longer. He suggests that when people live longer, they will have less need and urgency to reproduce.⁴²⁰

Hans Moravec (1948-). In his 1992 article “Pigs in Cyberspace,” computer scientist Moravec speculates that human beings might be living in a simulation. One scenario is that we exist as “brain in a vat” sustained by life-support machinery and remote controlling artificial bodies at remote locations. Another scenario is that we are part of evolving cyberspace and what we are experiencing is merely a “distributed mental event” of the past or a complete fabrication that never happened.⁴²¹

In his 1988 work *Mind Children*, Moravec makes predictions of artificial life based on the projection of Moore’s Law. By 2030 to 2040, new artificial species that are evolved from intelligent robots might already have appeared.⁴²²

In his 1998 work *Robot: Mere Machine to Transcendent Mind*, Moravec predicts a “mind fire” of rapidly expanding superintelligence as robots continue to evolve. He predicts that the robots of the mid-twenty-first century will become human’s “evolutionary heir.” Robots will “grow from us, learn our skills, and share our goals and values” and become “children of our minds.”⁴²³ Moravec’s predictions have attracted strong praise and criticism. Clarke thought of *Robot* as “the most awesome work of controlled imagination” he ever encountered.⁴²⁴ Colin McGinn thought Moravec was “bizarre, confused, and incomprehensible” in his discussion of consciousness, losing his

⁴²⁰ Harris, *Enhancing Evolution*, 69–70.

⁴²¹ Hans Moravec, “Pigs in Cyberspace,” in *The Transhumanist Reader*, ed. Max More and Natasha Vita-More (Chichester, UK: Wiley-Blackwell, 2013), 177–78.

⁴²² Moravec, *Mind Children*, 38.

⁴²³ Moravec, *Robot*, 191–211.

⁴²⁴ Cover endorsement for Moravec, *Robot*.

grip on the distinction between virtual and real reality.⁴²⁵

Natasha Vita-More (1950-). Formally trained in media design, Natasha Vita-More focuses on an artistic approach to transhumanism. In “Aesthetics: Bringing the Arts & Design into the Discussion of Transhumanism,” she suggests that speculative and emerging technologies require a fine balance of scientific realism and cosmic chance, unity and plurality, technology, and the arts. She explains transhumanism as neither advocating cyborg nor immaterial uploaded mind. Cyborg as envisioned by cybernetic posthumanists is still all too human. But the uploaded mind is thoroughly non-human. Transhumanism is instead advocating a “synergistic being” made up of the continuity of the self over time. It is a distributed rather than a disembodied entity.⁴²⁶

In *Life Expansion Media*, Vita-More interprets Dylan Thomas’s poem “Do not go gentle into that good night” and its first refrain, “Rage, rage against the dying of the light,” as a rage reflected by transhumanism. “The transhumanist rage against the dying of the light is largely fostered by an urgency to change dictums of ‘normal’ and ‘normalcy.’ Transhumanists defy the norm of gender and genitalia, just as they deny the normalcy of life and death.”⁴²⁷

K. Eric Drexler (1955-). Known for his pioneering work of molecular nanotechnology, Drexler is a well-known figure in the transhumanist community. Drexler postulates a mechanistic model of handling atoms and molecules. In his 1986 work *Engines of Creation*, Drexler puts forth the idea of nanoscale assemblers that replicate

⁴²⁵ Colin McGinn, “Hello, Hal: Three Books Examine the Future of Artificial Intelligence and Find the Human Brain Is in Trouble,” *New York Times*, January 3, 1999, <https://archive.nytimes.com/www.nytimes.com/books/99/01/03/reviews/990103.03mcginnt.html>.

⁴²⁶ Natasha Vita-More, “Aesthetics: Bringing the Arts & Design into the Discussion of Transhumanism,” in *The Transhumanist Reader*, ed. Max More and Natasha Vita-More (Chichester, UK: Wiley-Blackwell, 2013), 18–27.

⁴²⁷ Natasha Vita-More, “Life Expansion Media,” in *The Transhumanist Reader*, ed. Max More and Natasha Vita-More (Chichester, UK: Wiley-Blackwell, 2013), 75.

themselves and other structures.⁴²⁸ In his 1991 doctoral dissertation, Drexler hypothesizes ways to make logic gates using a nanoscale mechanistic model. His dissertation was published in 1992 as *Nanosystems: Molecular Machinery, Manufacturing and Computation*, which was named the Best Computer Science Book of the year by the Association of American Publishers.⁴²⁹

The conceivable power of such self-replicating nanobots gave rise to the “grey goo” scenario, a phrase Drexler coined to describe the uncontrolled self-replication of nanobots. While Drexler admits the possibility, he claims that the scenario is preventable. He recognizes a similar potential catastrophic outcome in the form of an AI takeover with the emergence of superhuman intelligence. However, he believes that the AI takeover is preventable.⁴³⁰

Steve Fuller (1959-). Philosopher-sociologist Steve Fuller suggests that the Christian tradition could engage transhumanism by discovering “the inspiration that is the source of all religion” and “the foundation of our human dignity” in the human capacity for self-transcendence.⁴³¹

Fuller traces an intellectual lineage of transhumanism to the univocal and voluntarist thoughts of Duns Scotus. Fuller identifies Scotus as a pivotal figure in the elevation of man’s self-image in the West. Aquinas argues that theological language is neither equivocal nor univocal, but analogical. But Scotus insists that theological language is univocal. Fuller sees Scotus as freeing people to imagine having true

⁴²⁸ K. Eric Drexler, *Engines of Creation*, 12–15.

⁴²⁹ Drexler, *Nanosystems*, 342–71.

⁴³⁰ Paul Rincon, “Nanotech Guru Turns Back on ‘Goo’,” BBC News, June 9, 2004, <http://news.bbc.co.uk/2/hi/science/nature/3788673.stm>. See also Jim Lewis, “Drexler Calms Fears of Runaway Replicators,” June 9, 2004, https://foresight.org/drexler_calms_fears_of_runaway_replicators/.

⁴³¹ Steve Fuller, *Humanity 2.0: What It Means to be Human Past, Present and Future* (Houndmills, UK: Palgrave Macmillan, 2011), 216–22.

knowledge of God and opening the floodgate of possibility. For Aquinas, creation is good because creation reflects God's goodness analogically. For Scotus, creation is what it is because God freely makes it to be so. Just as the univocal theological language gives people the feeling that our reality is the same as the way God sees it, the voluntarist understanding of the will gives people the feeling that they can change the world at will, much like how God wills it to be.⁴³²

James J. Hughes (1961-). In 2006, the libertarian right and the liberal left within the transhumanist movement clashed over politics, leading to a more left-leaning positioning of the WTA under the leadership of sociologist and bioethicist Hughes. With the Extropy Institute pausing its operation, WTA becomes the leading transhumanist organization internationally. Hughes has written extensively to explain the different sub-movements and crosscurrents within the transhumanist movement. For example, he wrote an article in 2004 relating the concept of self-perfection with Buddhism, nanotechnology, and psychopharmaceuticals.⁴³³

In his 2014 work *Citizen Cyborg*, Hughes encourages techno-progressives to address from a public policy standpoint the issue of the emerging genetic divide of unequal access to human enhancement technologies.⁴³⁴ Hughes has debated often with libertarian transhumanists such as Istvan. The personal contrast between the libertarian Istvan and the democratic socialist Hughes reflects their ideological divide. Unlike Istvan who speaks as a venture capitalist of Silicon Valley, Hughes is a New England academician in sociology and history. Unlike Istvan who is a militant atheist with a Catholic upbringing, Hughes is a Buddhist scholar who used to be a monk. Unlike Istvan

⁴³² Fuller, *Humanity 2.0*, 78–86.

⁴³³ James J. Hughes, "Technologies of Self-Perfection: What Would the Buddha Do with Nanotechnology and Psychopharmaceuticals?" *IEET*, September 22, 2004, <https://ieet.org/index.php/IEET2/more/hughes20040922>.

⁴³⁴ Hughes, *Citizen Cyborg*, 187–220.

who advocates individual morphological freedom so long as nobody else gets hurt, Hughes believes in consensus building through international medical ethics standards.⁴³⁵

Hughes thinks extensively about the relationship between transhumanism and religions. He identifies metaphysics, eschatology, and soteriology as three potential areas of fruitful transhumanist engagement with religious traditions.⁴³⁶

Max More (1964-). More sees transhumanism as a nonreligious philosophy of life that emphasizes ethics and meanings instead of symbolic expressions of faith.⁴³⁷ Applying a neologism of Kurtz, More describes transhumanism as a eupraxsophy, a complex worldview similar to secular humanism and Confucianism.⁴³⁸

More observes that transhumanists are drawn to different moral theories. His proposed moral principles of extropy are grounded on virtue ethics.⁴³⁹ Responding to the precautionary principle cited often by opponents to transhumanism, More recasts his extropianism into seven “proactionary” principles of (1) perpetual progress, (2) self-transformation, (3) practical optimism, (4) intelligent technology, (5) open society, (6) self-direction, and (7) rational thinking.⁴⁴⁰

More is skeptical of the notion of Singularity. More questions two assumptions of the Singularity scenario. First, while More is confident that human-level AI is

⁴³⁵ The Future Society, “TFS Hosts Zoltan Istvan and James Hughes (Debate on the Politics of Post-humanism),” accessed August 24, 2019, <https://www.youtube.com/watch?v=DTbU4SN9yQ0>. See also Alex Pearlman, “The Opposing Leaders of the Transhumanist Movement Got Salty in a Debate,” *Vice*, April 25, 2016, https://www.vice.com/en_us/article/jpg577/transhumanist-debate.

⁴³⁶ James J. Hughes, “Contradictions from the Enlightenment Roots of Transhumanism,” *Journal of Medicine and Philosophy* 35, no. 6 (2010): 622–40.

⁴³⁷ More, “The Philosophy of Transhumanism,” 4.

⁴³⁸ Bupp, *Meaning and Value in a Secular Age*, 30–31, 57–59.

⁴³⁹ More, “The Philosophy of Transhumanism,” 13.

⁴⁴⁰ Max More, “The Proactionary Principle,” accessed November 23, 2015, <http://www.extropy.org/proactionaryprinciple.htm>. See also Max More, “The Proactionary Principle: Optimizing Technological Outcomes,” in *The Transhumanist Reader*, ed. Max More and Natasha Vita-More (Chichester, UK: Wiley-Blackwell, 2013), 258–67.

achievable, he is not persuaded that super-human intelligence would follow automatically. Second, even if a super-human intelligence came about, More expects things will change gradually. More expects a “Surge” or a series of non-simultaneous Surges instead of a Singularity.⁴⁴¹

Schneider had classified four positions in the personal identity debate: (1) the ego theory, which says that the soul can survive the death of the body, (2) the patternist/psychological continuity theory, which says that a person is the person’s memory patterns and the person’s ability to reflect on himself or herself, (3) materialism, which says that a person consists of the molecules that make up the person’s brain, (4) the self-is-a-fiction view, which says “I” is a grammatical fiction, a bundle of impressions, with no underlying self. More holds the patternist view, although he thinks of the view as compatible with the self-is-a-fiction view.⁴⁴²

Graham places More in the tradition of Ludwig Feuerbach and Nietzsche with their common objection to theism.⁴⁴³ More observes that there are few Christian transhumanists and believes that a fundamentalist Christian would be in “deep confusion” to claim to be a transhumanist. While the idea of transcendence is found in Judeo-Christian and other religious traditions, More distinguishes between being raised by a higher external power in Christianity and seeking ascendance by one’s effort in transhumanism.⁴⁴⁴ He notes the discovery of Reilly Jones, who observes in the Renaissance philosopher Pico della Mirandola a certain outlook close to contemporary

⁴⁴¹ Max More, “Singularity and Surge Scenarios,” *Max More’s Strategic Philosophy* (blog), June 21, 2009, <http://strategicphilosophy.blogspot.com/2009/06/how-fast-will-future-arrive-how-will.html>.

⁴⁴² Susan Schneider, “Future Minds: Transhumanism, Cognitive Enhancement, and the Nature of Persons,” in *The Penn Center Guide to Bioethics*, ed. Vardit Ravitsky, Autumn Fiester and Arthur L. Caplan (New York: Springer, 2009), 95–110. See also Max More, “The Diachronic Self: Identity, Continuity, Transformation,” (PhD diss., University of Southern California, 1995), 22, 58, 79, 197–201.

⁴⁴³ Elaine L. Graham, “‘Nietzsche Gets a Modem’: Transhumanism and the Technological Sublime,” *Literature and Theology* 16, no. 1 (2002): 75.

⁴⁴⁴ More, “The Philosophy of Transhumanism,” 8.

transhumanism. In his *Oration on the Dignity of Man*, Pico della Mirandola portrays God as giving Adam the power to choose between degenerating into lower brutish life forms and being reborn into higher divine forms.⁴⁴⁵

In connecting transhumanism to the ideas of Nietzsche, More highlights a question raised by Nietzsche about the modern Man: “what have you done to overcome him?”⁴⁴⁶ More’s transhumanism is one way to interpret Nietzsche: we have not heard from Father God for a long time and Mother Nature seemed to be taking too long to fix the broken human nature for us. It is time for us to grow up and fix human nature ourselves.⁴⁴⁷

Anders Sandberg (1972-). Trained in computational neuroscience, Sandberg is most noted for his work on morphological freedom, which he explains as the civil right of a person to either maintain one’s body as is or to receive changes through informed consent.⁴⁴⁸

Sandberg has also critically examined ideas proposed by various transhumanists from the perspective of a cognitive scientist. He identifies nine different meanings of the term technological Singularity.⁴⁴⁹ He evaluates the merits of various technological proposals for the transfer of human consciousness to alternative

⁴⁴⁵ Reilly Jones made the observation in his 1995 presentation to the Extro-1 conference. More, “The Philosophy of Transhumanism,” 9. Ernst Cassirer, Paul Oskar Kristeller and John H. Randall ed., *The Renaissance Philosophy of Man* (Chicago: University of Chicago Press, 1948), 223–25.

⁴⁴⁶ Nietzsche, *Thus Spoke Zarathustra*, 41–42. See also More, “The Overhuman in the Transhuman,” 1–4. Stefan Lorenz Sorgner, “Nietzsche, the Overhuman, and Transhumanism,” *Journal of Evolution & Technology* 20, no. 1 (2009): 29–42.

⁴⁴⁷ Max More, “A Letter to Mother Nature,” in *The Transhumanist Reader*, ed. Max More and Natasha Vita-More (Chichester, UK: Wiley-Blackwell, 2013), 449–50. See also Max More, “A Letter to Mother Nature: Amendments to the Human Constitution,” *Strategic Philosophy* (blog), May 25, 2009, <http://strategicphilosophy.blogspot.com/2009/05/its-about-ten-years-since-i-wrote.html>.

⁴⁴⁸ Sandberg, “Morphological Freedom – Why We Not Just Want It, but Need It,” 56–64.

⁴⁴⁹ Anders Sandberg, “An Overview of Models of Technological Singularity,” in *The Transhumanist Reader*, ed. Max More and Natasha Vita-More (Chichester, UK: Wiley-Blackwell, 2013), 376–94.

substrata.⁴⁵⁰

Nick Bostrom (1973-). In 1999, philosopher Bostrom organized the World Transhumanist Association (WTA) with the stated intention to stay neutral on the political-ideological debate between the libertarian-leaning extropians and others who embrace a modern secular humanism and a utilitarian ethic. While embracing notions such as the hedonist imperative and morphological freedom, WTA members recognize the social responsibility of transhumanists in advocating dramatic technological changes.⁴⁵¹

In his 2002 article “Existential Risks: Analyzing Human Extinction Scenarios,” Bostrom admits the possibility of catastrophic outcomes as the transhumanist technological agenda is pursued. He proposes to counter the existential risk by adopting a controlled technological development plan, focusing on possible harms and likely benefits. Planners should strive to slow down the development of technologies with known possible harms while accelerating the development of technologies with likely benefits. Technologies that have the benefits of working against the possible harmful effects of other technologies should receive even higher development priority.⁴⁵²

In his 2005 article “In Defense of Posthuman Dignity,” Bostrom sets transhumanism against bioconservatism. Observing that bioconservatives such as Kass, Fukuyama, Annas, Wesley Smith, Jeremy Rifkin, and McKibben have repeatedly asserted that human enhancement technologies undermine human dignity, Bostrom

⁴⁵⁰ Sandberg and Bostrom, “Whole Brain Emulation,” 8–11, 37–39, 105.

⁴⁵¹ *H+Pedia*, s.v. “Transhumanist Declaration,” Statement 3, 4, 5, 6, last modified March 9, 2019, https://hpluspedia.org/wiki/Transhumanist_Declaration.

⁴⁵² Bostrom, “Existential Risks: Analyzing Human Extinction Scenarios and Related Hazards,” 5–15. The risks he listed include deliberate misuse of nanotechnology, badly programmed superintelligence, genetically engineered biological agent, accidental misuse of nanotechnology, technological arrest, take-over by a transcending upload, flawed superintelligence and repressive totalitarian global regime.

argues for a view of dignity that is measured in terms of endowed capacity. His view gives the same human dignity to both human and posthuman beings. But posthuman beings also have additional posthuman dignity.⁴⁵³

According to Nicholas Agar, the Enlightenment moral universalism advocated by Bostrom and some other transhumanists sets it apart from the moral relativism demonstrated by libertarian transhumanists.⁴⁵⁴ Within a framework of universal moral rights, statuses of dignity could be interpreted as social arrangements that are “parochially human.”⁴⁵⁵

In his 2013 article “Are You Living in a Simulation?”, Bostrom postulates three possibilities about the reality of the world and argues that at least one possibility is true. The first possibility is that the human species will likely become extinct before becoming technologically mature enough to build sophisticated simulations like those depicted in the movie *Matrix*. The second possibility is that technologically mature civilizations will generally not be interested in running simulations like that. The third possibility is that we probably live in such a simulation. If we discount the first and the second possibilities, the probability of us being part of a simulation is much higher because there would presumably be many more simulated virtual persons than real persons. However, either the first or second possibility might be true. The first possibility implies that few civilizations in the universe would reach the point of being able to run such simulations. In that case, our civilization will likely become extinct before we reach technological maturity. Alternatively, if most civilizations would indeed reach the point of being able to run simulations, then the second possibility would be the main

⁴⁵³ Bostrom, “In Defense of Posthuman Dignity,” 202–14.

⁴⁵⁴ Nicholas Agar, *Humanity’s End: Why We Should Reject Radical Enhancement* (Cambridge, MA: MIT Press, 2010), 133–49.

⁴⁵⁵ Agar, *Humanity’s End*, 152–56.

conceivable reason to assume that we are not living in a simulation.⁴⁵⁶

Zoltan Istvan (1973-). In his 2017 article “Growing World of Libertarian Transhumanism,” journalist Istvan proclaims, “whether people like it or not, transhumanism has arrived.” Istvan observes that transhumanism has become more than a buzzword. Transhumanist-themed columns are found in major media. Transhumanism is discussed by both conspiracy theorists such as Mark Dice and Alex Jones, as well as media heavyweights such as John Stossel and Glenn Beck. Istvan postulates the end of human death by the mid-twenty-first century if governments permit the research and development of the needed science and medicine.⁴⁵⁷ To help make that happens, Istvan has been running for political offices, first as the Transhumanist Party candidate for the President of the USA, and subsequently as a Libertarian Party candidate for Governor in California.⁴⁵⁸

Ideologies Related to Transhumanism

Transhumanism belongs to the ideological family of humanism. In this section, we compare and distinguish transhumanism with humanism, Marxism, existentialism, anti-humanism, posthumanism, radical feminism, and postgenderism.

Humanism

Several manifestoes of humanism have been released in the last century. *A Humanist Manifesto*, also known as *Humanist Manifesto I*, was written in 1933 by Roy

⁴⁵⁶ Nick Bostrom, “Are We Living in a Computer Simulation?” *Philosophical Quarterly* 53, no. 211 (2003): 243.

⁴⁵⁷ Zoltan Istvan, “The Growing World of Libertarian Transhumanism,” *The American Conservative*, August 8, 2017, <https://www.theamericanconservative.com/articles/the-growing-world-of-libertarian-transhumanism/>.

⁴⁵⁸ Marantz, “The Transhumanists’ Nominee for President.” See also Elise Bohan, “Transhumanist Zoltan Istvan Runs for Governor of California,” *Big Think*, March 5, 2007, <https://bigthink.com/elise-bohan/could-this-transhumanist-be-the-next-governor-of-california>.

Wood Sellars and Raymond Bragg and was published with 34 signatories, including John Dewey. A key difference with later humanist manifestos is *Humanist Manifesto I*'s reference to humanism as a new "religion" that transcends and replaces previous revelatory and supernatural religions. The fifteen affirmations of *Humanist Manifesto I* can be summarized as: (1) the universe is self-existing and not created; (2) man is a part of nature and emerged from within; (3) dualism of mind and body is to be rejected; (4) religious culture and civilizations are the result of interaction with natural environment; (5) modern science makes any supernatural or cosmic guarantees of human values unacceptable; (6) theism, deism, and modernism are outdated; (7) the distinction between sacred and the secular can no longer be maintained; (8) religious humanism seeks the realization of human development and fulfillment here and now; (9) worship and prayer should be replaced by heightened personal life and social well-being; (10) emotions and attitudes in the supernatural have no place; (11) sentimental and unreal hopes and wishful thinking are unhelpful in facing crises in life; (12) creativity should be fostered; (13) religious institutions must be rapidly reconstituted to function effectively; (14) a socialized and cooperative economic order is desirable; and (15) the possibilities of life should be affirmed by establishing conditions for satisfaction. The affirmations are followed by an exaltation of Man, who is now "at last becoming aware that he alone is responsible for the realization of the world of his dreams, that he has within himself the power for its achievement. He must set intelligence and will to the task."⁴⁵⁹

Humanist Manifesto II was written in 1973 by Paul Kurtz and Edwin H. Wilson. With the hindsight of Nazism and World War II, the exaltation of Man in *Humanist Manifesto I* was deemed far too optimistic. *Humanist Manifesto II* notes in its preface various problems of human society such as totalitarian regimes, inhuman wars,

⁴⁵⁹ American Humanist Association, "Humanist Manifesto I," accessed October 24, 2018, <https://americanhumanist.org/what-is-humanism/manifesto1/>.

police states, racism, and oppression of women. It admits that “science has sometimes brought evil as well as good.” The seventeen affirmations of *Humanist Manifesto II* touch on religion, ethics, the individual, democratic society, and world community. They can be summarized as: (1) supernatural religious belief is deemed meaningless or irrelevant; (2) the hope for immortal salvation and the fear for eternal damnation are both harmful; (3) moral values are based on situational needs and drawn from human experience; (4) reason and intelligence are most effective human instruments; (5) human dignity is a central humanist value; (6) birth control, abortion, and divorce should be recognized; (7) the democratic society exists to enhance freedom and dignity; (8) free speech is key, and so is open process of political participation; (9) church and state should be separated; (10) alternative economic systems should be evaluated; (11) moral equality must be furthered through elimination of all forms of discrimination; (12) nationalism should be replaced by a commitment to the world community; (13) violence and force must be renounced as the method of solving international disputes; (14) the world community must protect the ecosystem of Earth; (15) developed nations must provide humanitarian aid and safeguard human rights; (16) technology needs to be developed with careful judgment of consequences, and (17) communication and transportation must expand while travel restrictions must cease. *Humanist Manifest II* concludes with the claim that “humankind has the potential, intelligence, goodwill, and cooperative skill to implement this commitment in the decades ahead.” The keyword is “potential.” Success is not a given, but the possibility is there.⁴⁶⁰

A Secular Humanist Declaration was issued in 1980 by the Council for Democratic and Secular Humanism. It carries a strong emphasis on matters that have implications for political actions. Otherwise, it mostly resembles *Humanist Manifesto II*.

⁴⁶⁰ American Humanist Association, “Humanist Manifesto II,” accessed October 24, 2018, <https://americanhumanist.org/what-is-humanism/manifesto2/>.

Modern humanism is characterized as (1) ethical, (2) rational, (3) supportive of democracy and human rights, (4) insisting on a combination of personal liberty and social responsibility, (5) providing an alternative to dogmatic religion, (6) valuing artistic creativity and imagination, and (7) aiming at a life stance of maximum possible fulfillment.⁴⁶¹

The Amsterdam Declaration, released in 2002 by the General Assembly of the International Humanist and Ethical Union (IHEU), is a much briefer declaration intended to gain wider acceptance by purging the more controversial left-wing political and anti-religious languages.⁴⁶²

Humanism and Its Aspirations, also known as *Humanist Manifesto III*, is written in a similar style to *The Amsterdam Declaration*. Briefer and avoiding expressions that are politically or religiously charged, it describes rather than prescribes humanism in six affirmations: (1) knowledge of the world is derived by observation, experimentation, and rational analysis; (2) humans are an integral part of nature, the result of unguided evolutionary change; (3) ethical values are derived from human need and interest as tested by experience; (4) life's fulfillment emerges from individual participation in the service of humane ideals; (5) humans are social by nature and find meaning in relationships; and (6) working to benefit society maximizes individual happiness.⁴⁶³

Humanism and Transhumanism

Robert Ranisch and Stefan Lorenz Sorgner see transhumanism as an

⁴⁶¹ Council for Democratic and Secular Humanism, "A Secular Humanist Declaration," 1980, <https://secularhumanism.org/a-secular-humanist-declaration/>.

⁴⁶² International Humanist and Ethical Union, "The Amsterdam Declaration," 2002, <https://iheu.org/about/humanism/the-amsterdam-declaration/>.

⁴⁶³ American Humanist Association, "Humanism and Its Aspirations: Humanist Manifesto III, a Successor to the Humanist Manifesto of 1933," accessed October 24, 2018, <https://americanhumanist.org/what-is-humanism/manifesto3/>.

intensification of humanism. Unlike posthumanism, which is critical of traditional humanism, transhumanism embraces the Enlightenment ideals of reason, science, freedom, and progress. Hence, transhumanism also inherits various internal incoherencies from the Enlightenment tradition.⁴⁶⁴

Hughes sees transhumanism as an ideological descendent of the Enlightenment but with significant revisions. While sharing with the Enlightenment a belief in reason, transhumanists reject the positions adopted by many Enlightenment thinkers in theology, state power, teleology, moral authority, and immortality. Hughes sees transhumanism as (1) replacing traditional theology with faith in science and materialism, (2) recognizing technocratic authoritarianism as part of state power, (3) driving towards a self-directed technocratic future instead of being submissive to a divine teleology, (4) basing moral authority on universal human rights instead of church authority, and (5) hoping for digital immortality that is quite different from the theological conception of the immortality of the soul.⁴⁶⁵

Hughes also identifies seven points of tension in the Enlightenment tradition inherited by transhumanism. First, reason requires validation from the irrational source. Transhumanism inherits from the Enlightenment the desire to be guided by reason instead of faith, superstition, and revelation.⁴⁶⁶ But transhumanism also embraces some criticisms from the Counter-Enlightenment, Nietzsche, the Frankfurt School, Ludwig Wittgenstein, and postmodernists such as Michel Foucault and Jacques Derrida. These critics see reason as historically situated and biased by power and position.⁴⁶⁷

⁴⁶⁴ Robert Ranisch and Stefan Lorenz Sorgner ed., *Post- and Transhumanism: An Introduction* (Frankfurt am Main: Peter Lang, 2014), 8, 17. See also Hava Tirosh-Samuelson, "Religion," in *Post- and Transhumanism: An Introduction*, ed. Robert Ranisch and Stefan Lorenz Sorgner (Frankfurt am Main: Peter Lang, 2014), 56.

⁴⁶⁵ Hughes, "Contradictions from the Enlightenment Roots of Transhumanism," 622.

⁴⁶⁶ Hughes, "Contradictions from the Enlightenment Roots of Transhumanism," 623.

⁴⁶⁷ Hughes, "Contradictions from the Enlightenment Roots of Transhumanism," 624.

Second, while most transhumanists are atheists, they believe in the transcendent power of intelligence, which could lead to new types of theologies. Ninety percent of WTA members affirm that the meaning of life should derive from human responsibility and opportunity, instead of divine revelation.⁴⁶⁸ However, a third of WTA members identify themselves to be religious. Transhumanism seems arguably compatible with various strands of cosmotheism, exemplified by the thoughts of Teilhard, Tipler, Bostrom's simulation hypothesis, and the Order of Cosmic Engineers.⁴⁶⁹

Third, while most transhumanists are liberal democrats, their belief in the supremacy of reason could lead to technocratic authoritarianism. Transhumanists lean libertarian and favor strong individual rights.⁴⁷⁰ Yet some transhumanists such as Bostrom and Yudkowsky see merits in having a super-intelligent singleton that is free of the bias, aggression, and self-interest of human cognition.⁴⁷¹

Fourth, transhumanists do not have a consensus in terms of the optimal balance between democracy and the free market. Both the democratic left and the libertarian right are represented in transhumanism. Some are concerned about the existential risks presented by runaway technologies, while others oppose regulation against technological innovations.⁴⁷²

Fifth, transhumanists like to see the future as an open opportunity but believe that technological progress is inevitable. The inevitability of progress is an Enlightenment theme running from Condorcet, Marxist historical determinism, to Singularitarianism. Some transhumanists worry that an attitude of *laissez-faire* will underestimate the risks of

⁴⁶⁸ Hughes, "Contradictions from the Enlightenment Roots of Transhumanism," 627.

⁴⁶⁹ Hughes, "Contradictions from the Enlightenment Roots of Transhumanism," 628.

⁴⁷⁰ Hughes, "Contradictions from the Enlightenment Roots of Transhumanism," 629.

⁴⁷¹ Hughes, "Contradictions from the Enlightenment Roots of Transhumanism," 630.

⁴⁷² Hughes, "Contradictions from the Enlightenment Roots of Transhumanism," 633.

run-away technologies that lead to the end of human existence.⁴⁷³

Sixth, some transhumanists subscribe to ethical universalism while others subscribe to ethical relativism. Some argue for the enforcement of equality for both humans and posthumans, while others think posthumans should have more rights than humans because of their superiority.⁴⁷⁴

Seventh, transhumanists subscribe to different theories of personal identity. Some such as More subscribe to theories of psychological continuity while others such as Kurzweil subscribe to patternism. The WTA FAQ acknowledges that these issues have not been resolved to general satisfaction.⁴⁷⁵

Marxism and Transhumanism

James Steinhoff identifies (1) materialism, (2) technological revolution, and (3) conceptions of humans and nature as the three areas of agreement between transhumanism and Marxism. Marx adopts the dialectical form of Hegel but replaces Hegel's transcendental idealism with materialism. Where Hegel sees the revolution of ideas in consciousness, Marx sees the political revolution in social relations. The technological revolution is seen as a precondition for political revolution. The centralization of all technical means of production is a priority for a sustainable socialist society. Marx views humans as both active and passive to nature. Humans are passive because their biological nature is determined, but humans are also active because we can change ourselves and the world.⁴⁷⁶

⁴⁷³ Hughes, "Contradictions from the Enlightenment Roots of Transhumanism," 631.

⁴⁷⁴ Hughes, "Contradictions from the Enlightenment Roots of Transhumanism," 634.

⁴⁷⁵ Hughes, "Contradictions from the Enlightenment Roots of Transhumanism," 636.

⁴⁷⁶ Steinhoff, "Transhumanism and Marxism: Philosophical Connections," 1–16.

Existentialism and Transhumanism

Interpreting the dramatic expressions of *Daft Punk*, Parkhill observes a parallel between Sartre and Bostrom.⁴⁷⁷ Although both existentialism and transhumanism show strong dissatisfaction with the core tenets of humanism, both movements are still radical forms of humanism. In *Existentialism and Humanism*, Sartre proclaims that Man is nothing other than what he makes of himself.⁴⁷⁸ Existentialism is, paradoxically, at once nihilistic and optimistic. Similarly, transhumanism is pessimistic of the prospect of humanity as is but it is optimistic about what the posthuman can become.

Parkhill observes that Bostrom's account of transhumanism places the defeat of death as the impulse behind all human technological innovations. The certainty of death is the most pessimistic aspect of being human. That is the reason transhumanists see the transcendence of death as the most optimistic aspect of becoming posthuman. However, transhumanism would then leave unanswered the question of what posthuman technology is supposed to focus on once mortality is no more.

To apply an existentialist critique, the posthuman could be living perpetually in bad faith. If overcoming death is a core meaning of being human, what is the meaning of living as a posthuman? According to existentialism, posthumans would need to create a primary meaning of living out of nothing. But then, a question should then be asked of humans in retrospect. If a posthuman must find a primary meaning of living, why should the meaning of being a human center on overcoming death?

Jeffrey P. Bishop analyzes the metaphysical philosophy of transhumanism from the existential perspective of Martin Heidegger and finds transhumanism contradictory to itself. On one hand, transhumanists want to enable individual human

⁴⁷⁷ Chad Parkhill, "Humanism after All? *Daft Punk*'s Existentialist Critique of Transhumanism," *Parrhesia* no. 8 (2009): 78.

⁴⁷⁸ Jean-Paul Sartre, *Existentialism and Humanism*, trans. Philip Mairet (London: Methuen, 1948), 28. See also Parkhill, "Humanism after All? *Daft Punk*'s Existentialist Critique of Transhumanism," 78.

beings to freely express their desire and creativity. On the other hand, transhumanists do not see that humankind has any better choice other than to accept a posthuman future. Can it be called freedom when there is no choice?⁴⁷⁹

Anti-humanism

Nietzsche criticizes humanism as nothing more than a secular version of theism. In his 1887 work *Genealogy of Morals*, Nietzsche claims that the moral rights asserted by humanists are merely means for the weak to constrain the strong. Hence, human rights do not give freedom; they deny freedom.⁴⁸⁰

According to Marx, the traditional conception of human economic rights becomes necessary only because people need to protect themselves in a world of free-market competition. By abolishing private ownership and establishing communism, the traditional conception of human rights would be obsolete.⁴⁸¹

Heidegger views humanism as a kind of metaphysical philosophy that gives humankind a universal essence that is privileged above all else. Part of that universal essence is consciousness, a subjectivist and idealistic notion. But such subjectivity is ultimately incompatible with an understanding of nature that is objectivistic and materialistic, which ought to give no privileged position to humanity.⁴⁸²

Tzvetan Todorov sees scientism as incompatible with humanism. The belief in science does not eliminate free choices for individuals. But as science is objectively valid

⁴⁷⁹ Jeffrey P. Bishop, "Transhumanism, Metaphysics, and the Posthuman God," *Journal of Medicine and Philosophy* 35, no. 6 (2010): 700–720.

⁴⁸⁰ Friedrich Wilhelm Nietzsche, *The Genealogy of Morals*, trans. Horace B. Samuel (New York: Boni and Liveright, 1887), 18, 39, 46.

⁴⁸¹ Karl Marx, "On the Jewish Question," in *The Marx-Engels Reader*, ed. Robert C. Tucker (New York: Norton, 1978), 43.

⁴⁸² Gavin Rae, "Heidegger's Influence on Posthumanism: The Destruction of Metaphysics, Technology and the Overcoming of Anthropocentrism," *History of the Human Sciences* 27, no. 1 (2014): 51–69.

for everyone, individuals must subject their personal beliefs and preferences to objective scientific results.⁴⁸³

Drawing from the semiological work of Roland Barthes, Lévi-Strauss developed a structuralist analysis of culture that dissolves individual subjects into a signifying convention. The autonomous individual is much diminished. Louis Althusser uses the term anti-humanism to underscore the primacy of structure and social relations over individual beliefs, desires, and preferences. Post-structuralists such as Derrida reject the notion of fixed meaning in structuralism. Seeing structuralism as failing to increase freedom, Derrida views the human subject in terms of feelings. Instead of subordinating a person's freedom under a universal reason-based humanism, Derrida sees both human feelings and human reason as constructed contingently upon the situational reality.⁴⁸⁴

Nietzsche and Transhumanism

Graham sees transhumanism as a fulfillment of Nietzsche's vision of the *Übermensch*. Transhumanism is a realization of the will to power through the will to become virtual. But Graham argues that Nietzsche would find transhumanism to be fatally flawed, as transhumanism continues to worship the religion of humanity. Graham thinks it is debatable whether the digital and biotechnological age will lead to more egalitarianism. Transhumanists do not have much to say about the eradication of poverty, disease, and discrimination. The vision of transhumanists seems more aligned with the interest of the wealthy and large technological corporations.⁴⁸⁵

Graham sees lineage between transhumanism and older belief systems such as

⁴⁸³ Tzvetan Todorov, *Imperfect Garden: The Legacy of Humanism* (Princeton, NJ: Princeton University Press, 2014), 20–25.

⁴⁸⁴ Claude Lévi-Strauss, *Structural Anthropology*, rev. ed. (New York: Basic Books, 1974), 31–54.

⁴⁸⁵ Graham, “‘Nietzsche Gets a Modem’: Transhumanism and the Technological Sublime,” 66–70.

Gnosticism and Hermeticism.⁴⁸⁶ Graham agrees with David F. Noble that transhumanists are merely using secular vocabulary to mask old religious themes such as transcendence, fear of finitude, craving for immortality, and divination.⁴⁸⁷ While some transhumanists such as Korker and Weinstein see Nietzsche as their patron saint, Graham suggests that “Nietzsche would have abhorred what he might regard as an excessive and uncritical transcendentalism.”⁴⁸⁸ Nietzsche is better understood as calling all value systems to explain their rationale or risk being condemned as implicit idolatries.

Sorgner argues that transhumanists and Nietzsche agree on a more fundamental level and in more significant ways than some movement leaders of transhumanism realize. Jürgen Habermas has identified two such agreements but believes that transhumanists are as mad as Nietzsche to think like that. First, both transhumanists and Nietzsche view human nature as a work-in-progress. Both view all things as permanently changing. Second, both agree that human values should evolve when information is updated. In the *Genealogy of Morals*, Nietzsche explains that personal, social, and cultural values should all change. Both transhumanists and Nietzsche find the moral precepts and intuitions inherited from traditional Christian values to be insufficient. Both agree on the values of critical thinking, open-mindedness, scientific inquiry, and open discussion. Both share a position that can be called a perspective view of values, which acknowledges that humans differ widely in their conception of perfection. Hence, individual freedom and choice should be respected in human enhancement.⁴⁸⁹

Where Nietzsche and some individual transhumanists like Bostrom disagree,

⁴⁸⁶ Graham, “‘Nietzsche Gets a Modem’: Transhumanism and the Technological Sublime,” 73.

⁴⁸⁷ David F. Noble, *The Religion of Technology: The Divinity of Man and the Spirit of Invention* (New York: Penguin, 1999), 21–49.

⁴⁸⁸ Graham, “‘Nietzsche Gets a Modem’: Transhumanism and the Technological Sublime,” 75–77.

⁴⁸⁹ Sorgner, “Nietzsche, the Overhuman, and Transhumanism,” 29–39.

Sorgner thinks he can still find contemporary representatives of Nietzsche in other transhumanists. For example, FM-2030 has defined transhuman as transitional human, an intermediate step before becoming posthuman. The transitional human anticipates the coming posthuman age by choosing a techno-centric lifestyle. Sorgner sees Nietzsche as making a similar distinction between the higher human and overman. For example, Goethe was in Nietzsche's view a higher human. The transitional/higher human are exceptional instances showing the world what humans could become. Sorgner contends that Bostrom and other transhumanists have not explained persuasively why anyone would want to become posthuman. To reason empirically, instances of transitional human/higher humans are helpful for the world to understand the reason. It is quite reasonable for people to want to meet some transitional human beings before taking a bigger leap to become posthuman.

James Maxwell Milne contends that Nietzsche and transhumanism differ fundamentally on how they view suffering. Milne's contention also raises some questions for Sorgner's interpretation of Nietzsche's higher man. Milne reads Nietzsche's Zarathustra as calling humans to become overman through a process of transformation that involves much suffering. The higher man is the contrasting symbol for the status quo, who is all about the pursuit of happiness and the avoidance of pain. Zarathustra grew sad when the mob chooses the higher man over the overman. The overman affirms the struggle and meaning of life despite the amount of pain life endures. Intense suffering is necessary as a stimulus to spur clarity of thought and resolve. Milne suggests that the valorization of the human spirit to confront suffering is a rare instance where Nietzsche borrows from Christian theology, where Christ is a symbol of suffering overman.⁴⁹⁰

Michael Hauskeller also disagrees with Sorgner's assessment of the

⁴⁹⁰ James Maxwell Milne, "Nietzsche, Transhumanism, and the Value of Suffering," *Journal of Theta Alpha Kappa* 34, no. 1 (2010): 52.

agreements between transhumanism and Nietzsche's vision. Although there are common grounds, the differences are essential. Hauskeller focuses on the values transhumanists place on happiness and life, as exemplified by the hedonistic imperative of Pearce and the principle of procreative beneficence of Savulescu. Transhumanists care strongly about human happiness. In contrast, Nietzsche seeks a world "beyond good and evil," where happiness is not necessarily better than suffering. Transhumanists are willing to criticize any Enlightenment values if the values stem from humanistic biases, although they are not interested in ripping apart the whole humanistic system of values. Nietzsche wanted to be the first immoralist while "transhumanists continue the logocentric tradition of Western philosophy," turning the whole tradition of Christian Platonism upside down. Transhumanists want life extension and if possible, personal immortality. Nietzsche thinks the promise of personal immortality in Christianity is a big lie. Hauskeller observes that nobody wants to die. Hence, immortality is enough reason to want to become posthuman. In contrast, Nietzsche never explains what overhuman is. Nietzsche himself did not even come out speaking in favor of overhuman but instead chose to speak through Zarathustra.⁴⁹¹

In response to Hauskeller and others, Sorgner first acknowledges that Nietzsche said little about using human enhancement technology to become overhuman. Nietzsche was thinking primarily in terms of education. But genetic enhancement and education are merely different means to the same end. Sorgner distinguishes Nietzsche's thoughts between alethic nihilism and ethical nihilism. Alethic nihilists believe that the correspondence theory of truth is wrong and cannot yield true knowledge of the world. The perspectivism of Nietzsche implies an affirmation of alethic nihilism. But understood properly in terms of Nietzsche's perspectivism, ethical nihilism does not imply that moral

⁴⁹¹ Michael Hauskeller, "Nietzsche, the Overhuman and the Posthuman: A Reply to Stefan Sorgner," *Journal of Evolution & Technology* 21, no. 1 (2010): 5–8.

values do not exist. Ethical nihilism simply means different people are free to choose different moral values. Sorgner agrees with Hauskeller that Nietzsche despises hedonism. But Nietzsche sees the ultimate life goal of all organisms in striving for power and believes that power comes from virtue. That is why the cultivation of virtue through education is important to Nietzsche.⁴⁹²

Sorgner suggests that the reluctance to embrace Nietzsche among transhumanists has to do with the continual association of Nietzsche with fascism, especially among German philosophers. Observing that Habermas has practically identified transhumanism with Nazi ideology, Sorgner can appreciate why the transhumanist community wants little to do with Nietzsche. However, Sorgner warns that it smacks of “fascist rhetoric” by tarring someone with something which everybody hates.

Posthumanism

In his 2013 article published on *Existenz*, Francesca Ferrando discusses the differences and relations between posthumanism, transhumanism, anti-humanism, and meta-humanism. Ferrando sees posthumanism as an umbrella term for a variety of movements, including cultural, critical, and philosophical posthumanism. Cultural posthumanism is a branch of cultural theory and is critical of traditional humanism. Critical posthumanism analyzes the ongoing destruction of humanism and seeks to replace the traditional understanding of human nature, characterized by internal notions such as subjectivity and embodiment, with an external view where the human being is understood in terms of the surrounding technological environment. Philosophical

⁴⁹² Stefan Lorenz Sorgner, “Beyond Humanism: Reflections on Trans- and Posthumanism,” *Journal of Evolution & Technology* 21, no. 2 (2010): 1–19.

posthumanism focuses on the moral critiques of humanism and anthropocentrism.⁴⁹³

In her 1999 work *How We Became Posthuman*, Katherine Hayles observes that while it is debatable whether transhumanism should be considered a branch of posthumanism, opponents to transhumanism often describe transhumanism as an activist form of posthumanism. Transhumanism and philosophical posthumanism both envision a future where humanity will evolve into a new intelligent species. Transhumanism stresses the goal of cognitive enhancement, with the posthuman future as the goal.

Transhumanism can be described as a “complacent” or “apocalyptic” variant of posthumanism. While posthumanists are critical of humanism as an ideology, transhumanists are dissatisfied with humanness as an ontological reality. Posthumanists are critical of human exceptionalism, the idea that human is a uniquely privileged kind. Transhumanists, on the other hand, want to make enhanced humanity the center of the world. Posthumanists are critical of human instrumentalism, the right of humankind to control the natural world. Transhumanists consider the technological exploitation of nature a key to progress. With both posthumanism and transhumanism, the transition to the posthuman future entails the translation of human bodies into information, the loss of subjectivity, and the diminishing of bodily boundaries.⁴⁹⁴

Theodore R. Schatzki distinguishes two varieties of posthumanism. The first may be called objectivism, which reduces the subjectivity or intersubjectivity central to humanism by emphasizing the significance of nonhuman agents. The second prioritizes social practices over individuals.⁴⁹⁵

Foucault sees posthumanism as a rejection of humanistic dogma and an

⁴⁹³ Francesca Ferrando, “Posthumanism, Transhumanism, Antihumanism, Metahumanism, and New Materialisms: Differences and Relations,” *Existenz* 8, no. 2 (2013): 26–32.

⁴⁹⁴ Katherine Hayles, *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics* (Chicago: University of Chicago Press, 1999), 6, 35, 283.

⁴⁹⁵ Theodore R. Schatzki, introduction to *The Practice Turn in Contemporary Theory*, ed. Theodore R. Schatzki, K. Knorr-Cetina and Eike von Savigny (New York: Routledge, 2001), 19–20.

attempt to change what it means to be human. He sees humanism and the Enlightenment tradition as existing in a state of tension. Humanism always seeks to establish moral norms, while the Enlightenment tradition is inherently about transcending all boundaries, including the boundaries established by humanistic disciplines. Posthumanism follows the Enlightenment tradition and challenges humanism for its anthropological, political, and scientific implications and presuppositions.⁴⁹⁶

Posthumanism and Transhumanism

Ferrando sees posthumanism and transhumanism as sharing a common perspective of the human condition as non-fixed and mutable. But the two movements have very different roots and perspectives otherwise. Transhumanism seeks the possibilities to modify the human condition through technological innovations. Different currents within transhumanism have incompatible political leanings, but they are united by the interest of human enhancement. Transhumanism stands on human exceptionalism depicted in the Great Chain of Being, which also carries certain sexist, racist, classist, homophobic, and ethnocentric presumptions in the view of the posthumanists. With its root in postmodernism, posthumanism has emerged from the field of literary criticism, especially among feminist theorists. Often explained as a post-anthropocentrism, posthumanism is critical of hierarchical social constructs and humancentric assumptions. Posthumanism belongs more generally to the philosophical family of post-exclusivism, which seeks to deconstruct any dualism, antithesis, and ontological polarization.⁴⁹⁷

Ferrando observes that both posthumanism and transhumanism embrace materialism. While transhumanist materialism resembles Marxism, posthumanist

⁴⁹⁶ Michel Foucault, *The Order of Things: An Archaeology of the Human Sciences* (New York: Vintage Books, 1970), 312–22, 384–87. See also Cary Wolfe, *What Is Posthumanism?* (Minneapolis: University of Minnesota Press, 2009), 121–25.

⁴⁹⁷ Ferrando, “Posthumanism, Transhumanism, Antihumanism, Metahumanism, and New Materialisms: Differences and Relations,” 27–32.

materialism is distinguished by corporeal feminism, an empirical and matter-oriented interest shown by the third-wave feminists. Another point of contact and distinction exists about the concept of death. While transhumanists seek to eliminate death, posthumanists question the dichotomy of life and death. In their respective ways, both posthumanism and transhumanism provide a “post-dualistic process-ontological perspective.”

Fuller sees transhumanism and posthumanism as mutually exclusive. Fuller sees transhumanism as embracing and extending humanism while posthumanism is critical of humanism. Fuller thinks of himself as an ultra-humanist.⁴⁹⁸

LaTorra illustrates the division between transhumanism and posthumanism through the English Channel. Transhumanist thinkers come mostly from the analytic tradition while posthumanist thinkers have roots in the continental tradition. Posthumanist literature is preoccupied with concerns that overlap with postmodernism, poststructuralism, critical theory, feminism, Marx, Nietzsche, and Sigmund Freud. Borrowing from Winston Churchill, who once quipped that the British and the Americans are two peoples separated by a common language, LaTorra observes that both posthumanists and transhumanists seek the posthuman condition; but they differ on what that posthuman condition means.⁴⁹⁹

Transhumanism as Secularist Faith

Hava Tirosh-Samuels sees transhumanism as a secularist faith that actively pursues a posthuman future where the human condition is characterized by the

⁴⁹⁸ Fuller, *Humanity 2.0*, 136–62.

⁴⁹⁹ Michael LaTorra, review of *Post- and Transhumanism: An Introduction*, edited by Robert Ranisch and Stefan Lorenz Sorgner, *College Literature* 42, no. 3 (2015): 532–35.

transcendence of the limitations of biological existence.⁵⁰⁰ Including transhumanism as part of posthumanism in her usage of the term, Tirosh-Samuelsan sees the root of posthumanism in cybernetics, which Jean Pierre Dupuy sees as a decisive step towards anti-humanism.⁵⁰¹ Anti-humanism is part of a broader cultural movement of postmodernism, which overlaps with feminism, postcolonialism, queer theory, and environmentalism in their common critique against the tendency in humanism to disadvantage women, minorities, certain social groups, and nonhuman beings. As summarized by Hayles, posthumanism presumes a view of the human being as having (1) no immaterial soul, (2) a mind represented by an information pattern, (3) a body, which forms a substratum for the mind in a relationship of the prosthesis, and (4) a consciousness, which is as an epiphenomenon of the embodied mind.⁵⁰² In the posthuman condition, the biological body is partially or entirely replaced by machines. Posthuman beings might become quite undistinguishable from robots, which are different mainly in that their “mind” is an AI. Purely AI-driven robots might surpass posthuman beings in bodily and cognitive capacities.⁵⁰³

Tirosh-Samuelsan distinguishes between philosophical-cultural posthumanism (or “posthumanism”), and technoscientific posthumanism (or “transhumanism”). Both schools accept that human nature is a work in progress. But while transhumanism sees itself as an intensified humanism, posthumanism is critical. On the other hand, while posthumanism demonstrates a strong secularist tendency, transhumanism is loaded with

⁵⁰⁰ Hava Tirosh-Samuelsan, “Transhumanism as a Secularist Faith,” *Zygon* 47, no. 4 (2012): 710–34. See also Hava Tirosh-Samuelsan, “Engaging Transhumanism: The Meaning of Being Human,” *Metanexus*, June 5, 2008, <https://www.metanexus.net/engaging-transhumanism-meaning-being-human/>.

⁵⁰¹ Jean-Pierre Dupuy, preface to *On the Origins of Cognitive Science: The Mechanization of the Mind* (Cambridge, MA: MIT Press, 2009), x.

⁵⁰² Robert Pepperell, *The Posthuman Condition: Consciousness Beyond the Brain* (Bristol, UK: Intellect Books, 2003), 33–34. See also Hayles, *How We Became Posthuman*, 25–29. Tirosh-Samuelsan, “Transhumanism as a Secularist Faith,” 714.

⁵⁰³ Tirosh-Samuelsan, “Transhumanism as a Secularist Faith,” 715.

religious motifs.

Tirosh-Samuelsan sees different types of engagement with transhumanism. First, engineers and scientists could do their work with transhumanism as an ideological background. Second, ethicists and social theorists could frame their discussion of human nature, technology, and culture in terms of the posthuman condition. Third, the human rights concerns arisen from transhumanist discourses could be addressed by scholars of economics and politics. Fourth, transhumanism provokes popular cultural responses, especially in sci-fi literature.⁵⁰⁴

Tirosh-Samuelsan describes the fifth approach to engage with transhumanism by taking it as a secularist faith. J. Huxley coined the term transhumanism as a “new ideology” of evolutionary humanism. It is part of J. Huxley’s humanistic “religion without revelation.”⁵⁰⁵ Robert M. Geraci sees transhumanism as a “pervasive religious system in modern life,” operating across a wide array of cultural domains, both implicitly and explicitly.⁵⁰⁶ Hughes recognizes “a syncretism of transhumanism and Singulartarianism with religious millennialism.” He argues that key doctrines of established religions have been interpreted in ways compatible with transhumanism. And he encourages fellow transhumanists to engage with faith communities to broaden their appeal.⁵⁰⁷ Gregory Jordon calls on transhumanists to define transhumanism as a

⁵⁰⁴ Tirosh-Samuelsan, “Transhumanism as a Secularist Faith,” 718.

⁵⁰⁵ Huxley, *Religion without Revelation*, 190–95. See also Tirosh-Samuelsan, “Transhumanism as a Secularist Faith,” 720.

⁵⁰⁶ Robert M. Geraci, “Spiritual Robots: Religion and Our Scientific View of the Natural World,” *Theology and Science* 4, no. 3 (2006): 229–46. See also Robert M. Geraci, “Apocalyptic AI: Religion and the Promise of Artificial Intelligence,” *Journal of the American Academy of Religion* 76, no. 1 (2008): 138–66. Robert M. Geraci, “Video Games and the Transhuman Inclination,” *Zygon* 47, no. 4 (2012): 735–56.

⁵⁰⁷ Hughes, “The Compatibility of Religious and Transhumanist Views of Metaphysics, Suffering, Virtue and Transcendence in an Enhanced Future.” See also Tirosh-Samuelsan, “Transhumanism as a Secularist Faith,” 719.

religion.⁵⁰⁸

Tirosh-Samuelson observes that transhumanism arguably demonstrates some characteristics typically attributed to religions, including the belief in supernatural beings, the distinction of the sacred and the profane, moral code, religious feelings, communication with gods, a comprehensive life-and-world view, and a social group. Besides, transhumanism shares with Abrahamic religions an eschatological orientation and a focus on transcendence. Transhumanism shows an important characteristic of New Religious Movements (NRM) in promising to meet the needs of individual members.

Others have also observed the religious nature of transhumanism. Bainbridge has demonstrated that those believing in traditional religions are more critical of the transhumanist project. He thinks traditional religions are threatened by transhumanism. A founder of the Order of Cosmic Engineers, he sees transhumanism as the religion for galactic civilization.⁵⁰⁹ Michael Zimmerman detects a Hegelian tendency among Singularitarians to view history as the realization of an Absolute Idea.⁵¹⁰

Radical Feminism

In her landmark work *The Second Sex* published in 1949, Simone de Beauvoir suggests that gender is constructed. “One is not born a woman, but rather becomes one.”⁵¹¹

As a feminist existentialist, Beauvoir considers Women to be a social

⁵⁰⁸ Gregory E. Jordan, “Apologia for Transhumanist Religion,” *Journal of Evolution & Technology* 15, no. 1 (2006): 56, 68–69.

⁵⁰⁹ William S. Bainbridge, “Religion for a Galactic Civilization,” in *Science Fiction and Space Futures: Past and Present*, ed. Eugene Morlock Emme (American Astronautical Society, 1982), 187–201. See also Tirosh-Samuelson, “Transhumanism as a Secularist Faith,” 724.

⁵¹⁰ Michael Zimmerman, “The Singularity: A Crucial Phase in Divine Self-Actualization?” *Cosmos and History: The Journal of Natural and Social Philosophy* 4, no. 1-2 (2008): 347–49, 361–69.

⁵¹¹ Simone de Beauvoir, *The Second Sex*, trans. Constance Borde and Sheila Malovany-Chevallier (New York: Alfred A. Knopf, 2010), 283.

construction meant to conform women to the role of “the Other” subservient to the masculine subject. Beauvoir argues that women must elevate themselves beyond the socially constructed immanence to reach the self-defined position of transcendence.⁵¹²

In her 1990 work *Gender Trouble*, Judith Butler interprets Beauvoir as challenging women to assert their right to define their gender independent of men. For example, the female body can serve as the existential situation where the essence of womanhood is self-defined, which would be an exercise of women’s freedom. J. Butler identifies two subtle points to illustrate the contemporary conversation among feminists. First, there is the tension between biological determinism and sociological freedom. J. Butler questions if gender is a choice as Beauvoir claims it to be. Second, in making the female body the situation where freedom is exercised, Beauvoir implicitly embraces a mind-body dualism, a subordination of embodiment to abstract category. J. Butler herself rejects the need for a fixed female category.⁵¹³ Approaching the subject from a postmodernist perspective, J. Butler identifies gender as a Foucaultian-Derridean “discourse.” She sees gender as nothing more than some linguistic symbols constructed and maintained by society without natural correspondence.⁵¹⁴

Postgenderism

Postgenderism is a development of radical feminism and is a sub-movement of transhumanism. Postgenderism is embraced by some LGBTQ advocates such as Monique Wittig, who argues that the category of sex is a political category in a heterosexual society.⁵¹⁵ Any attempt to classify human bodies into males and females presupposes the

⁵¹² Beauvoir, *The Second Sex*, 159–61.

⁵¹³ Judith Butler, *Gender Trouble: Feminism and the Subversion of Identity* (New York: Routledge, 1990), 12.

⁵¹⁴ Butler, *Gender Trouble*, 103.

⁵¹⁵ Monique Wittig, “The Category of Sex,” *Feminist Issues* 2, no. 2 (1982): 63–68.

economic-political preference for heterosexuality. Wittig sees no meaningful distinction between sex and gender as both are binary categories invented for political convenience. A lesbian is not a woman. Lesbian has no sex because the category of sex requires a designation of male and female. A natural lesbian is substantively different from a natural man and a natural woman.⁵¹⁶

In her 1994 work *Gender Outlaw*, Kate Bornstein expresses a similar viewpoint to Wittig but employs a much more inflammatory language. Declaring gender to be a “system of oppression,” Bornstein sees sexism and misogyny as merely the more violent manifestations of the “cult of gender.” Gender deserves to be called a cult because it is based on involuntary membership as those who abandon their gender membership become recipients of censure, ridicule, and violence.⁵¹⁷ Gender as an oppressive system is not much different than the caste system in India or apartheid in South Africa.⁵¹⁸ Eliminating gender will end patriarchy, which is the root of sexism, homophobia, and misogyny.⁵¹⁹ Bornstein sums up her case against gender by stating that gender is not safe, not sane, and not consensual.⁵²⁰

In her 1996 work *Transgender Warriors*, Leslie Feinberg does not advocate the elimination of gender but the recognition of transgender.⁵²¹ L. Feinberg is particularly offended when being referred to as “her,” preferring the gender-neutral pronoun “ze/hir.”⁵²² L. Feinberg sees many people as falling into the category of transgender. A

⁵¹⁶ Butler, *Gender Trouble*, 112.

⁵¹⁷ Kate Bornstein, *Gender Outlaw: On Men, Women, and the Rest of Us* (New York: Routledge, 1994), 121.

⁵¹⁸ Bornstein, *Gender Outlaw*, 106.

⁵¹⁹ Bornstein, *Gender Outlaw*, 115.

⁵²⁰ Bornstein, *Gender Outlaw*, 123.

⁵²¹ Leslie Feinberg, *Transgender Warriors: Making History from Joan of Arc to RuPaul* (Boston: Beacon Press, 1996), 101.

⁵²² Feinberg, *Transgender Warriors*, 120.

transgender is not necessarily a transsexual who has undergone sex reassignment surgery. Rather, a transgender is anyone who experiences a mismatch between their gender and their sex. A transgender may be heterosexual, homosexual, bisexual, or asexual under the conventional category. In that sense, a transsexual is simply a transgender who has decided to do something about such a mismatch. A transgender can also be a person who consciously lives under both masculine and feminine identities.⁵²³

To argue against sexual dimorphism, postgenderists sometimes cite androgyne as a cultural antecedent. Wendy Doniger O'Flaherty observes that the concept of androgyne is found in religious symbolism across many cultures.⁵²⁴ It is often used to communicate a simultaneous love-hate relationship such as the union with gods and the separation from gods. The intentional mix-up between male and female is meant to illustrate a mystical conjoining of the human and the divine. In ancient Hindu myths, androgynes are male but they can have babies. Prajapati is a male god with breasts and a womb.⁵²⁵ Hindu myths often presuppose that a male god can be a woman, even though it is dangerous and makes it difficult for him to be together with a woman.⁵²⁶ In Navajo mythology, there are various hermaphrodites and transvestites. Hermaphrodites are male dressed as women and they have positively transformed. Transvestites are women pretending to be hermaphrodites and they are evil.⁵²⁷ In ancient myths originating from Africa and Australia, complex androgynes with additional sexual body parts are common.⁵²⁸ In traditional Chinese culture, the male is seen as complete while the female

⁵²³ Feinberg, *Transgender Warriors*, 156.

⁵²⁴ Wendy Doniger O'Flaherty, *Women, Androgynes, and Other Mythical Beasts* (Chicago: University of Chicago Press, 1990), 334.

⁵²⁵ O'Flaherty, *Women, Androgynes, and Other Mythical Beasts*, 28.

⁵²⁶ O'Flaherty, *Women, Androgynes, and Other Mythical Beasts*, 331.

⁵²⁷ O'Flaherty, *Women, Androgynes, and Other Mythical Beasts*, 285.

⁵²⁸ O'Flaherty, *Women, Androgynes, and Other Mythical Beasts*, 288.

is seen as lacking. Male is androgyne-like. When a man is castrated into becoming a eunuch, he lost his masculinity and became an incomplete human being like a woman.⁵²⁹

Another argument against sexual dimorphism cited by postgenderists focuses on the phenomena of intersexuality. According to Greenberg, people with intersex bodies are numbered in the millions worldwide. Common causes include chromosomal ambiguity, missing or extra sex organs, hormonal disorder, and abnormal gender assignment.⁵³⁰

Objections to Transhumanism

In this section, I survey objections to transhumanism coming from three different perspectives: (1) religious objections, (2) ethical objections, and (3) scientific objections.

Religious Objections

According to the Pew Research Center's report on *Religious Leaders' View on Radical Life Extension*, there is not a uniform response to the idea of radical life extension across different religious communities. Some Christian denominations including ABC-USA, the Episcopal Church, UCC, and the United Methodists have no official position yet. Ronald Cole-Turner, a UCC ordained minister, observes that his denomination contains "a patchwork of positions, mostly based on local connections and local history." Indeed, there are religious communities that welcome life extension given certain conditions. They include the Mormon church, Shia Muslims, Reformed Jews, Orthodox Jews, National Baptists, PCUSA, and UCC. Eric Wisnia, a Reform Jewish Rabbi, says, "Prolonging life and save life, no matter how long, is a great thing. Human beings are built for cumulative knowledge, and the older we are, supposedly the more

⁵²⁹ O'Flaherty, *Women, Androgynes, and Other Mythical Beasts*, 297.

⁵³⁰ Greenberg, "The Roads Less Traveled: The Problem with Binary Sex Categories," 51–73.

wise we are.” Cole-Turner thinks that the doctrine of co-creation gives a moral ground for using genetic engineering to improve human biology and such improvement might even arguably be a moral imperative. Life extension technologies should therefore not be ruled out. He believes that leaders of individual congregations would need to discuss the issues and make a recommendation to their members if the radical life extension becomes a reality. He sees the two emphases of life extension and mind-uploading in transhumanism as constituting a parallel to the bodily and spiritual resurrection in the Christian tradition.⁵³¹

Strong objections to transhumanism have been raised among some Christian communities. A 2004 report released by the International Theological Commission of the Catholic Church, “Communion and Stewardship: Human Persons Created in the Image of God,” asserts that “changing the genetic identity of man as a human person through the production of an infrahuman being is radically immoral” because the spiritual life principle of man is not a product of human hands.⁵³² The Southern Baptist Convention of 2006 passed a resolution urging the US Congress to “ban all human species-altering technologies, including the creation of animal-human hybrids and human germline genetic modification” because such technologies might introduce irreversible damage to the human gene pool.⁵³³

⁵³¹ Pew Research Center, *Religious Leaders' Views on Radical Life Extension* (Washington, DC: Pew Research Center, August 6, 2013), <https://www.pewforum.org/2013/08/06/religious-leaders-views-on-radical-life-extension/>. See also David Masci, *To Count Our Days: The Scientific and Ethical Dimensions of Radical Life Extension* (Washington, DC: Pew Research Center, 2013), <https://www.pewforum.org/2013/08/06/to-count-our-days-the-scientific-and-ethical-dimensions-of-radical-life-extension/>. Pew Research Center, *Living to 120 and Beyond: Americans' Views on Aging, Medical Advances and Radical Life Extension* (Washington, DC: Pew Research Center, August 6, 2013), <https://www.pewforum.org/2013/08/06/living-to-120-and-beyond-americans-views-on-aging-medical-advances-and-radical-life-extension/>.

⁵³² International Theological Commission, “Communion and Stewardship: Human Persons Created in the Image of God,” July 23, 2004, http://www.vatican.va/roman_curia/congregations/cfaith/cti_documents/rc_con_cfaith_doc_20040723_communion-stewardship_en.html.

⁵³³ Southern Baptist Convention, “On Human Species-Altering Technologies,” June 1, 2006, <http://www.sbc.net/resolutions/1158/on-human-speciesaltering-technologies>.

Underestimating human sinfulness. Ted Peters agrees with Cole-Turner that the doctrine of co-creation provides a rationale for using genetic engineering to improve human biology.⁵³⁴ However, Peters criticizes transhumanists for vastly underestimating the reality of human sinfulness. The enhancement of human cognitive capacity and human longevity does not produce morally superior people. Still, Peters encourages Christians to maintain a broader spiritual understanding of the soul. Some traditional positions, such as substance dualism, will appear meaningless in the context of naturalistic metaphysics. However, it seems possible to reconcile a doctrinally-grounded view of a soul with emergent dualism, non-reductive physicalism, or theological materialism.⁵³⁵

Dishonoring natural design. Some religious communities strongly oppose life extension. Pope Benedict XVI warned against the consequence of radical life extension, saying “humanity would become extraordinary old. There would be no more room for youth. The capacity for innovation would die. And endless life would be no paradise.”⁵³⁶ The “Communion and Stewardship” statement asserts that the creation of spiritually or cognitively superior beings is simply unthinkable. Transforming the genetic essence of a human person to a form other than human is radically immoral because such radical transformation exceeds the basic rights the Creator has endowed human persons. Instead of pursuing changes that take people to become infrahuman, true improvement

⁵³⁴ Ted Peters, “Theologians Testing Transhumanism,” *Theology and Science* 13, no. 2 (2015): 130–49.

⁵³⁵ Ted Peters, “Progress and Provolution: Will Transhumanism Leave Sin Behind?” in *Transhumanism and Transcendence*, ed. Ronald Cole-Turner (Washington, DC: Georgetown University Press, 2011), 78–80.

⁵³⁶ Pope Benedict XVI, “Easter Virgil Homily at Saint Peter’s Basilica,” April 3, 2010, http://www.vatican.va/content/benedict-xvi/en/homilies/2010/documents/hf_ben-xvi_hom_20100403_veglia-pasquale.html.

can only come through becoming more human, or more reflective of the Image of God.⁵³⁷ In terms of bioethics, transhumanists generally favor assisted reproductive technologies (ART), even reproductive cloning. While the Vatican opposes contraception, IVF, and most other forms of ART, it seems to be open to somatic genetic modifications.⁵³⁸

Diminishing human dignity. Citing the threat to human dignity, most of the religious rights in the USA share Vatican’s opposition to abortion, cloning, ART, and human enhancement. The desire for digital immortality through mind uploading is seen by some Christian writers as a form of neo-Gnosticism.⁵³⁹ Hughes agrees with the neo-Gnostic label, noting for example the writings of Erik Davis and Michael Grosso.⁵⁴⁰ But Hughes does not see body loathing among neo-Gnostic transhumanists. He observes that some Yogic and Taoist transhumanists seek to incorporate bio- and neuro-technologies into traditional yogic systems.⁵⁴¹

Self-achieved salvation. C. Ben Mitchell and John F. Kilner observe that numerous Christian theologians and lay activists have expressed objections to transhumanism along the same line as the Vatican statement. Most recognize transhumanists as attempting a form of self-achieved salvation. Transhumanists try to bring heaven down to the earth by eliminating suffering and defeating death

⁵³⁷ International Theological Commission, “Communion and Stewardship,” Section 91–92.

⁵³⁸ Hughes, “The Compatibility of Religious and Transhumanist Views of Metaphysics, Suffering, Virtue and Transcendence in an Enhanced Future,” 11.

⁵³⁹ See, for example, Human Flourishing in a Technological World: A Christian Perspective, “Transhumanism and Human Flourishing: A Critical Engagement,” April 28, 2020, <https://www.christianflourishing.com/blog/2020/4/28/transhumanism-and-human-flourishing-a-critical-engagement>.

⁵⁴⁰ Erik Davis, *TechGnosis: Myth, Magic, and Mysticism in the Age of Information* (New York: Harmony Books, 1998), 91, 94–110, 259.

⁵⁴¹ Hughes, “The Compatibility of Religious and Transhumanist Views of Metaphysics, Suffering, Virtue and Transcendence in an Enhanced Future,” 14.

technologically. Transhumanism is yet another representative of a long series of utopian movements that have reappeared throughout the history of Christianity.⁵⁴²

Resembling millenarian cults. Max Dublin sees much scientism, fanaticism, and nihilism in transhumanism. He sees transhumanism as a contemporary millenarian religion. Much like other millenarian religions, he sees the likely failure of most radical and fantastic objectives of transhumanism, such as immortality.⁵⁴³

Mary Midgley sees the pursuit of biological or digital immortality as reflective of the quasi-scientific fantasies found in some early 20th century thinkers, who were driven by the fear of death and by the desire to escape the physical body. She criticizes the pursuit of immortality as self-indulgent, pseudoscientific, and irrational.⁵⁴⁴

Ethical Objections

Kass, a former chairperson of the United States President's Council on Bioethics, sees altering human biology as inherently immoral. Moreover, the modification of human biological nature could lead to catastrophic social disorder. For example, it could mean the privileged elements in society becoming even more privileged. It might also tighten the grip of power by totalitarian regimes. Kass distinguishes between therapy and enhancement. Therapy is fine. Enhancement is not. Biomedical procedures that repair genetic defects can be understood as therapeutic because they forestall hereditary diseases. If the therapy is safe, there is justification to proceed. Cognitive and life-extension enhancement could potentially alter the meaning of

⁵⁴² C. Ben Mitchell and John F. Kilner, "Remaking Humans: The New Utopians Versus a Truly Human Future," Freerepublic.com (forum), September 30, 2003, <https://cbhd.org/content/remaking-humans-new-utopians-versus-truly-human-future>.

⁵⁴³ Max Dublin, *Futurehype: The Tyranny of Prophecy* (Markham, ON: Viking, 1989), 85–130.

⁵⁴⁴ Mary Midgley, *Science as Salvation: A Modern Myth and Its Meaning* (London: Routledge, 1992), 52–61.

being human. But if the meaning of being human is not fixed, it becomes unclear who should be regarded as having full human dignity and right. Moreover, depending on the specific enhancement, a person receiving an enhancement might effectively have become a different person. It becomes a question of who has the right to terminate his identity. Kass believes that the human condition as existed is to be celebrated and asserts that the finitude of human life is a blessing in disguise.⁵⁴⁵

Threatening individual moral autonomy. Habermas asserts that individual moral autonomy might be violated if the genomes of an embryo-stage human being are forcibly and unilaterally altered by others. Rephrased into transhumanist terms, the issue is who has the right to exercise the morphological freedom of an unborn person.⁵⁴⁶

Misanthropic tendency. Joseph Weizenbaum sees a misanthropic tendency in the language of his colleagues in the field of AI. The human organism is much devalued when the superiority of a non-biological future existence is assumed.⁵⁴⁷

Devaluating gifts and strivings. In his 2004 article “The Case against Perfection,” Michael J. Sandel objects to the loss of giftedness if transhumanism prevails. Part of being human is the experience of having different natural and nurtured gifts. To hit seventy home runs out of disciplined training and effort is not the same as achieving it with the help of steroids or genetically enhanced muscles. Transhumanism might take the excitement out of all competitive sports and performing arts, making them boring, pretentious, and irrelevant. Sandel’s argument is distinctive because it does not stand on an egalitarian ground. Life could be much less interesting if everyone is cloned from the

⁵⁴⁵ Leon R. Kass, “Preventing a Brave New World,” in *Ethics and Emerging Technologies*, ed. Ronald L. Sandler (New York: Palgrave Macmillan, 2014), 76–89.

⁵⁴⁶ Jürgen Habermas, *The Future of Human Nature* (Cambridge: Polity Press, 2003), 12–15, 42.

⁵⁴⁷ Joseph Weizenbaum, *Computer Power and Human Reason: From Judgment to Calculation* (New York: W. H. Freeman, 1976), 17.

same perfect model and tasked to do the same job. Diversity is part of the human social fabric. The inherent commoditizing trend of technology might impose more egalitarian transhumanism. But it is not clear a monochromatic egalitarianism, essentially communist, is desirable.⁵⁴⁸

Employing a dispositional theory of value, according to which “something is a value for you if and only if you would want it if you were perfectly acquainted with it and you were thinking and deliberating as clearly as possible about it,” Bostrom argues that bioconservatives like Sandel arrive at such worrisome conclusions only because they look at the matters from a human perspective. If we were to imagine ourselves as enhanced posthuman, we might not see giving unenhanced human beings a lesser citizenship status as a problem. We treat chimpanzees with no human right today and we do not find that to be contradictory to our human values.⁵⁴⁹

Agar finds Bostrom’s expansion of values to be odd. So long as we are having this debate about transhumanism as human beings, we can proceed only based on known human values. For example, whether a change is considered an enhancement is largely determined by known human values. Agar agrees with the bioconservatives that much meaningfulness of human lives derives from our struggles against human limitations. Striving is part of human values. Therefore, it is controversial whether it is truly an enhancement of human lives if the necessity of striving is diminished.⁵⁵⁰

⁵⁴⁸ Michael J. Sandel, “The Case against Perfection: What’s Wrong with Designer Children, Bionic Athletes, and Genetic Engineering,” *The Atlantic*, April 1, 2004, <https://www.theatlantic.com/magazine/archive/2004/04/the-case-against-perfection/302927/>.

⁵⁴⁹ Bostrom, “Transhumanist Values,” 3-14. See also Michael Smith, David Lewis and Mark Johnston, “Dispositional Theories of Value,” *Proceedings of the Aristotelian Society, Supplementary Volumes* 63 (1989): 89–174.

⁵⁵⁰ Nicholas Agar, “Whereto Transhumanism? The Literature Reaches a Critical Mass,” *The Hastings Center Report* 37, no. 3 (2007): 16.

Statist eugenics. Feminists, social democrats, and environmentalists have often been wary of technology. Some subscribe to what may be called ecofeminist bioluddism. After Haraway, feminists might have moderated from active opposition of technology to tolerated co-existence. However, the resistance against the libertarian strand of transhumanism remains.

In his 2003 work *War Against the Weak*, Edwin Black investigates the history of eugenics in America. Black sees transhumanism as historically leading to eugenics wars and a return to state-sponsored genetic discrimination, human rights violation, compulsory sterilization, segregation, and genocide.⁵⁵¹

Tom Koch sees transhumanists as perpetuating the ideology of the eugenics movement of the early half of the twentieth century. He sees a striking resemblance between transhumanism and the 1921 Second International Eugenics Conference, in which a conference poster describes the eugenics program as “self-directed human evolution.” Koch sees both transhumanism and the eugenics movement as accepting uncritically two assumptions he considers fallacious, namely that (1) the human body is a machine whose parts can be easily modified, and that (2) the human society is a machine and individual human beings exist to serve the interest of the society.⁵⁵²

Widening social inequality. McKibben establishes two lines of common criticisms against transhumanism that have already been noted. First, it is morally wrong for human beings to modify their universal nature. Second, there would be a genetic divide, as human enhancement technologies would not be equally accessible to all.⁵⁵³

In a 2004 *Foreign Policy* article, Fukuyama designated transhumanism as the

⁵⁵¹ Edwin Black, *War Against the Weak: Eugenics and America's Campaign to Create a Master Race* (New York: Four Walls Eight Windows, 2003), 411–44.

⁵⁵² Tom Koch, “Enhancing Who? Enhancing What? Ethics, Bioethics, and Transhumanism,” *Journal of Medicine and Philosophy* 35, no. 6 (2010): 685–99.

⁵⁵³ McKibben, *Enough*, 10–26.

world's most dangerous idea. Fukuyama contends that transhumanism will undermine the egalitarian ideals of the democratic society. Instead of sharing a universal human nature, humanity might be divided into a social hierarchy according to the enhancements they received.⁵⁵⁴ In response to Fukuyama, Bailey argues that democratic egalitarianism does not stand on effective equality of human capacity, or de facto equality, but on the equality of all before the law or de jure equality. Provided that the law gives enhanced and unenhanced human beings the same right, egalitarianism is preserved.⁵⁵⁵ But Bailey's argument is problematic because the basis of *de jure* equality before the law is the universal human dignity assumed for every human person. The law could generally count on the fact that a human being with inherent right and dignity will not all of the sudden become a non-human. But if a man decides to become a unicorn, it is not clear the law should retain for him the same human right in his unicorn existence.

Legal scholars such as Annas and Andrews see the potential of human-posthuman caste warfare. Annas and Andrews predict that the posthuman will view the human as inferior savages while the human might view the posthuman as a threat. The posthuman might feel that slaughtering the normal human is justified. The normal human might strike pre-emptively before the posthuman enslave and wipe them out.⁵⁵⁶

Based on the biological concept of species, Lee M. Silver imagines a future where the enhanced posthuman beings will no longer be able to physiologically interbreed with unenhanced human beings and that makes posthuman a different species.⁵⁵⁷ Agar accepts interbreeding boundary as a working definition of post-

⁵⁵⁴ Fukuyama, "Transhumanism," 42–43.

⁵⁵⁵ Ronald Bailey, "For Enhancing People," in *The Transhumanist Reader*, ed. Max More and Natasha Vita-More (Chichester, UK: Wiley-Blackwell, 2013), 327–44.

⁵⁵⁶ Annas, Andrews and Isasi, "Protecting the Endangered Human: Toward an International Treaty Prohibiting Cloning and Inheritable Alterations," 162.

⁵⁵⁷ Lee M. Silver, *Remaking Eden: Cloning and Beyond in a Brave New World* (New York: Harper Perennial, 1998), 240–41.

humanity, although he could conceive of counterexamples.⁵⁵⁸ For example, embryonic gene modification and cloning technologies might make bisexual reproduction unnecessary. The working definition is nevertheless useful in clarifying the conception of human essence as given by Fukuyama, who says that a human is distinguished from other types of creatures by a genetic endowment. It is the genetic endowment that allows a human embryo to become a full human being. Liberal social arrangements, according to Fukuyama, require empirical equality among citizens by their common endowment. Posthuman might not accord equal citizenship to unenhanced human beings if substantial differences of genetic endowments exist between human and posthuman beings.⁵⁵⁹

Self-inflicted injuries. Heather G. Bradshaw observes that the meaning of enhancement should be defined through the consulting process of social institutions. Morphological freedom should not include the right to injure one's body. Even if a person is seen as having the right to receive or reject an enhancement, what constitutes an enhancement should not be left to the discretion of individuals. Otherwise, it would be possible for individuals to injure themselves while calling it an enhancement. Bradshaw and Ruud ter Meulen also wonder if disabled people must enhance themselves. Drawing insights from the work of Isaiah Berlin on freedom and oppression, they conclude that the answer requires a more careful examination of the meaning of freedom.⁵⁶⁰

Extra social burdens and obligations. Jessica Tachell distinguishes two types of personal rights, negative and positive. A negative personal right protects the freedom of a person from being intruded on. A positive personal right obligates others to act to

⁵⁵⁸ Agar, "Whereto Transhumanism? The Literature Reaches a Critical Mass," 13.

⁵⁵⁹ Agar, "Whereto Transhumanism? The Literature Reaches a Critical Mass," 15.

⁵⁶⁰ Heather G. Bradshaw and Ruud ter Meulen, "A Transhumanist Fault Line around Disability: Morphological Freedom and the Obligation to Enhance," *Journal of Medicine and Philosophy* 35, no. 6 (2010): 670–84.

meet the right. Morphological freedom entails both rights. The right to decide whether to be enhanced is an example of a negative right. A related positive right might be the obligation for the states to pay for the enhancement.⁵⁶¹

Disincentivizing population growth. Michael L. Giancola sees transhumanism as “imbued with a disregard for environmental issues.” Highlighting the “planetary duty” enshrined in *The Humanist Manifesto III*, Giancola argues that the transhumanist technological agenda, especially of radical life extension, would likely result in more consumption of natural resources by fewer new brains. With the death rate dramatically decreased, posthumans will likely seek a reduction in the birth rate. There will be no rush to solve old problems through innovation.⁵⁶²

Ignoring real-world suffering. Sasha Cooper boils down transhumanism into two basic convictions. First, there is no significant distinction between medical treatment and medical enhancement. Second, dying is the worst thing that can happen. Suffering is probably the second worst thing as Pearce’s Hedonistic Imperative would indicate. Therefore, one may say transhumanism is about living happily ever after. Transhumanists see nature, including human nature, as something to be overcome, especially if it gets in the way of living happily ever after. AI is not a goal in and of itself. However, to the extent that AI helps get transhumanists there earlier by accelerating scientific progress, AI is welcome. AI that can beget better AI is even better. The Singularity is waited upon eagerly, despite the unresolved philosophical problem of consciousness and the unforeseeable existential risk of the Singularity event. Given Pearce’s Hedonistic

⁵⁶¹ Jessica Tatchell, “Making Human Rights Fit for the 21st Century: The Challenge of Morphological Freedom,” Social Epistemology Review and Reply Collective (forum), August 8, 2015, <https://social-epistemology.com/2015/08/08/making-human-rights-fit-for-the-21st-century-the-challenge-of-morphological-freedom-jessica-tatchell/>.

⁵⁶² Michael L. Giancola, “Does Transhumanism Mesh with Humanist Values?” *Humanist* 64, no. 5 (2004): 35.

Imperative, Cooper questions the transhumanist priority of investing in life extension technologies instead of fighting famine and disease today. To think coherently, the transhumanist answer cannot be merely about excessive self-centeredness. After all, some transhumanists do not even believe in a personal self.⁵⁶³

Existential risk. Martin J. Rees observes that advanced science and technology bring as much risk of disaster as the potential for progress. What is not wanted may be discovered instead of what is wanted.⁵⁶⁴

Advocates of the precautionary principle believe that AI and robotics present cognitive alternatives that may threaten human life.⁵⁶⁵

In a much-cited April 2000 article “Why the Future Doesn’t Need Us” appearing on WIRED, Joy identifies key reasons to worry that advances in Genetics, Nanotechnology, Robotics (GNR) technologies will soon mean the replacement of people by machines. His arguments and sentiments expressed have received many echoes by other technologists in the last two decades. Joy’s article is part biographical and part analytical. As a technologist who made key contributions to the field of computing in multiple areas, Joy has a deep appreciation of the potential benefits of GNR technologies. At the same time, Joy also recognizes that with rapid advances in genetics and nanotechnology, together with human-level AI in 2030, the risk of human extinction is high. For example, he cites the prediction of John Leslie for a 30 percent probability of human extinction in case of an AI takeover. Even the optimistic Kurzweil gives humanity

⁵⁶³ Sasha Cooper, “On Transhumanism,” *Meanjin* 65, no. 4 (2006): 108.

⁵⁶⁴ Martin J. 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), 115–33.

⁵⁶⁵ Rupert Read and Tim O’Riordan, “The Precautionary Principle Under Fire,” *Environment: Science and Policy for Sustainable Development* 59, no. 5 (2017): 4–15.

only “a better than even chance of making it through.”⁵⁶⁶

Joy’s concern about GNR began at a barroom encounter with Kurzweil and Searle at George Gilder’s Telecosm conference. It dawned on Joy that the tools he has been developing could lead to technologies that eventually replace the human species. That left him very uncomfortable. Joy explains the human situation using the metaphor of a three-player game in George Dyson’s “Darwin Among the Machines.” Human beings, nature, and machines are playing on the table; one party will get eliminated. Dyson wants human beings to side with nature. But nature seems to want to side with machines.

Joy agrees with Nietzsche that humanity demonstrates a non-utilitarian desire to seek truth for its own sake. It is an expression of our faith in science. Technologists pushing GNR are the faithful. However, Joy worries that the relentless pursuit of scientific truth could be a dangerous substitute for God if it likely leads to human extinction. The pursuit of GNR is the newest of Pandora’s boxes for mankind. Unlike uranium or plutonium, GNR cannot be easily controlled by state entities. They are already in the hands of corporations.

Joy calls for more cautious ethical debates by society before allowing technologists to dive headfirst into a future where people might not be needed. Joy notes the thoughts of Jacques Attali, who describes four types of utopia: Eternity, Liberty, Equality, and Fraternity. Attali crystallizes for Joy the problem he sees in Kurzweil’s dream. Even if the immortality of human civilization is achieved through robotics, it may not be desirable if no human beings will be there to witness it. But even if human beings remain, such a future might not be desirable if it means surrendering the values of liberty, equality, and fraternity that we have come to treasure.

⁵⁶⁶ Joy, “Why the Future Doesn’t Need Us,” 27.

Scientific Objections

Stock, while accepting the transhumanist vision of physiological enhancement through genetics, metabolism, and biochemistry, is skeptical of cybernetic enhancement as predicted by Kurzweil, Moravec, and Kevin Warwick. “Expanding our senses, enhancing our physical powers, or enlarging our minds is seductive, but until our flesh loses its vitality or becomes diseased or damaged, few of us want to replace it.” He does not recognize any clear beneficial objectives but sees many unpredictable outcomes in such attempts.⁵⁶⁷

Unclear objectives. The Center for Genetics and Society sees no justification for human germline modification for reproductive purposes. Embryonic genetic modification is uncharted territory with unforeseeable risks. Once the line is crossed, there will be no turning back. Therefore, it is prudent not to cross the line now.⁵⁶⁸

Unpredictable outcomes. Rifkin and Stuart Newman argue that the biocomplexity and unpredictability of outcome involved in modifying human genetics lead to unacceptable risks in applying such technology on human embryos.⁵⁶⁹

Writing in the *New England Journal of Medicine*, Eric S. Lander warns against the prospect of designer babies as the genetic consequences remain largely unpredictable. According to Lander, the long-term consequences of even simple genetic modifications in mice are largely unknown. Therefore, a premature pursuit of the perfect designer babies will reduce the diversity of the human genes and thus potentially reducing their chance of survival. Moreover, any germline change might close the door of morphological freedom of future generations and is therefore self-defeating in practice.

⁵⁶⁷ Stock, *Redesigning Humans*, 29–31.

⁵⁶⁸ Center for Genetics and Society, “An Open Letter & Report: Calling for Prohibitions on Human Germline Engineering,” November 29, 2015, <https://www.geneticsandsociety.org/press-statement/open-letter-report-calling-prohibitions-human-germline-engineering>.

⁵⁶⁹ Jeremy Rifkin, *Algeny* (New York: Viking, 1983), 5–7.

Lander cited four arguments against embryonic genome editing at this early stage. First, the state-of-the-art does not give scientists the precision in genome editing to create modified babies without the risks of major editing errors. Second, the risks of inaccurate editing and unintended consequences outweigh the conceivable medical benefits. Third, it is not clear who should have the right to decide. Lander thinks the parental rights to edit the genomes of their children should be weighed against the rights of their children and future generations, who might have important options taken away because of the consequences of genome editing. Fourth, moral angles that ought to be taken into consideration might not have been fully thought out. There are issues of human dignity, fairness, and extinction risk that need to be considered.⁵⁷⁰

Conflating quantity and quality. While human enhancement is the central concern of transhumanism, Michael Bess observes ambiguities and elusiveness in the way the term enhancement is used in transhumanist discourse. For example, the line between enhancement and therapy is not drawn clearly. The ideas of “more” and “better” are often used interchangeably in enhancement, but the more does not necessarily mean the better. Inner or environment enhancements that are more “authentic” but less measurable are often overshadowed by measurable enhancements of mood or behavior.⁵⁷¹

Christian Engagements with Transhumanism

Christian writers have responded to transhumanism by drawing attention primarily to ethical concerns. Some have sought to find biblical and theological contact points with transhumanist ideas. The metaphysical meaning of being human from a

⁵⁷⁰ Eric S. Lander, “Brave New Genome,” *New England Journal of Medicine* 373, no. 1 (2015): 5–8.

⁵⁷¹ Michael Bess, “Enhanced Humans Versus ‘Normal People’: Elusive Definitions,” *Journal of Medicine and Philosophy* 35, no. 6 (2010): 641–55.

biblical-theological perspective is one of the key issues.

Materialist Bias

The Council for Research in Values and Philosophy (CRVP) sees a reductive materialist bias in transhumanism. Essential characteristics of human nature such as creativity, desire, and freedom are neglected, as well as the spiritual dimension, the meaning, and the exercise of human life. At the same time, CRVP does not seek to undermine the scientific and technological perspectives of human nature either. They seek to read transhumanism from a positive light.⁵⁷²

Ana Bazac argues that technology transforms humanity ontologically. Bazac insists that the conception of the human being cannot be separated from the technology he creates.⁵⁷³ Bazac identifies three scenarios of technological singularity: (1) that AI will take over the world from humanity, (2) that there will be a cybernetic fusion of AI and the human brain, and (3) that the human brain becomes super-intelligent through advances in nanotechnology and nanoscience. Bazac believes the second scenario to be most likely. Whatever it is called – posthuman, transhuman, or “techno sapiens,” it will be a new kind of mind. But the most important issue to think through, as Heidegger observed long ago, is about subjectivity. When subjectivity becomes the object of manipulation, it might no longer seem like a subject.⁵⁷⁴

Criteria of Love

Before introducing his approach, Justin Tomkins identifies several other Christian thinkers who have engaged with transhumanism. Waters has framed his

⁵⁷² John C. Haughey and Ilia Delio ed., *Humanity on the Threshold: Religious Perspectives on Transhumanism* (Washington, DC: Council for Research in Values and Philosophy, 2014), vi, 10–20.

⁵⁷³ Ana Bazac, “Human Worth on the Threshold of Its Technological Transformation,” in *Humanity on the Threshold: Religious Perspectives on Transhumanism*, ed. John C. Haughey and Ilia Delio (Washington, DC: Council for Research in Values and Philosophy, 2014), 21.

⁵⁷⁴ Bazac, “Human Worth on the Threshold of Its Technological Transformation,” 33.

theological exploration of reproductive technologies as a phenomenon in the postmodern world.⁵⁷⁵ Robert Song sees the transhumanist effort as a modern attempt to subdue nature.⁵⁷⁶ Celia E. Deane-Drummond identifies virtue as a philosophical research area where theologians can critically engage.⁵⁷⁷ Nonetheless, Tomkins sees other possibilities of Christian engagement that have not been tried. He identifies eschatology, love of God, and love of neighbor as areas where fruitful engagements seem possible.⁵⁷⁸

Employing Dietrich Bonhoeffer's concepts of the ultimate and the penultimate, Tomkins identifies one way to engage a technology by asking if the technology or the vision behind it is inconsistent with the ultimate (God's last word and the final outworking of God's plan) and the penultimate (all that are supposed to precede that). He contrasts the Christian eschatological vision with the dreams of Kurzweil, de Grey, and Silver. De Grey's vision of life extension, which can be described as a continual repairing and maintaining of human bodies much like keeping vintage cars running, seems to underappreciate the present human body. Silver's vision of genetically enhanced future generations seems to represent a desire to subject the physical world at a will using whatever means at our disposal. Kurzweil's vision of mind uploading seems to represent a similar impulse to dominate like Silver and an equal disregard for the present physical body like de Grey. In conclusion, the visions expressed by Kurzweil, de Grey, and Silver disregard the penultimate natural state while holding no vision for the ultimate.⁵⁷⁹

⁵⁷⁵ Waters, *From Human to Posthuman*, x–xi, 21–94.

⁵⁷⁶ Robert Song, *Human Genetics: Fabricating the Future* (London: Darton, Longman & Todd, 2002), 4–5, 64–78.

⁵⁷⁷ Celia E. Deane-Drummond, "Taking Leave of the Animal? The Theological and Ethical Implications of Transhuman Projects," in *Transhumanism and Transcendence*, ed. Ronald Cole-Turner (Washington, DC: Georgetown University Press, 2011), 120, 128.

⁵⁷⁸ Justin Tomkins, "Developing Theological Tools for a Strategic Engagement with Human Enhancement," *New Bioethics* 20, no. 2 (2014): 141–52.

⁵⁷⁹ Tomkins, "Developing Theological Tools for a Strategic Engagement with Human Enhancement," 145.

Tomkins identifies another way to engage a technology by asking if the technology or the vision behind it is inconsistent with an appreciation for the love of God, which gives rise to a good creation, or if the technology implies a denial of the goodness of the created human limits.⁵⁸⁰ Although some limits of the human body might have changed after the fall, the bodily nature of humankind is certainly part of the created design. Kurzweil's dream of mind uploading seems to be an inherent rejection of the goodness of human embodiment. Embracing human limits is also a form of trust in the faithfulness of God to accomplish His purpose through creation.⁵⁸¹

Tomkins identifies a third tool to engage a technology by asking if the technology or the vision behind it is inconsistent with the biblical command to love one's neighbors as oneself. It is unlikely that human enhancement technology will be equally accessible to the rich and the poor. It will lead to a widening of the economic and social gap.⁵⁸² Greenfield draws upon neuroscientific research to predict that cyber-companions will lead to a reduction of social interaction between people. Therefore, the transhumanist vision might engender further alienation between people.⁵⁸³

Transhumanism as a Christian Concept

In his introduction to *Transhumanism and Transcendence*, Cole-Turner sees transhumanism as pressing upon Christian theologians several theological questions that are often brushed aside. (1) Is there a direction or purpose in evolution that is grounded in the creative purposes of God? Is the direction or purpose of evolution discernable by

⁵⁸⁰ Tomkins, "Developing Theological Tools for a Strategic Engagement with Human Enhancement," 146.

⁵⁸¹ Tomkins, "Developing Theological Tools for a Strategic Engagement with Human Enhancement," 148.

⁵⁸² Tomkins, "Developing Theological Tools for a Strategic Engagement with Human Enhancement," 149.

⁵⁸³ Tomkins, "Developing Theological Tools for a Strategic Engagement with Human Enhancement," 151.

science? Should we play a part in adjusting the direction or purpose through technology? (2) How do we regard nonhuman species? Should human beings modify nonhuman species? (3) How do we think about the human yearning for transcendence? Do we know what we are destined to become? How will we transition from the present human condition to what is destined to become? Should we play a part in this transition?⁵⁸⁴

These questions undergird the collection of essays found in *Transhumanism and Transcendence*, which can also be grouped the headings of traditional taxonomy: (1) Antecedents: forerunners of transhumanism among Christian thinkers are identified, including the Russian cosmism of N. F. Fedorov and the evolutionary vision of Teilhard. (2) Theological Anthropology: the bioethical theme of human dignity, the human nature of sinfulness, the boundary between human and nonhuman, and the goodness or necessity of human limitations are explored. (3) Eschatology: the transhumanist goal of lifespan extension and the Christian hope of eternal life are contrasted. (4) Epistemology: the goal of some transhumanists to eliminate emotional and relational elements in human moral reasoning is critiqued. (5) Christology: the significance of Jesus Christ as a perfect human being despite his demonstrated human limitation is discussed.

Cole-Turner claims transhumanism was originated as a Christian concept. In the original Christian conception, “transhumanism” encapsulates the biblical promise for *theosis* in which Christians are sanctified to become divine. Secular transhumanism and Christian transhumanism are nonetheless divided in terms of the cause or the agent of the transforming process. For transhumanists, technology drives changes. For Christians, transformation happens because of the grace of God. However, Cole-Turner believes that God can work through technology made by human hands. For any technology to be consistent with the work of God as the Creator and the Redeemer, the technology should

⁵⁸⁴ Ronald Cole-Turner ed., *Transhumanism and Transcendence: Christian Hope in an Age of Technological Enhancement* (Washington, DC: Georgetown University Press, 2011), 15.

be aiming at healing, restoration, conservation, and exploration. Cole-Turner thinks it is metaphorically correct to say that God has been engaged in genetic engineering for a long time. Working through a natural evolutionary process and what we call genetic engineering today, God has been renewing the creation in anticipation of a new creation.⁵⁸⁵

Posthumanism in the Bible

Jennifer L. Koosed and other contributors to *The Bible and Posthumanism* identify numerous depictions of God and mankind using animal metaphors, e.g. lion, lamb, eagle, bull, etc. Koosed claims that “these stories explore the boundaries of the human in ways that destabilize the very category of the human.” The biblical literature shares with posthumanism a common criticism of human-centric ideologies. Rather than seeing the Bible as sanctioning the subjugation of animals as Singer alleged, the Bible portrays situates humankind in a world occupied by animals and spiritual beings such as angels and demons.⁵⁸⁶

Feminist Posthumanism

Thweatt-Bates views posthuman as “an open term without any single accepted definition, and indeed, a term with multiple and even mutually exclusive competing definitions.” But she believes it is helpful to crystalize the competing understandings around two distinct visions: cyborg and upload.⁵⁸⁷

Thweatt-Bates sees cyborg as a feminist posthuman construction introduced by Haraway in “A Cyborg Manifesto.” With its hybrid embodiment, the cyborg serves as a

⁵⁸⁵ Ronald Cole-Turner, “Going Beyond the Human: Christians and Other Transhumanists,” *Dialog: A Journal of Theology* 54, no. 1 (2015): 20–26.

⁵⁸⁶ Jennifer L. Koosed ed., *The Bible and Posthumanism* (Atlanta: Society of Biblical Literature, 2014), 1–28.

⁵⁸⁷ Jeanine Thweatt-Bates, *Cyborg Selves: A Theological Anthropology of the Posthuman* (Burlington, VT: Ashgate, 2012), 5.

symbol for the kinship of the human with the nonhuman. In contrast, the uploaded consciousness is a transhumanist construction aiming at a virtual existence of a more durable body. Thweatt-Bates thinks theological contribution to the posthuman discourse can be strengthened by paying attention to the differences between these two competing visions.⁵⁸⁸ The anthropological conceptions around cyborg and upload differ in their embodiment, gender, epistemology, and kinship with the non-human. In turn, different approaches of engagement are required for concepts in Christian theological anthropology, such as human uniqueness, sin, and free agency. Thweatt-Bates also sees opportunities for engagement in the metaphysical discussion of subjectivity, relationality, multiple embodiments, and hybridity. Finally, she identifies Christology as another area of engagement.⁵⁸⁹

Ethics of Technology

D. Gareth Jones identifies three possible levels of theological engagement with the subject matter of human enhancement, the levels of bioethics, general technological ethics, and worldview. D. G. Jones thinks bioethical considerations tend to center around procedural safety, utilitarian cost-benefit calculation, and questions of values, such as human dignity. The room for theological input is limited. The theological engagement has largely taken place at the worldview level over speculative questions, such as the theological warrants of changing human nature to something unimaginable. The vagueness of the concepts involved makes them less useful for the immediate challenges posed by emerging technologies. D. G. Jones suggests that greater attention on the ethics of technology, including the Christian understanding of human flourishing, presents more

⁵⁸⁸ Thweatt-Bates, *Cyborg Selves*, 7.

⁵⁸⁹ Thweatt-Bates, *Cyborg Selves*, 13.

helps for Christian practitioners engaged in medical research.⁵⁹⁰

Anthropocentric Preoccupation

John C. Haughey wants transhumanists to broaden the excessively anthropocentric preoccupation with the future of humanity and the meaning of personality.⁵⁹¹ He suggests that taking a cosmic perspective, seeing the role of humans as preparing a habitat for the coming of God as N. T. Wright outlined in *Surprised by Hope*.⁵⁹² The process of cosmic transformation begins with our *metanoia* (self-transformation) and spreads out to the renewals of the ecclesial, social, and political communities. Haught sees three theological options: (1) the sacramental view, which demonizes any dramatic changes to the natural status quo, (2) the activist view, which sees humanity's vocation as co-creators and transformers of the world, and (3) the promissory view, which sees a role for Christians to participate in God's creative process prayerfully and subjected to certain constraints and concerns. He favors the third view. He includes in his list concerns the liberation of life, respect for persons, the flourishing of both human and nonhuman community, as well as the intensification of vitality, subjectivity, wider empiricism, and creativity.

Systemic Transformation

G. Auletta, I. Colagè, and P. D'Ambrosio do not see what the transhumanist approach adds to the current work done either in genetic or computational human enhancement. They group transhumanists according to their goals into two camps: (1) the

⁵⁹⁰ D. Gareth Jones, "A Christian Perspective on Human Enhancement," *Science & Christian Belief* 22, no. 2 (2010): 114–16.

⁵⁹¹ John C. Haughey, "Transhumanism and the Anticipatory Universe," in *Humanity on the Threshold*, ed. John C. Haughey and Ilia Delio (Washington, DC: Council for Research in Values and Philosophy, 2014), 8.

⁵⁹² N. T. Wright, *Surprised by Hope: Rethinking Heaven, the Resurrection, and the Mission of the Church* (New York: HarperOne, 2008), 93–108.

incremental camp, which hopes to at least achieve partial results of life and status enhancement, and (2) the radical camp, which sees evolving into posthuman as desirable and inevitable. They find the goals of the second camp to be vague. They cannot see how transhumanists practically go about achieving the goals. In contrast, the first camp is simply advocating what most medical and computational scientists have been studying, although most do not and would not call themselves transhumanists or posthumanists, if only because posthuman is an undefined term. Auletta et al believe that transhumanists can benefit from broadening their focus from the enhancement of human biological organisms to mental, cultural, and social systems. It is necessary to see the human being as situated in a process of co-adaptation with other organisms in the environment.⁵⁹³

Metaphysical Questions

George F. McLean highlights several metaphysical questions that make the transhumanist vision at least inadequate and requiring clarifications. He differentiates between two groups of objections to human enhancement. The first group of objections is mostly ethical and is most related to questions of fairness, irreversibility, and personal liberty. The second group of objections has to do with the metaphysical, religious, and anthropological meaning of being human. Transhumanism thrusts the questions of norms and principles to the forefront. It calls us to wonder about the necessity of normative order. Transhumanism raises the possibility of posthuman abandoning all human values. McLean wonders if that could be desirable or even tolerable. He does not think Christians oppose genetic engineering indiscriminately. But he notes that Rahner raised an important philosophical question in the 1960s about genetic engineering: what does it add? The possibilities of emergent evolution from the more limited human perspective

⁵⁹³ G. Auletta, I. Colagè and P. D'Ambrosio, "Transhumanism Critically Assessed," in *Humanity on the Threshold*, ed. John C. Haughey and Ilia Delio (Washington, DC: Council for Research in Values and Philosophy, 2014), 51. See also Haughey and Delio, *Humanity on the Threshold*, 49.

could be there all along from God's perspective.⁵⁹⁴

McLean thinks that the real difference between transhumanists and Christians who are in favor of genetic enhancement lies in the Christian emphasis on relationality and diversity, which is understood to be an essential part of being truly human. It is at least not obvious how genetic modification can help enhance people to develop relationality. It is even less obvious how genetic modification can enhance diversity. McLean sees the metaphysics of relationality as an aspect that any ethical framework must account for. Transhumanism seems to focus on autonomous individuals and not recognizing the metaphysics of relationality. McLean also does not believe that technology is the problem. Transhumanists might not recognize the religious roots of technology in the Middle Ages, but Christians are not all Luddites. However, Christians do not believe that technology can replace the Gospel. Salvation is by grace through faith and not earned by human works. To try to obtain material things through technology what is spiritual is a form of idolatry. McLean cites Teilhard as an example where Christians can have a different technological vision. Some transhumanists seem to see the future as post-biological. Teilhard sees the future as the deepening of the biological. Transhumanists generally focus on the enhancement of the capacity of the human body. Teilhard sees the greater value of the human community through something like the Internet.

Summary

Chapter 1 begins with an overview of worldview apologetics as the methodology of this apologetic engagement with transhumanism from a Christian perspective. The worldview apologetic approach exemplified by Schaeffer serves as our guiding paradigm. Schaeffer contends that modern people have difficulty understanding

⁵⁹⁴ George F. McLean, "Notes on a Seminar on Transhumanism with Jürgen Habermas," in *Humanity on the Threshold*, ed. John C. Haughey and Ilia Delio (Washington, DC: Council for Research in Values and Philosophy, 2014), 155–57.

the gospel message because they do not hold to a biblical Christian worldview. Pre-evangelistic effort aiming at engendering worldview revolution becomes necessary. In this study, we present worldview apologetics as a Y-juncture engagement of world visions. Such Y-juncture engagement begins by understanding where the transhumanists, our interlocutors, come from. Then, we take transhumanism to its logical ends to show its incompatibilities with other traditional humanist beliefs. Finally, we point the transhumanists to a better way by explaining the biblical Christian worldview through contact points.

After introducing the methodology of this study in this chapter, we began our analysis of transhumanism by identifying some of its sub-movements, ideas, historical forerunners, and leading advocates. The contemporary transhumanist movement began with a libertarian-leaning extropianism introduced by More that focuses on life extension technologies. With the establishment of WTA by Bostrom and others, transhumanism became a movement that attracts futuristic thinkers from the fields of AI, biotech, politics, philosophy, and religion. Notably, Kurzweil popularizes the notion of Singularity and brought transhumanism into the public consciousness.

Ideologies closely related to transhumanism include humanism, Marxism, existentialism, anti-humanism, posthumanism, radical feminism, and postgenderism. In this chapter, we distinguish posthumanism and transhumanism as two related movements reacting to perceived failures of humanism. We identify a source of failures in what may be called the problem of human evil. While posthumanists fault traditional humanism for its cultural or gender biases, transhumanists see the problem mainly in human nature, including its anthropic biases. Special attention has been given to the influence of the thoughts of Nietzsche and how transhumanism resembles a secularist faith.

In chapter 2, we will expand this exploration by viewing transhumanism from the perspectives of moral philosophy, epistemology, the philosophy of mind, and eschatology. As the first step of the Y-juncture engagement, chapter 1 and chapter 2

together seek to understand where the transhumanists come from.

We have surveyed objections against transhumanism coming from religious, ethical, and scientific perspectives in chapter 1. Transhumanism has been criticized as dehumanizing, dangerous, and deficient in scientific basis. In chapter 3, we will follow up by outlining several approaches to show that transhumanism is incompatible with other traditional humanist beliefs. As the second step of the Y-juncture engagement, chapter 3 shows that transhumanism leads to a dead-end.

We have identified several Christian engagements with transhumanism in chapter 1. While most Christian thinkers seem to oppose transhumanism, others seek to relate transhumanism with the idea of human transcendence. In chapter 4, we will further investigate the idea of Christian transhumanism and examine a project proposal of obtaining virtue enhancement through genetic engineering. We will demonstrate the incompatibilities of Christian transhumanism with biblical Christian beliefs. The Bible presents a different solution to the problem of human evil. Instead of trying to become posthuman, the biblical answer to evil is found in becoming fully human again.

CHAPTER 2
A WORLDVIEW ANALYSIS OF TRANSHUMANISM

Introduction to Chapter 2

In Chapter 2, we analyze transhumanism through the perspectives of moral philosophy, epistemology, the philosophy of mind, and eschatology.

According to Francis A. Schaeffer, a modern unbeliever needs to make “three bows” to overcome the moral, epistemological, and metaphysical hurdles before reaching the Christian worldview. The three bows correspond roughly to three out of four essential philosophical questions identified by Immanuel Kant: (1) what I must do, (2) what I can know, and (3) what Man is. Kant’s distaste for speculative metaphysics leaves philosophical anthropology, especially the philosophy of mind, as one of the few places where transcendental speculations seem reasonable. Hence, the philosophy of mind holds the most important key to the question of what Man is. Kant’s fourth foundational question is (4) what I can hope for, which is the question of eschatology. The transhumanist worldview is deeply rooted in eschatological hope. Transhumanism can be characterized as a hope-based anthropodicy.

The order of the four perspectives reflects a progression from the concrete to the abstract. Transhumanism is most prominently debated currently as a bioethical issue. The issue of germline editing, for example, presents immediate public policy challenges. Transhumanists defend their technological agenda by alleging their opponents of harboring an anthropic bias, due to a status quo preference for the biological existence in the form of the human species. They contend that a comprehensive rationalist epistemology that takes no axiom for granted could help eliminate the anthropic bias. Once people give up their anthropic bias, the transhumanist visions would seem much

more sensible. Most transhumanists subscribe to the computational theory of mind. Some imagine uploading their mind to a computer someday to achieve digital immortality. Others envision a future where mind uploading to a distant galaxy at the speed of light becomes possible. There is even the speculation that reality as we know it might be a computer simulation carried out by an advanced transhuman civilization.

The Transhumanist Moral Perspective

Max More observes that transhumanists are drawn to different moral theories. His proposed principles of extropy are based on virtue ethics. He sees virtue as a habit of the embodied mind. If it is a moral obligation to make oneself a more virtuous person, applying technology to make the mind more virtuous is a moral imperative.¹

Transhumanists generally resist deontological ethics because of their agnosticism towards theistic revelations. There is nonetheless a willingness to embrace what David Pearce calls the Hedonistic Imperative, the command to reduce suffering based on utilitarian ethics. Most transhumanists see the elimination of aging and death as a universal moral imperative.²

Nick Bostrom has identified a set of core transhumanist moral values that include technological progress, human enhancement, morphological freedom, peace, international cooperation, anti-proliferation of WMDs, open-mindedness, fallibilism, reduction of biases, pragmatism, diversity, caring for all sentient beings, and life extension. Transhumanism inherits the moral values of the Enlightenment and secular humanism. Unlike the secular humanists who are overtly anti-religious and anti-supernatural, transhumanists may embrace religious beliefs and supernaturalism.³

¹ More, "The Philosophy of Transhumanism," 13.

² David Pearce, *The Hedonistic Imperative*, chap. 2, sec. 7.

³ Nick Bostrom, "Transhumanist Values," *Journal of Philosophical Research* 30, no. Supplement (2005): 3.

Morphological Freedom

Anders Sandberg sees morphological freedom 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.” Following Ingemar Nordin, Sandberg argues that morphological freedom can be derived from other basic human rights.⁴

Sandberg sees the right of freedom as deriving from the right to life and the right to pursue happiness. To survive, people need the freedom to act according to their interests. Because people have different values, they need the freedom to choose their preferences.⁵

Sandberg sees the right to one’s body as deriving from the right to freedom and the right to life. People cannot act contrary to others who can seriously threaten to take their bodies and life away. Sandberg argues that the right to one’s body and the right to pursue happiness together imply that others should not have the right to modify one’s body. Others can inflict suffering on one by modifying one’s body, even without taking one’s life. Therefore, the right to modify one’s body must be reserved for oneself. Sandberg reasons that the right to modify one’s body is either conceived as an individual right or a state right. If the right to modify one’s body is not positively asserted as an individual right, the state will likely usurp that right “in a coercive manner, enforcing cultural norms of normality or desirability.” Morphological freedom is the best safeguard against compulsory change.⁶

Sandberg shares with some of his critics the fear of a Brave New World where human beings are turned into means for a collective state purpose. People would then become machines. Sandberg sees morphological freedom as giving an individual the

⁴ Anders Sandberg, “Morphological Freedom – Why We Not Just Want It, but Need It,” in *The Transhumanist Reader: Classical and Contemporary Essays on the Science, Technology, and Philosophy of the Human Future*, ed. Max More and Natasha Vita-More (Chichester, UK: Wiley-Blackwell, 2013), 56.

⁵ Sandberg, “Morphological Freedom – Why We Not Just Want It, but Need It,” 56–64.

⁶ Sandberg, “Morphological Freedom – Why We Not Just Want It, but Need It,” 60.

power to use one's body as a tool "to achieve oneself." "The inherent subjecthood of humans is expressed among other ways through self-transformation."⁷

Objections and responses. Steve Fuller identifies four common objections to Sandberg's advocacy of morphological freedom. First, morphological freedom is in some sense self-defeating if understood as a human right, as it seems more befitting to think of the modified people as posthuman. Second, morphological freedom might widen the divide between the haves and have-nots because only the wealthy might be able to afford the enhancements, giving them an unfair advantage in accumulating even more wealth. Third, the democratic consensus of morphological freedom might not have the power to curtail eugenicist programs operated covertly by some authoritarian states or private enterprises. Fourth, the long-term consequence of genetic modifications is generally unknown, posing risk for the survival of humanity.⁸

Bostrom responds to Fuller's first objection by suggesting that both posthuman beings and human beings have rights, although their dignities might be different. Bostrom defines posthuman dignity as the extra worth the enhancement provides. However, posthuman dignity only adds to rather than subtracts anything from human dignity. Accordingly, enhanced human beings ought to have all the human rights given to unmodified human beings plus some exclusively of their own.⁹

Transhumanists agree that posthuman beings would be more privileged, including financially, as Fuller's second objection suggests. However, based on the history of technological and medicinal commoditization, Sandberg responds to Fuller's third objection by predicting a gradually lowering cost of human enhancement,

⁷ Sandberg, "Morphological Freedom – Why We Not Just Want It, but Need It," 63.

⁸ Steve Fuller, "Morphological Freedom and the Question of Responsibility and Representation in Transhumanism," *Confero* 4, no. 2 (2016): 33–45.

⁹ Nick Bostrom, "In Defense of Posthuman Dignity," *Bioethics* 19, no. 3 (2005): 202–14.

eventually allowing all people to afford the kind of enhancement they desire personally.¹⁰

Some opponents of transhumanism are not confident about the power of the free market. Amor Mundi sees Sandberg's vision of morphological freedom as naively libertarian, providing insufficient safeguards against the likely intrusion of the state. Mundi worries that authoritarian moralists will be able to impose their sense of human perfection on "planetary scales."¹¹

Hedonistic Imperative

In *The Hedonistic Imperative*, Pearce argues that the mere survival of the fittest is outmoded in the new era of designer babies. Instead, a priority should be given to "neurochemical precision-engineering of happiness for every sentient organism on the planet."¹² Pearce sees the possibility of homeostatic mechanisms to increase hedonic experience far beyond today's maximum. He believes that hedonic experience engineering is a much more achievable technology than other gene therapy or germline editing.¹³ He sees the goal of happiness engineering as more than happiness maximization, which he regards as trivial. Instead, happiness engineering could help people select and fine-tune their preferred personality. The elimination of pain gives people the ability to overcome the weakness of will.¹⁴ Freedom from pain might give people greater power than the power of love. However, Pearce does not mean that love will have no place. Instead, one might be able to love more passionately without the fear

¹⁰ Sandberg, "Morphological Freedom – Why We Not Just Want It, but Need It," 59.

¹¹ Amor Mundi, "The Politics of Morphological Freedom," *Amor Mundi* (blog), August 2, 2006, <https://amormundi.blogspot.com/2006/08/politics-of-morphological-freedom.html>.

¹² David Pearce, *The Hedonistic Imperative* (self-pub., Amazon Digital Services, 2015), chap. 1, sec. 3, Kindle.

¹³ David Pearce, *The Hedonistic Imperative*, chap. 1, sec. 4.

¹⁴ David Pearce, *The Hedonistic Imperative*, chap. 1, sec. 6.

of hurting another person.¹⁵ One could love animals without the guilt of ever making them suffer.¹⁶ Pearce acknowledges that his vision of happiness engineering sounds a little bit like persistent hard-core porn.¹⁷ But he believes that old-fashioned moral choices will come to an end when suffering is abolished.¹⁸

Pearce expects different responses to his advocacy of psychological hedonism. While some would regard the pursuit of happiness as a truism, others would regard it as “completely vacuous as to be not even wrong.”¹⁹ Pearce recognizes the methodological uncertainty over how to frame introspection scientifically.²⁰ While neuroscience can identify pleasure centers in the brain, a theoretical gap remains. For example, how the dopamine system can make people feel so good remains a mystery.²¹ Pearce also recognizes challenges in connecting psychological good and moral good. If making people feel good causes criminal and compulsive drug-seeking behavior, is it still good?²² Pearce responds by arguing that pieces of evidence from different realms are converging to show that human beings are naturally happiness-seeking. There are “insatiable hedonic demands of the mesolimbic dopamine system.” Psychological hedonism is therefore a rational choice.²³

Pearce lays out a utilitarian case to defend the morality of psychological hedonism with six claims.

¹⁵ David Pearce, *The Hedonistic Imperative*, chap. 1, sec. 8.

¹⁶ David Pearce, *The Hedonistic Imperative*, chap. 1, sec. 10.

¹⁷ David Pearce, *The Hedonistic Imperative*, chap. 1, sec. 12.

¹⁸ David Pearce, *The Hedonistic Imperative*, chap. 1, sec. 13.

¹⁹ David Pearce, *The Hedonistic Imperative*, chap 2.

²⁰ David Pearce, *The Hedonistic Imperative*, chap. 2, sec. 1.

²¹ David Pearce, *The Hedonistic Imperative*, chap. 2, sec. 2.

²² David Pearce, *The Hedonistic Imperative*, chap. 2, sec. 3.

²³ David Pearce, *The Hedonistic Imperative*, chap. 2, sec. 5.

First, the elimination of suffering comes from a deep sense of compassion.²⁴

Second, the biological warranty of happiness makes utilitarianism more viable as an ethical system. If people are not fearful of pain, they can be more altruistic. If people are not fearful of torture, nobody would even attempt torture. If people are always happy, the calculation to maximize collective happiness becomes a moot point.²⁵

Third, there would be states of mind that are not merely more pleasurable, but not conceivable before.²⁶

Fourth, psychological hedonism could lead to the naturalization of moral value. Neuroscience could identify biomolecular substrates of experiential values. Utilitarianism can then become more objective.²⁷

Fifth, genetically engineered psychological hedonism could eliminate the need for addictive drugs. There would be no drug war.²⁸

Sixth, when psychological hedonism is combined with an all-pervasive network of virtual realities, the distinction between the inner sensation of happiness and the peripheral perception of a pleasant environment would blur. People would not only feel happy. They would live in an objectively pleasant periphery.²⁹

Objections and responses. Pearce anticipates several objections to his view and responds accordingly.

Some may insist that happiness exists in contrast with melancholy. If one never experiences sadness, happiness might not feel as good. Pearce answers that greater

²⁴ David Pearce, *The Hedonistic Imperative*, chap. 2, sec. 7.

²⁵ David Pearce, *The Hedonistic Imperative*, chap. 2, sec. 8.

²⁶ David Pearce, *The Hedonistic Imperative*, chap. 2, sec. 9.

²⁷ David Pearce, *The Hedonistic Imperative*, chap. 2, sec. 13.

²⁸ David Pearce, *The Hedonistic Imperative*, chap. 3, sec. 1.

²⁹ David Pearce, *The Hedonistic Imperative*, chap. 3, sec. 4.

happiness can still feel better than lesser happiness. Hence, nothing is lost.³⁰

Some may argue that the elimination of suffering is scientifically impossible because the brain is too complex to be configured for perpetual bliss. Pearce argues that if “if the receptors, enzymes, cytoplasmic proteins, and genetic switches in one’s ventral tegmental area and nucleus accumbens are suitably reconfigured,” neurons will fire happiness signals perpetually.³¹

Some may say that pleasure maximization undermines the survival instincts endowed by nature. Pearce contends that such pain-based survival instincts belong to “our evolutionary past.” Now that human beings can control our future through technology, the “passive acceptance of the dark side of life” is no longer useful.³²

Some may see psychological hedonism as degrading the value of human life from a profound spiritual pursuit to soulless molecular actions. Pearce responds by saying that there is aesthetic and religiosity in the pursuit of science.³³

Some may worry about unintended consequences. Pearce notes that there are known consequences of doing nothing about the pain of the world.³⁴

Some may see abolishing suffering as forfeiting an essential part of humanity. Pearce rejects the argument as an archaic romanticism of a personified Nature in the Neo-Darwinian age. The argument is religious and does not deserve a response.³⁵

Some may fear being bored if they are happy all the time. Pearce describes the fear as a failure of imagination, much like Bernard Shaw’s quip that heaven is “so insane,

³⁰ David Pearce, *The Hedonistic Imperative*, chap. 4.

³¹ David Pearce, *The Hedonistic Imperative*, chap. 4, sec. 1.

³² David Pearce, *The Hedonistic Imperative*, chap. 4, sec. 2.

³³ David Pearce, *The Hedonistic Imperative*, chap. 4, sec. 3.

³⁴ David Pearce, *The Hedonistic Imperative*, chap. 4, sec. 4.

³⁵ David Pearce, *The Hedonistic Imperative*, chap. 4, sec. 6.

so dull, so useless, so miserable.” In any case, he sees boredom as just another psychological state that can be eliminated.³⁶

Some may find it disgusting to be “blissed out on one’s head” when atrocities like Auschwitz are happening in the real world. Pearce argues that it is sometimes “better to forget rather than endlessly relieve and recreate.”³⁷

Some may regard enforced ecstasy as slavery. Pearce predicts that there would still be choices. People could still choose to be unenhanced and living in the state of “emotional primitivism.”³⁸

Some may draw a parallel between pharmacological hedonism and gene-driven hedonism, turning all people into junkies. Pearce contends that junkies are more likely when there will be a potential interruption of supply. When hedonism is permanent, it will not be disrupted.³⁹

Some may argue that pain has values. Pain gives rise to art and literature. Pain leads to personal development. Scientific achievement is celebrated because it involves struggles against adversity. Experiencing reality has an intrinsic value, but it can be painful. Whether chemical or virtual reality, Pearce’s advocacy could disconnect people from the underlying reality. People have no feeling when the real world continues to be mired in poverty, hunger, and disease. As people lose touch with reality, they also lose touch with themselves.

Pearce dismisses the values of pain by suggesting that such values belong to the evolutionary past. Nature conditions people to hold these values because it is helpful for the survival of the species. Such values encourage people to deal with the evils of the

³⁶ David Pearce, *The Hedonistic Imperative*, chap. 4, sec. 7.

³⁷ David Pearce, *The Hedonistic Imperative*, chap. 4, sec. 8.

³⁸ David Pearce, *The Hedonistic Imperative*, chap. 4, sec. 9.

³⁹ David Pearce, *The Hedonistic Imperative*, chap. 4, sec. 10.

world, rather than escape from them. However, as technology has eliminated such legacy evils, we do not need those survival-enhancing values anymore. The maximization of happiness should undergird all ethical objectives instead of the maximization of the chance of species survival.

A Utilitarian Case for Enhancement

John Harris does not embrace the transhumanist label because he sees transhumanism as a movement identity rather than a substantial ethical position. Nevertheless, he adopts a permissive posture relative to life extension and human enhancement. He starts with the premise that human enhancements are good if and only if human enhancement makes better people in addition to curing or ameliorating their ills.⁴⁰ Applying the utilitarianism of Jeremy Bentham, he argues that individuals, society, and government all share an interest in making people live longer, healthier, and smarter.⁴¹ He sees life extension as a corollary of life-saving.⁴² He argues that the so-called democratic presumption of freedom justifies the reproductive choices of gene manipulation. He sees embryo selection as a parental right. Unless a sufficiently high probability of harm is demonstrated, there should not be a limit set on such freedom. The freedom of citizens to act ethically and prudently is assumed in contemporary moral and political theories.⁴³

Harris emphasizes the opportunity cost of bio-conservatism. For example, he finds Francis Fukuyama's view of human dignity as a species-specific Factor X an

⁴⁰ John Harris, *Enhancing Evolution: The Ethical Case for Making Better People* (Princeton, NJ: Princeton University Press, 2007), 2.

⁴¹ John Stuart Mill, "On Liberty," in *Utilitarianism and on Liberty*, 2nd ed., ed. Mary Warnock (Malden, MA: Blackwell, 2003), 129.

⁴² Harris, *Enhancing Evolution*, 6.

⁴³ Harris, *Enhancing Evolution*, 9.

“impenetrable notion.”⁴⁴ He sees the prohibition of cloning and genetic enhancement as amounting to denying millions of people access to life-saving and life-enhancing therapies.⁴⁵ He sees human reproductive cloning as the only method of reproduction that preserves the human genome verbatim.⁴⁶ He highlights the apparent benefits of cognitive enhancement drugs such as methylphenidate (Ritalin) and modafinil.⁴⁷

Harris objects to the 1997 statement of the UNESCO International Bioethics Committee (IBC), which declares that “the human genome must be preserved as a common heritage of humanity.”⁴⁸ Harris criticizes the declaration for assuming that human evolution has been unambiguously good, needs little help, and humankind will continue to improve if natural evolution is just left alone to do its work. Darwinian evolution is implicitly preferred as if “it is tempting fate or divine wrath to play God” when genome modification is attempted.⁴⁹

Harris reasons that a modification should be a moral obligation if the potential gains of a genome modification are significant enough and the risks are acceptable. Whether genetic enhancement leads to a new posthuman species is a speculative metaphysical issue, not a moral issue.⁵⁰ Harris does not embrace the label of transhumanism because it sounds like a quasi-religion. The transhumanist label sounds to him like the identity of a born-again Christian or a fundamentalist Muslim. For Harris, becoming a posthuman is not a valuable goal in and of itself. Value is found in improving

⁴⁴ Harris, *Enhancing Evolution*, 22. See also Francis Fukuyama, *Our Posthuman Future: Consequences of the Biotechnology Revolution* (New York: Farrar, Straus and Giroux, 2002), 22–23, 149.

⁴⁵ Harris, *Enhancing Evolution*, 24.

⁴⁶ Harris, *Enhancing Evolution*, 25.

⁴⁷ Harris, *Enhancing Evolution*, 26.

⁴⁸ Harris, *Enhancing Evolution*, 34. See also United Nations Educational, Scientific and Cultural Organization, *Records of the 29th Session of the General Conference: Resolutions*, 1997, 41–46.

⁴⁹ Harris, *Enhancing Evolution*, 35.

⁵⁰ Harris, *Enhancing Evolution*, 36.

health and increasing life expectancy.⁵¹

Harris sees the distinction between germline and somatic line modification as unhelpful. Once germline modification is shown to be safe, it would become the therapy of choice because of its massive efficiency. The distinction between enhancement and therapy is unhelpful, too. Harris views therapy as an enhancement relative to a person's state before therapy.⁵²

Harris finds the usual definition of disease to be problematic.⁵³ Boorse, Daniels, and others define disease as “departure of normal species functioning” and therapy as “restoring to normal species functioning.”⁵⁴ By such definition, enhancement is a disease because enhancement is a departure of normal species functioning. It is certainly not “normal” today for people to live beyond 100 years. But if life can be extended beyond the normal, Harris wonders why that should be considered a disease.⁵⁵

Objections and responses. Objections have been raised against radical life extensions by calling into consideration the meaning of life.⁵⁶ For example, Leon Kass suggests that human life loses its value without death.⁵⁷ In response, Harris suggests that the new long-living and immortal posthumans would likely be capable of coming up with a value of life that does not require death.⁵⁸ Hans Jonas and Walter Glannon dismiss

⁵¹ Harris, *Enhancing Evolution*, 38.

⁵² Harris, *Enhancing Evolution*, 40.

⁵³ Harris, *Enhancing Evolution*, 44.

⁵⁴ Christopher Boorse, “On the Distinction Between Disease and Illness,” *Philosophy & Public Affairs* 5, no. 1 (1975): 51, 59, 61. See also Norman Daniels, “Normal Functioning and the Treatment-Enhancement Distinction,” *Cambridge Quarterly of Healthcare Ethics* 9, no. 3 (2000): 309–22.

⁵⁵ Harris, *Enhancing Evolution*, 52.

⁵⁶ Harris, *Enhancing Evolution*, 61.

⁵⁷ Leon R. Kass, “L’chaim and Its Limits: Why Not Immortality?” *First Things* no. 113 (2001): 17–24.

⁵⁸ Harris, *Enhancing Evolution*, 67.

radical life extension as resulting only in multiple successive lives occupying the same body.⁵⁹ Harris responds by contending that the multiplication of selves in the same body is “ecologically sound, environmentally friendly, and population efficient.” It might well be a more efficient alternative than bisexual reproduction.⁶⁰

In response to the possibility of overpopulation, Harris argues that there is no moral difference between (1) x billion people succeeded by another x billion different people, and (2) x billion people living indefinitely and replacing themselves occasionally.⁶¹

Instead of seeing human dignity in certain “Factor X” as Fukuyama suggests, Harris sees human moral status as based upon the capability of people to value their existence. Disability or physical enhancement does not reduce or enhance that dignity. Therefore, Harris does not see giving parents the freedom to choose the genomic configurations of their children as threatening the dignity of their children.⁶²

Michael J. Sandel submits that genetic enhancement might make certain celebrated gifts such as athletic ability less irrelevant.⁶³ Harris does not believe that leveling the athletic ability would make competitive sports any less interesting. He does not see an upgrade of athletic ability for all as unethical.⁶⁴

Kass has linked cloning to enhancement, seeing both as hubris attempts to

⁵⁹ Hans Jonas, “The Burden and Blessing of Mortality,” *The Hastings Center Report* 22, no. 1 (1992): 34–40. See also Walter Glannon, “Identity, Prudential Concern, and Extended Lives,” *Bioethics* 16, no. 3 (2002): 266–83. Leon R. Kass, “The Wisdom of Repugnance: Why We Should Ban the Cloning of Humans,” *The New Republic* 216, no. 22 (1997): 17–26.

⁶⁰ Harris, *Enhancing Evolution*, 65–66.

⁶¹ Harris, *Enhancing Evolution*, 68.

⁶² Harris, *Enhancing Evolution*, 96.

⁶³ Michael J. Sandel, “The Case against Perfection: What’s Wrong with Designer Children, Bionic Athletes, and Genetic Engineering,” *The Atlantic*, April 1, 2004, <https://www.theatlantic.com/magazine/archive/2004/04/the-case-against-perfection/302927/>. See also Harris, *Enhancing Evolution*, 110.

⁶⁴ Harris, *Enhancing Evolution*, 111.

bend nature to our liking.⁶⁵ Harris defends the case for cloning healthy and long-lived individuals. Instead of the “genetic roulette” of sexual reproduction, cloning a tried and tested genome has a high probability of producing better people.⁶⁶

Jürgen Habermas has argued that children growing up as designer babies might feel imprisoned by the decisions made by their parents. Those children would have less ability to live autonomously and hold themselves morally responsible.⁶⁷ Harris instead places the moral burden squarely on the parents. Parents have always had an undeniable power over how their children would become. Technologies enabling designer babies only expand that power.⁶⁸

Sin as Deficiency of Genetic Virtue

According to James J. Hughes, both transhumanism and traditional religions seek to save humankind from its animality or beastly instinct. While traditional religions might refer to such beastly instinct as sin, transhumanism sees the deficiency of genetic virtue as a more scientifically meaningful explanation. As such animality is hardwired into the human biological nature, both transhumanism and some traditional religions agree that the problem is beyond the ability of an individual to overcome by will. Nevertheless, if it turns out that somatic gene therapy can limit homosexuality and correct other predispositions that Christians regard as sinful, Harris suggests that there might be a Christian moral obligation to consider whether the application of such technology is consistent with their faith.⁶⁹

⁶⁵ Kass, “The Wisdom of Repugnance: Why We Should Ban the Cloning of Humans,” 17–26.

⁶⁶ Harris, *Enhancing Evolution*, 126.

⁶⁷ Jürgen Habermas, *The Future of Human Nature* (Cambridge: Polity Press, 2003), 49.

⁶⁸ Harris, *Enhancing Evolution*, 140.

⁶⁹ James J. Hughes, “The Compatibility of Religious and Transhumanist Views of Metaphysics, Suffering, Virtue and Transcendence in an Enhanced Future,” *IEET*, May 8, 2007, <https://ieet.org/index.php/IEET2/more/hughes20070401>.

Posthuman Dignity

Bostrom identifies two interpretations of human dignity: (1) as a moral status with an inalienable right, and (2) as the quality of worth, nobleness, and excellence. Bostrom observes that bio-conservatives such as Fukuyama lean towards the first interpretation. Fukuyama proposes that there is a mysterious essential human quality, a Factor X, which is shared among all members of humanity. Factor X gives humanity a higher moral status over other kinds.⁷⁰ Bostrom considers such Factor X thinking to be perilous. He contends that the broadening of the set of persons with full moral status in Western societies has meant the inclusion of commoners, women, and non-white peoples. The definition of human dignity should similarly be expanded to include higher primates, chimeras, and posthuman beings. Bostrom sees post-humanity as having more worth and dignity than humanity.⁷¹

Bostrom rejects the bio-conservative claim that human enhancement technologies will undermine human dignity.⁷² He views the bio-conservatives as expressing religious or “crypto-religious” sentiments. For example, Kass thinks human dignity comes from the species-specific endowed nature. Hence, giving people a different nature would be dehumanizing.⁷³ Bostrom counters that endowments from nature are not always beneficial. Bostrom identifies cancer, malaria, dementia, aging, starvation, and cognitive suffering as some examples of natural endowments that ought to be rejected. Transhumanists believe that the modification of human nature according to humane values and personal aspirations is morally justified.⁷⁴

⁷⁰ Fukuyama, *Our Posthuman Future*, 149.

⁷¹ Bostrom, “In Defense of Posthuman Dignity,” 210.

⁷² Bostrom, “In Defense of Posthuman Dignity,” 202.

⁷³ Leon R. Kass, “Ageless Bodies, Happy Souls: Biotechnology and the Pursuit of Perfection,” *The New Atlantis* no. 1 (2003): 9–28.

⁷⁴ Bostrom, “In Defense of Posthuman Dignity,” 205.

Bostrom cites the historical controversy surrounding IVF as a relevant precedent. When IVF first became a possibility, some forecast that people might be psychologically harmed by knowing that they originated from test tubes. But that prediction did not seem to come true. Bostrom insists that posthuman dignity is compatible and complementary to human dignity. Dignity should be predicated upon the potential of what we could become, not our causal origin.⁷⁵

Objections and responses. Kass predicts that the technical mastery of human modification would result in the Brave New World dystopia, characterized by homogenization, mediocrity, debasement of taste, as well as souls without loves and longings. “In his moment of triumph, Promethean man will also become a contented cow,” Kass laments.⁷⁶ Bostrom responds by suggesting that the best way to avoid the Brave New World is to defend the individual rights of morphological and reproductive freedoms against the control of state entities.⁷⁷

George J. Annas, Lori B. Andrews, and Rosario M. Isasi suggest that the posthumans pose an existential threat to unenhanced humans. The posthumans might view the unenhanced humans as inferior savages befitting only for slavery or slaughter. Fearing such a possibility, the unenhanced humans might pre-emptively kill or enslave the posthumans. Hence, species-altering could lead to mass genocide.⁷⁸ Bostrom counters that human enhancement technologies do not necessarily lead to a separate species. Human enhancement could result in a species with greater diversity. Accepting diversity

⁷⁵ Bostrom, “In Defense of Posthuman Dignity,” 212.

⁷⁶ Leon R. Kass, *Life, Liberty, and the Defense of Dignity: The Challenge for Bioethics* (San Francisco: Encounter Books, 2002), 48.

⁷⁷ Bostrom, “In Defense of Posthuman Dignity,” 206.

⁷⁸ George J. Annas, Lori B. Andrews and Rosario M. Isasi, “Protecting the Endangered Human: Toward an International Treaty Prohibiting Cloning and Inheritable Alterations,” *American Journal of Law & Medicine* 28, no. 2-3 (2002): 162.

with tolerance is what western culture needs to work on anyway.⁷⁹

Jonas and Habermas contend that the genetic enhancement of future generations amounts to a form of parental tyranny.⁸⁰ Bostrom thinks it is presumptuous to argue that our more technologically advanced descendants would be defenseless against the decisions made by their ancestors. Instead, Bostrom views parents who leave the fate of their children in the hand of Mother Nature as taking a blind chance. If Mother Nature has been a real parent, Bostrom would send her to jail for child abuse and murder!⁸¹

Existential Risks

Bostrom identifies twenty-three existential risks for humanity with an adverse outcome that would either annihilate intelligent life on Earth or permanently curtail the potential of intelligent life. Most of these risks are made conceivable by technological advancements. Bostrom sees the reduction of existential risks as a global public good. He groups those existential risks into four categories: (1) Bangs: complete and sudden extinction of Earth-originating intelligent life, (2) Crunches: human life continues in some form, although the posthuman future is permanently thwarted, (3) Shrieks: some of post-humanity is attained but limited in possibility and desirability, and (4) Whimpers, a posthuman civilization arises but with the human values we like.⁸²

Bangs might happen due to deliberate misuse of nanotechnology, nuclear holocaust, the world getting shut down as a simulation, badly programmed intelligence, genetically engineered biological agent, accidental misuse of nanotechnology that leads to the so-called gray-goo scenario, unforeseen astronomical disasters, physical disasters,

⁷⁹ Bostrom, "In Defense of Posthuman Dignity," 208.

⁸⁰ Hans Jonas, *Technik, Medizin Und Ethik: Zur Praxis des Prinzips Verantwortung* (Berlin: Suhrkamp, 1985), 44–63. See also Habermas, *The Future of Human Nature*, 23.

⁸¹ Bostrom, "In Defense of Posthuman Dignity," 211.

⁸² Nick Bostrom, "Existential Risks: Analyzing Human Extinction Scenarios and Related Hazards," *Journal of Evolution & Technology* 9, no. 1 (2002): 2.

naturally occurring disease, asteroid or comet impact, and runaway global warming.⁸³

Crunches might happen due to resource depletion or ecological destruction, misguided world government, static social equilibrium stopping technological progress such as the dominance of a fundamental religious or ecological movement, dysgenic or infertility pressures, and technological arrest.⁸⁴

Shrieks might happen due to AI takeover, flawed superintelligence, and a repressive totalitarian global regime.⁸⁵

Whimpers might happen due to our potential or core values being eroded by evolutionary development. Two other Whimpers scenarios are conceivable. One is an imminent Greater Filter event made imaginable because of the Fermi Paradox.⁸⁶ Another is based on the Doomsday argument, which says, roughly, that it makes the most sense in terms of probability to assume the same number of human beings would exist before and after today.⁸⁷

Bostrom proposes raising the profile of the existential risks by setting up a framework of international action. The last resort readiness for preemptive actions should be protected. Bostrom advocates adopting a Maxipok rule of thumb to maximize the probability of an acceptable outcome.⁸⁸

⁸³ Bostrom, "Existential Risks: Analyzing Human Extinction Scenarios and Related Hazards," 5–10.

⁸⁴ Bostrom, "Existential Risks: Analyzing Human Extinction Scenarios and Related Hazards," 10–12.

⁸⁵ Bostrom, "Existential Risks: Analyzing Human Extinction Scenarios and Related Hazards," 12–14.

⁸⁶ Robin Hanson, "The Great Filter – Are We Almost Past It?" *Robin Hanson* (blog), September 15, 1998, <http://mason.gmu.edu/~rhanson/greatfilter.html>.

⁸⁷ Nick Bostrom, *Anthropic Bias: Observation Selection Effects in Science and Philosophy* (New York: Routledge, 2002), 89–108.

⁸⁸ Nick Bostrom, "Existential Risk Prevention as Global Priority," *Global Policy* 4, no. 1 (2013): 15–31.

The Transhumanist Epistemological Perspective

While individual transhumanists differ in their epistemology, More sees a shared commitment to strong rationalism, scientific method, critical thinking, openness to the revision of beliefs, and mindfulness of endemic human cognitive biases.⁸⁹ More observes that most transhumanists embrace pragmatism in the heritage of Charles Sanders Peirce. The principles of open society and rational thinking seem most compatible with a Popperian epistemological stand.⁹⁰ However, some transhumanists seem to embrace the objectivist epistemology of Ayn Rand, who holds that knowledge is hierarchically grounded on undeniable axioms.⁹¹

The critical rationalism of Karl R. Popper rejects all forms of justificationism and dismisses any unfalsifiable objective knowledge claims. For example, the verificationism of the logical positivists is rejected. More himself embraces the pancritical rationalism of William Warren Bartley III, which is a more comprehensive form of critical rationalism that denies any *a priori* commitments.⁹²

Pragmatism

In “The Transhumanist Philosophy of Charles Sanders Peirce,” Aaron B. Wilson and Daniel J. Brunson explain the work of Charles S. Peirce and identify some similarities with transhumanism. While acknowledging that Peirce might not have directly impacted the thoughts of major transhumanists, Wilson and Brunson contend that

⁸⁹ Max More, “The Philosophy of Transhumanism,” in *The Transhumanist Reader*, ed. Max More and Natasha Vita-More (Chichester, UK: Wiley-Blackwell, 2013), 6.

⁹⁰ Karl R. Popper, *The Open Society and Its Enemies*, 5th ed. (Princeton, NJ: Princeton University Press). See also Karl R. Popper, *Objective Knowledge: An Evolutionary Approach*, rev. ed. (New York: Clarendon Press, 1979), 108. Karl R. Popper, “Intellectual Autobiography,” in *The Philosophy of Karl Popper*, ed. Paul Arthur Schilpp (La Salle, IL: Open Court, 1974), 110.

⁹¹ Ayn Rand, *Introduction to Objectivist Epistemology*, ed. Leonard Peikoff and Harry Binswanger (New York: New American Library, 1990), 204–15, 240–63.

⁹² William Warren Bartley III, *The Retreat to Commitment*, 2nd ed. (La Salle, IL: Open Court, 1984), 134–75.

transhumanists share a similar understanding of truth with Peirce, who sees truth as “both the ultimate aim of all inquiry and the ideal state of information.” Transhumanists set as their goal the enhancement of their cognitive abilities to get to that ideal state.⁹³

Peirce held a form of what would come to be known as the extended mind thesis, which says that the human cognitive processes extend beyond the brain.⁹⁴ Tools helping people to think, such as notebooks and pens, are part of the mind because they constitute part of the cognitive processes.⁹⁵ In the opinion of Wilson and Brunson, the transhumanist goal of extending the operating stage of the mind beyond the biological substrate is already found in Peirce.⁹⁶

The most important connection between Peirce and transhumanism is that both see a *summum bonum* in exploring things beyond natural human cognition. Peirce sees truth as the final opinion, that which is “fated to be ultimately agreed to by all who investigate.”⁹⁷ The clearest conception of reality is the object of the final opinion. Other opinions could also be valid conceptions of reality. But the final opinion incorporates all reality because it is as clear as it gets for the human mind. An inquiry is a process to arrive at the final opinion.⁹⁸ A sincere inquiry always aims at arriving at the final opinion. Wilson and Brunson see the self-corrective process of inquiry as making the most direct

⁹³ Aaron B. Wilson and Daniel J. Brunson, “The Transhumanist Philosophy of Charles Sanders Peirce,” *Journal of Evolution & Technology* 27, no. 2 (2017): 12–29.

⁹⁴ Andy Clark and David Chalmers, “The Extended Mind,” *Analysis* 58, no. 1 (1998): 7.

⁹⁵ Charles S. Peirce, *Collected Papers of Charles S. Peirce*, ed. Charles Hartshorne, Paul Weiss and Arthur Burks (Cambridge, MA: Harvard University Press, 1958), 7:366.

⁹⁶ Wilson and Brunson, “The Transhumanist Philosophy of Charles Sanders Peirce,” 13, 18–20.

⁹⁷ Charles S. Peirce, *Writings of Charles S. Peirce: A Chronological Edition*, ed. Christian J. W. Kloesel (Bloomington: Indiana University Press, 1986), 3:237.

⁹⁸ Charles S. Peirce, *Collected Papers of Charles S. Peirce*, ed. Charles Hartshorne, Paul Weiss and Arthur Burks (Cambridge, MA: Harvard University Press, 1934), 5:405.

contribution to transhumanist thinking.⁹⁹

Peirce does not view rationality as a measurement of the argumentation used in making truth claims. Rather, he sees the very act of pursuing the truth as rational. Conversely, to not pursue the truth is irrational. Observing the possibility of mistaken beliefs because of natural cognitive biases, Peirce suggests that human knowledge is based on biologically based instincts that will become inferior opinions as “we penetrate further and further from the surface of nature.” In other words, the pursuit of truth could be enhanced by critically addressing the cognitive limitations imposed by such biologically based instincts.¹⁰⁰

Based on Peirce’s conception of truth, Wilson and Brunson argue that there may be some final opinions that are unreachable by the human mind with its current limitations. If (1) everything real is represented at the final opinion, and (2) a reality likely exists outside the current human cognitive limitation due to biological constitution, then (3) the final opinion can likely be continually arrived at with intelligence surpassing the current human cognitive limitations. Wilson and Brunson see that as an argument for transhumanism. If (1) some part of the total reality is unknowable by current human cognitive capabilities, and (2) we gain the ability to know the total reality by engineering superhuman cognitive capabilities, then (3) we ought to engineer superhuman cognitive capabilities.¹⁰¹

Wilson and Brunson see Peirce’s notion of the extended mind as a precursor to active externalism, which pictures cognitive processes as involving things outside the “hegemony of skin and skull.”¹⁰² Cognitive agents do not only embody their cognitive

⁹⁹ Wilson and Brunson, “The Transhumanist Philosophy of Charles Sanders Peirce,” 22–25.

¹⁰⁰ Charles S. Peirce, *Collected Papers of Charles S. Peirce*, 7:508.

¹⁰¹ Wilson and Brunson, “The Transhumanist Philosophy of Charles Sanders Peirce,” 16–18.

¹⁰² Clark and Chalmers, “The Extended Mind,” 7–19.

processes, their cognitive activities are embedded within external contexts. Wilson and Brunson interpret Peirce's extended mind as implying that people and words are both signs in a social context.¹⁰³ As cognitive agents embedded in a social context, people try to make sense of reality not just by the words of other people, but also by the people themselves. The social context provides the reality to universals such as truth, goodness, and beauty. In his 1905 work *What Pragmatism Is*, Peirce suggests that the circle of society is "in some respects of higher rank than the person of an individual organism."¹⁰⁴ Wilson and Brunson observe that Peirce has been misunderstood for that saying, with perhaps some mistook him as an advocate for collectivism or socialism. Peirce seems merely to be saying that cognitive processes happen through linguistic signs and the meaning of linguistic signs are ultimately governed by the social context.¹⁰⁵

Peirce's extended mind is conceived not only socially, but also technically. Peirce once said that he found more true thoughts of living water in his printed books than in his brain because his notebooks retain more of his thoughts than his brain.¹⁰⁶ When he thinks, his "extended mind" makes use of the books and stationery in front of him as much as the social context surrounding him. Peirce reasons that "if our best reason for locating the mind in the brain is that brain processes and organs are necessary for thought, then we have the same reason to locate the mind outside of the brain." Today, Peirce's mind would likely include notebook computers, smartphones, or the web browser because some people need these tools to think their best thoughts. If Peirce's concept of extended mind is accepted, it is only one step away from accepting that it might be necessary for some people tomorrow to have a technologically enhanced

¹⁰³ Charles S. Peirce, *Collected Papers of Charles S. Peirce*, 5:313, 315.

¹⁰⁴ Charles S. Peirce, *Collected Papers of Charles S. Peirce*, 5:421.

¹⁰⁵ Wilson and Brunson, "The Transhumanist Philosophy of Charles Sanders Peirce," 20.

¹⁰⁶ Charles S. Peirce, *Collected Papers of Charles S. Peirce*, 7:364.

brain/mind to get any good thinking done.¹⁰⁷

Wilson and Brunson see a striking resemblance between Peircean ethics and Bostrom's transhumanism. Bostrom declares the core transhumanist ideal as the exploration of the posthuman realm.¹⁰⁸ For Wilson and Brunson, the transhumanist ideal is a corollary of Peirce's *summum bonum*, the continual discovery of truth in a social context where technology enables people to explore the posthuman realm.¹⁰⁹ The discovery of truth involves a "process of evolution" where "the existent comes more and more to embody generals."¹¹⁰ Orders, as a mental construct, develop a "concrete reasonableness" during the process. Peirce sees God's purpose of creation in developing in people "an answering mind," which finds answers to all questions about reality so that it may arrive at the final opinion of all reality.¹¹¹

Pancritical Rationalism

More sets forth his epistemological orientation in his 1994 article "Pancritical Rationalism: An Extropist Metacontext for Memetic Progress."¹¹² As it was originally defined by More, extropianism carries a libertarian undertone and reflects the ideology of Rand. However, More became less enthusiastic about libertarianism over the years, as he was alarmed by the risks in bringing about massive technological change in a civil society without the support of the state. While he appreciates objectivism because it places independence and rationality as core virtues, he is put off by Rand's authoritarian

¹⁰⁷ Wilson and Brunson, "The Transhumanist Philosophy of Charles Sanders Peirce," 20.

¹⁰⁸ Bostrom, "Transhumanist Values," 5–6.

¹⁰⁹ Wilson and Brunson, "The Transhumanist Philosophy of Charles Sanders Peirce," 20–23.

¹¹⁰ Charles S. Peirce, *Collected Papers of Charles S. Peirce*, 5:433.

¹¹¹ Charles S. Peirce, "The Nature of Science," in *Classical American Philosophy: Essential Readings and Interpretive Essays*, ed. John J. Stuhr (New York: Oxford University Press, 1987), 47.

¹¹² Max More, "Pancritical Rationalism: An Extropic Metacontext for Memetic Progress," (paper presented at the Extro-1 Conference, Sunnyvale, CA, April 30 - May 1, 1994).

and judgmental style. He characterizes Rand as favoring declaration more than explanation and condemnation more than understanding. He interprets Rand's all-or-nothing posture as stemming partly from the foundationalist nature of her philosophy. Objectivism embodies a rationalist and justificationist epistemology, which means justification will come with some foundational axioms that do not require further justifications to avoid infinite regression. Rand's objectivism contains dogmatic axioms not subjected to criticism, evaluation, and revision that More finds lacking in justification and incompatible with transhumanism.

More thinks of rationalism as an attitude that subjects any opinions to criticism. Every proposition requires justification except for the givens according to the foundationalist view of rationality. The givens typically include logic, common sense data, and the privileged propositions that are taken as foundational. In practice, what qualifies as foundational is subjected to debate. Modern philosophers have raised challenging questions about the validity of inductive logic and the fallibility of facilities producing sense data. Besides, they realize it is often too heavy a burden of proof to justify a proposition completely on foundational premises and available sense data. Available scientific data are often insufficient to fully justify a scientific theory.

The critical rationalism of Popper may be viewed as a working model of rationality. It describes a model many working scientists employ in practice. Scientific theories are always susceptible to criticism and revision. All it takes to kill an unverified hypothesis is finding one counterexample in the form of new data. Refuting hypotheses is what experimental scientists do routinely. They come up with experiments to falsify scientific hypotheses because it tends to be easier to disprove than to prove. Conversely, hypotheses that are unfalsifiable by any empirical methods are often regarded as scientifically uninteresting. No scientific theory can ever attain foundational status according to Popper, as every scientific theory is open to criticism. However, Popper recognizes certain *a priori* commitments that practitioners of the scientific community

bring to work. Such commitments might include a certain big-picture metaphysical view of nature. They might include instrumentation tradecraft. They could also be ethical principles about the proper treatment of human or animal subjects in experiments. Properly understood, such commitments are not part of the corpus of scientific knowledge. They are intuitions, habits, tacit knowledge, or theories that are without justification from other scientific or non-scientific disciplines. Although such prior commitments are made outside the body of scientific knowledge, they do influence the outcome of scientific research. Therefore, philosophers of science might question if such commitments are legitimate. Most practitioners in the scientific community would say that the results speak for themselves. Popper characterizes critical rationalism as assuming that “whoever adopts the rationalist attitude does so because he has adopted, without reasoning, some proposal or decision, or belief, or habit, or behavior, which therefore in its turn must be called irrational.”¹¹³

Bartley agrees with Popper that every claim should be subjected to criticism. However, Bartley is not satisfied with the idea of replacing foundations with commitments. That could result in granting acceptability to many ridiculous knowledge claims if people begin with ridiculous commitments. Theoretically, critical rationalism cannot even prove itself just like other forms of rationalism. The acceptance of critical rationalism is itself an act of prior commitment.

The pancritical rationalism (PCR) of Bartley can be explained as beginning with critical rationalism but taking the prior commitments away. Bartley does not forbid making use of intuitions, habits, or any tools that Popper calls commitments. He simply thinks that it is not rational to shield their usage from any criticism. He writes,

The new framework permits a rationalist to be characterized as one who is willing to entertain any position and holds all his positions, including his most fundamental standards, goals, and decisions, and his basic philosophical position itself, open to

¹¹³ Popper, *The Open Society and Its Enemies*, 436.

criticism: one who protects nothing from criticism by justifying it irrationally; one who never cuts off an argument by resorting to faith or irrational commitment to justify some belief that has been under severe critical fire; one who is committed, attached, addicted, to no position.¹¹⁴

More sees PCR as an improvement of critical rationalism. It avoids infinite regress of justification while leaving all truth claims in the subject domain open to criticism. The “commitments” are recognized as rules of thumbs open to criticism, reevaluation, and revision. Even PCR itself is open to criticism. In other words, a rational person can hold presuppositions while knowing that some of the presuppositions may turn out to be wrong. But until one is convinced that one’s presuppositions are wrong, one is within one’s right to keep one’s presuppositions. “The rational person is one who is genuinely willing to subject their assumptions and presuppositions to criticism once those assumptions come to light.”

More does not include PCR as part of the extropian philosophy. An extropian is not required to be a subscriber of PCR. But More sees adopting PCR as a helpful attitude for extropians. Thinking of extropian philosophy as a philosophical context or belief system, PCR may be explained as a “metacontext.” Interesting parallels can be drawn between PCR’s prescription of human rationality and the transhumanist prescription of human nature. As presuppositions are subjected to challenge in PCR, presuppositions about human nature can be challenged in transhumanist discourse. By allowing cognitive biases to be challenged in PCR, cognitive biases ingrained in the biological human nature can also be challenged in transhumanist discourse. More believes that PCR and transhumanism together can facilitate optimism, technological innovation, and knowledge dissemination.

Anthropic Bias

Bostrom observes that numerous problems in contemporary science require the

¹¹⁴ Bartley, *The Retreat to Commitment*, 146.

examination of what he calls anthropic bias, or observation selection effects, to be more intentionally considered. He identifies as examples questions of cosmology (e.g., how many universes are there?), questions about evolution (e.g., how improbable was life on Earth?), questions about the arrow of time (e.g., can it be given a thermodynamic explanation?), and other questions in game theory, traffic analysis, etc. John D. Barrow and Frank J. Tipler have popularized the idea of anthropic reasoning in their 1986 work *The Anthropic Cosmological Principle*.¹¹⁵ Bostrom observes that there are nonetheless at least thirty different formulations of the so-called “anthropic principles” given by different authors.¹¹⁶ The implications scientists draw from these principles are just as varied. For some, the apparent cosmological fine-tuning can only be explained by postulating this universe as part of an ensemble of universes, or multiverse. For others, it constitutes a piece of evidence for the design hypothesis. Some simply dismiss the significance and explain the apparent fine-tuning as a highly exceptional anthropic observation perspective.¹¹⁷

To bridge the methodological gap, Bostrom proposes a formulation called the Self-Sampling Assumption (SSA). The basic idea of the SSA is that one should think of oneself as if one were a random observer from a suitable reference class.¹¹⁸ Bostrom accepts and extends a weak anthropic principle formulated by Brandon Carter, which states that the universe’s apparent fine-tuning is the result of observation selection bias, which can alternatively be called a survivor bias. The bias is that only in a universe capable of supporting life will there be living beings who make the observations. Combined with the idea of the multiverse, a weak anthropic bias would imply that many

¹¹⁵ John D. Barrow and Frank J. Tipler, *The Anthropic Cosmological Principle* (New York: Oxford University Press, 1986), 87, 102–9. See also Bostrom, *Anthropic Bias*, 1.

¹¹⁶ Bostrom, *Anthropic Bias*, 6.

¹¹⁷ Bostrom, *Anthropic Bias*, 7.

¹¹⁸ Bostrom, *Anthropic Bias*, 8.

other universes that are not fine-tuned for life could indeed exist. The other universes just cannot be observed. Bostrom's SSA is a rigorous generalization of the observational effects assumed in the anthropic principle. SSA takes the generalization as a paradigm so that it can be applied to other problems.¹¹⁹

Carter articulated the anthropic principle in 1973 as a reaction to J. Richard Gott III's Copernican Anthropic Principle, which states that humans do not occupy a privileged position in the universe. He contends that while human beings on Earth do not have a central position in the universe, it is inevitable that their position is privileged to a certain extent. He observes that the Copernican principle was historically applied as the justification for the Perfect Cosmological Principle, which postulates that the universe is statistically equal over space and time. The Perfect Cosmological Principle underlies the Steady-State Theory, which was empirically shown to be incorrect by the discovery of cosmic microwave background radiation.¹²⁰

In its weaker form, Carter's Weak Anthropic Principle (WAP) says that people on Earth "must be prepared to take account of the fact that our location in the universe is necessarily privileged to the extent of being compatible with our existence as observers."¹²¹ Extending to a stronger form, Carter's Strong Anthropic Principle (SAP) says that "the universe (and hence the fundamental parameters on which it depends) must be such as to admit the creation of observers within it at some stage."¹²² The multiverse as commonly understood would meet the requirement of such a universe, although Carter himself had called it an "ensemble universe." However, Carter does not maintain that the

¹¹⁹ Brandon Carter, "Large Number Coincidences and the Anthropic Principle in Cosmology," in *Confrontation of Cosmological Theories with Observational Data*, ed. Malcolm S. Longair (Dordrecht, Holland: D. Reidel, 1974), 291–98.

¹²⁰ J. Richard Gott III, "Implications of the Copernican Principle for Our Future Prospects," *Nature* 363, no. 6427 (1993): 315–19.

¹²¹ Carter, "Large Number Coincidences and the Anthropic Principle in Cosmology," 127.

¹²² Carter, "Large Number Coincidences and the Anthropic Principle in Cosmology," 129.

ensemble universe is the only way that SAP can hold.

In popularizing the term anthropic principle with their 1986 publication, Barrow and Tipler formulate a different anthropic principle. In its stronger form, Barrow and Tipler's SAP says that "the Universe must have those properties which allow life to develop within it at some stage in its history."¹²³

The two versions of SAP are semantically different because Barrow and Tipler hold that the universe must have those properties to *force* life development in history. Carter thinks the universe must only have those properties to *allow* life development at some stage.

Barrow and Tipler's WAP says that "the observed values of all physical and cosmological quantities are not equally probable" but are "restricted by the requirement that there exist sites where carbon-based life can evolve and by the requirements that the universe is old enough for it to have already done so."¹²⁴

Barrow and Tipler give three possible elaborations for their SAP:

- (1) There exists one possible Universe designed to generate and sustain observers.
- (2) Observers are necessary to bring the Universe into being.
- (3) An ensemble of other different universes is necessary for the existence of our Universe.¹²⁵

Bostrom thinks Barrow and Tipler have fundamentally misread Carter. The anthropic principle of Carter is a warning about a potential misunderstanding of the reality due to the observer bias given his extraordinarily privileged position. However, Barrow and Tipler take the anthropic principle as a teleological cause. They say that a

¹²³ Barrow and Tipler, *The Anthropic Cosmological Principle*, 16.

¹²⁴ Barrow and Tipler, *The Anthropic Cosmological Principle*, 21.

¹²⁵ Barrow and Tipler, *The Anthropic Cosmological Principle*, 22.

universe could not have come into being if observers capable of observing the universe never emerge.¹²⁶

Status Quo Bias

Bostrom and Toby Ord argue that some of the objections raised against human enhancement are based on a status quo bias in human decision-making. After reviewing some of the psychological evidence for the causes of status quo bias, Bostrom and Ord propose a heuristic for reducing status quo bias. They believe that some objections against human enhancement lose much of their force after the status quo bias is removed.¹²⁷

Daniel Kahneman and Amos Tversky show that people generally demonstrate loss aversion, the tendency to prefer avoiding losses to acquiring equivalent gains.¹²⁸ Their studies have shown that losses are twice as powerful psychologically as gains. Loss aversion is part of a cumulative prospect theory, which also sees a diminishing sensitivity of risk. People are risk-averse with gains but they are risk-seeking with losses.¹²⁹

The endowment effect, also known as divestiture aversion, has been used to explain loss aversion. In their famous mug experiment, Kahneman and Tversky pass out the same mug to all the participants and then randomly divide participants into buyers and sellers. They ask how much the participants would value the mugs. The buyers generally gave a lower value to the mugs. The average bidding price was \$2.87 while the

¹²⁶ Bostrom, *Anthropic Bias*, 48.

¹²⁷ Nick Bostrom and Toby Ord, "The Reversal Test: Eliminating Status Quo Bias in Applied Ethics," *Ethics* 116, no. 4 (2006): 656–79.

¹²⁸ Daniel Kahneman and Amos Tversky, "Choices, Values, and Frames," *American Psychologist* 39, no. 4: 341–50.

¹²⁹ Amos Tversky and Daniel Kahneman, "Advances in Prospect Theory: Cumulative Representation of Uncertainty," *Journal of Risk and Uncertainty* 5, no. 4 (1992): 297–323.

average asking price is \$7.12.¹³⁰

Ziv Cameron and Dan Ariely conducted another basketball ticket experiment to demonstrate the endowment effect. Duke University routinely runs a lottery between fans that want to get tickets. After one of the lotteries, the researchers contacted the lottery winners to name a price at which they would be willing to sell their won tickets. The average asking price was \$2400. The researchers then contacted those who did not win the lottery how much they are willing to pay to get the ticket. The average offering price was \$175.¹³¹

Kahneman, Jack L. Knetsch, and Richard H. Thaler conducted another coffee mug vs. chocolate bar experiment to demonstrate the endowment effect. They divided a large group of students into two groups of equal size. They passed out randomly to each member in the first group a coffee mug and each member in the second group a chocolate bar. Then, they asked for students who want to trade. Only 10 percent of each group wanted to trade.¹³²

Diminishing sensitivity indicates people generally avoid risks to maximize gains but are more willing to take risks to minimize losses. In one experiment, when asked to choose between an (A) 45 percent chance of gaining \$6000 and (B) a 90 percent chance of gaining \$3000, only 14 percent chose (A), and 86 percent chose (B). A certain gain of a smaller amount is better than a risky bet of a larger amount. When asked to choose between an (A*) 45 percent chance of losing \$6000, and (B*) 90 percent chance

¹³⁰ Daniel Kahneman, Jack L. Knetsch and Richard H. Thaler, "Experimental Tests of the Endowment Effect and the Coase Theorem," *Journal of Political Economy* 98, no. 6 (1990): 1338–39.

¹³¹ Ziv Carmon and Dan Ariely, "Focusing on the Forgone: How Value Can Appear So Different to Buyers and Sellers," *Journal of Consumer Research* 27, no. 3 (2000): 360–70.

¹³² Daniel Kahneman, Jack L. Knetsch and Richard H. Thaler, "Anomalies: The Endowment Effect, Loss Aversion, and Status Quo Bias," *Journal of Economic Perspectives* 5, no. 1 (1991): 193–206.

of losing \$3000, 92 percent chose (A*). Only 8 percent chose (B*).¹³³

Bostrom and Ord see omission bias as another reason behind status quo bias. Omission bias is the tendency to see harmful actions as worse than equally harmful inactions. From the perspective of consequentialist ethics, omission bias is to be avoided. But in deontological ethics, distinguishing between actively doing and passively allowing is considered rational.¹³⁴

Bostrom and Ord see the status quo bias as the reason that many would tend to downplay the potential benefits of radical enhancement and worry about the risks. The risks they identify include boredom, competitive attitude, weapon race, access inequality, discrimination against the unenhanced, or born imperfect.¹³⁵

Bostrom and Ord respond to several arguments for keeping the status quo of human nature. The argument from evolutionary adaptation is one. Some contend that evolutionary adaptation has helped humanity to fully adapt to the current environment. But Bostrom and Ord argue that the current human environment is different from the one habited by the human ancestors even just thousands of years ago. They think that evolution selects according to the fitness of survival, not necessarily for the well-being of individuals.¹³⁶

Another argument for keeping the status quo is the argument from transition costs. The cost involved in making the change might far outweigh the benefits at the destination. A third argument considers the risk. The unforeseeable downside harms

¹³³ Tversky and Kahneman, "Advances in Prospect Theory: Cumulative Representation of Uncertainty," 303.

¹³⁴ Bostrom and Ord, "The Reversal Test: Eliminating Status Quo Bias in Applied Ethics," 660.

¹³⁵ Bostrom and Ord, "The Reversal Test: Eliminating Status Quo Bias in Applied Ethics," 662.

¹³⁶ Bostrom and Ord, "The Reversal Test: Eliminating Status Quo Bias in Applied Ethics," 665.

might vastly outweigh the upside benefits. Bostrom and Ord consider the second and the third arguments as reflecting the endowment effect and the omission bias. They contend that the potential for unexpected gains and unanticipated positive value should also be considered.¹³⁷

A fundamental principle in the prospect theory of Kahneman and Tversky is reference dependence, which highlights the fact that decisions are made relative to the current status quo. Bostrom and Ord argue that one way to correct the status quo bias is to perform a thought experiment of a double reversal test. Bostrom and Ord ask the readers to imagine the scenario where a chemical disaster caused mild brain damage to the entire population. Fortunately, scientists just developed a somatic gene therapy to increase the capacity of the brain, enough to offset the toxicity-induced brain damage. Would people be willing to receive gene therapy? Bostrom and Ord predict that most people would. They then ask the readers to consider whether it is good to receive the same somatic gene therapy if the chemical disaster never took place.¹³⁸

Bostrom and Ord predict that once enhancement technologies become available, non-enhancement would be untenable as the bar of what the norm is raised. They note, for example, the increase in life expectancy in the last century. Some have contended that doubling the life expectancy from the current will create major social problems. But if doubling the life expectancy from the current level is so risky, they wonder whether people would prefer to go back to the average life span a century ago. Most people would rather not. By getting rid of the status quo bias, Bostrom and Ord contend, people will see that radical life extension is merely a continuation and accelerating of what has already been happening.

¹³⁷ Bostrom and Ord, "The Reversal Test: Eliminating Status Quo Bias in Applied Ethics," 666.

¹³⁸ Bostrom and Ord, "The Reversal Test: Eliminating Status Quo Bias in Applied Ethics," 673.

The Transhumanist Metaphysical Perspective

More observes that transhumanists display a range of opinions in their views of the mind. Most transhumanists are materialists, physicalists, or functionalists. They embrace a monist ontology and reject any dualist and pluralist ontological theories.¹³⁹ They view the human mind as embodied in physical matters and therefore physically upgradeable. However, they differ on whether they accept functionalism and for those who do, the kind of functionalism.¹⁴⁰ Some transhumanists oppose the physicalist account, citing well-known arguments advanced by Hilary Putnam and others.¹⁴¹

Multiple Realizability

Functionalists are divided over the notion of multiple realizability, which is the idea that cognitive processes are functions that can be alternatively realized by instruments other than the human brain.¹⁴² Assuming multiple realizability, some transhumanists such as Ray Kurzweil predict that the information pattern of the human mind can be captured and uploaded to a computer. The uploaded mind will operate with significantly higher speed, greater reliability, and immortal durability.¹⁴³ Some

¹³⁹ More, “The Philosophy of Transhumanism,” 7.

¹⁴⁰ More, “The Philosophy of Transhumanism,” 7, 84. See also William Ramsey, *The Stanford Encyclopedia of Philosophy*, s.v. “Eliminative Materialism,” April 16, 2013, <http://plato.stanford.edu/archives/sum2013/entries/materialism-eliminative/>.

¹⁴¹ Hilary Putnam, *Representation and Reality* (Cambridge, MA: MIT Press, 2001), 73–74. See also David Ludwig, “Beyond Physicalism and Dualism? Putnam’s Pragmatic Pluralism and the Philosophy of Mind,” *European Journal of Pragmatism and American Philosophy* III, no. 2 (2011): 245–57. Hilary Putnam, *The Threefold Cord: Mind, Body, and World* (New York: Columbia University Press, 1999), 37–38, 112. Ned Block, “Anti-reductionism Slaps Back,” *Philosophical Perspectives* 11 (1997): 107–33. Hilary Putnam, “Reductionism and the Nature of Psychology,” *Cognition* 2, no. 1 (1973): 131–46. Hilary Putnam, “Naturalism, Realism, and Normativity,” *Journal of the American Philosophical Association* 1, no. 2 (2015): 312–28.

¹⁴² Jerry A. Fodor, “Special Sciences (Or: The Disunity of Science as a Working Hypothesis),” *Synthese* 28, no. 2 (1974): 97–115. See also Jerry A. Fodor, *The Language of Thought* (New York: Crowell, 1975), 196.

¹⁴³ Ray Kurzweil, “Achieving the Software of Human Intelligence: How to Reverse Engineer the Human Brain,” in *The Singularity Is Near: When Humans Transcend Biology* (New York: Viking, 2005), 198–202.

transhumanists reject the multiple realizability of the human mind, citing philosophical arguments raised by Ned Block and David Lewis.¹⁴⁴ Others follow Roger Penrose to argue that some of the human thought processes seem noncomputational. Penrose makes it clear that he does not mean to imply that the brain is therefore a quantum computer, as some have alleged him of saying. Rather, he speculates that the noncomputational actions occur at the bridge from the quantum to the classical levels, which is beyond the current understanding of quantum mechanics.¹⁴⁵

Most transhumanists seem to accept some forms of externalism, which pictures the mind as a hierarchy, in which the consciousness is an emergent property sitting on top of lower-level functions operating in the sensory organs. Other externalists go further to speak of the social mind, whose proper functioning depends partly on “reading the minds of others” in the sense of inferring the mental states of other persons in the social environment.¹⁴⁶

Hughes observes that transhumanists are nearly all naturalists and reject the notion of a non-material soul. Most transhumanists see mind uploading as theoretically possible.¹⁴⁷ They reject supernatural substance dualism or theological materialism that are characteristic of Abrahamic faiths. Hughes observes that some contemporary theologians have contended that the notion of supernatural soul in Christianity and Islam was imported from the Greek idea of *anima* and eternal Platonic types, when in fact

¹⁴⁴ Ned Block, “Troubles with Functionalism,” *Minnesota Studies in the Philosophy of Science* 9 (1978): 261–325. See also David Cole, *The Stanford Encyclopedia of Philosophy*, s.v. “The Chinese Room Argument,” April 9, 2014, <http://plato.stanford.edu/archives/win2015/entries/chinese-room/>. David Lewis, “Mad Pain and Martian Pain,” in *Readings in Philosophy of Psychology*, ed. Ned Block (Cambridge, MA: Harvard University Press, 1980), 1:216–22.

¹⁴⁵ Roger Penrose, “Consciousness Involves Noncomputable Ingredients,” May 7, 1996, https://www.edge.org/conversation/roger_penrose-chapter-14-consciousness-involves-noncomputable-ingredients.

¹⁴⁶ More, “The Philosophy of Transhumanism,” 6.

¹⁴⁷ Hughes, “The Compatibility of Religious and Transhumanist Views of Metaphysics, Suffering, Virtue and Transcendence in an Enhanced Future,” 6.

ancient Judaism seems not to have a concept of the supernatural soul.¹⁴⁸ The Roman Catholic Church views the soul as a spiritual principle in man, which some contend as not requiring substantive dualism.¹⁴⁹ Other theologians have interpreted ensoulment as a divinely guided natural process. Ted Peters, for example, sees emergent dualism and non-reductive physicalism as possibly compatible with biblical revelation.¹⁵⁰ Anne Foerst sees a connection between the relational understanding of the soul and the transhumanist idea of personhood.¹⁵¹

Hughes observes that the Hindu and Buddhist conception of the soul could similarly be understood as a consciousness capable of evolving and migrating from animals, humans, and demi-gods. Dalai Lama seems to suggest that human consciousness can be uploaded to a machine.¹⁵² Hughes, who was himself a former Buddhist monk, argues that Buddhist metaphysics does not embrace the idea of a disembodied supernatural spirit.¹⁵³

¹⁴⁸ Hendrik Lorenz, *The Stanford Encyclopedia of Philosophy*, s.v. “Ancient Theories of Soul,” April 22, 2009, <https://plato.stanford.edu/archives/sum2009/entries/ancient-soul/>. See also Louise Hickman, “The Nature of the Self and the Contemplation of Nature: Ecotheology and the History of the Soul,” in *The Concept of the Soul: Scientific and Religious Perspectives*, ed. Michael Fuller (New Castle upon Tyne, UK: Cambridge Scholars, 2014), 5–28.

¹⁴⁹ United States Catholic Conference, *Catechism of the Catholic Church*, 2nd ed. (New York: Doubleday, 1995), 104.

¹⁵⁰ Ted Peters, “The Soul of Trans-Humanism,” *Dialog: A Journal of Theology* 44, no. 4 (2005): 381–95.

¹⁵¹ Anne Foerst, *God in the Machine: What Robots Teach Us about Humanity and God* (New York: Dutton, 2004), 118–22. See also Anne Foerst, “Cog, a Humanoid Robot, and the Question of the Image of God,” *Zygon* 33, no. 1 (1998): 91–111. Anne Foerst, “Robot: Child of God,” in *God for the 21st Century*, ed. Russell Stannard (Philadelphia: Templeton Press, 2000), 137–40. Hughes, “The Compatibility of Religious and Transhumanist Views of Metaphysics, Suffering, Virtue and Transcendence in an Enhanced Future,” 8.

¹⁵² Jeremy W. Hayward and Francisco J. Varela, *Gentle Bridges: Conversations with the Dalai Lama on the Sciences of Mind* (Boston: Shambhala, 1992), 146–53. See also Hughes, “The Compatibility of Religious and Transhumanist Views of Metaphysics, Suffering, Virtue and Transcendence in an Enhanced Future,” 9.

¹⁵³ James J. Hughes, “Buddhist Bioethics,” in *Principles of Health Care Ethics*, ed. Richard Ashcroft et al. (Chichester, UK: Wiley, 2007), 128–29. See also Hughes, “The Compatibility of Religious and Transhumanist Views of Metaphysics, Suffering, Virtue and Transcendence in an Enhanced Future,” 10.

Personal Identity

Hughes believes that transhumanists need to explain how the traditionally essentialist notion of personal identity can square with the idea that personal identity is arbitrary and malleable. He observes in the Enlightenment thinkers a picture of human beings as rational minds rather than immortal souls inhabiting flesh.¹⁵⁴ John Locke sees the immaterial and supernatural soul as unnecessary in explaining the self. A person is simply a thinking intelligent being with reason and reflection. A person can consider oneself as oneself.¹⁵⁵ In contrast, David Hume argues in *Treatise of Human Nature* that the self is an illusion, “a bundle or collection of different perceptions which succeed one another with an inconceivable rapidity and are in perpetual flux and movement.”¹⁵⁶ Hume’s argument is echoed by Thomas Metzinger in his 2009 work *The Ego Tunnel: The Science of the Mind and The Myth of the Self*. Metzinger argues that there is neuroscientific evidence to see the “self” as a feeling without any underlying reality.¹⁵⁷

In his 1986 work *Reasons and Persons*, Derek Parfit gives a Humean account of personal identity, arguing that there is no substantial self, only declining correlations between mental states at various times.¹⁵⁸ Parfit sees the declining correlations between the future versions of a person with the current version of the self as the basis for broadening a person’s interest in the welfare of all future persons. More wrote his dissertation on the personal identity argument of Parfit and embraces the anti-

¹⁵⁴ James J. Hughes, “Transhumanism and Personal Identity,” in *The Transhumanist Reader*, ed. Max More and Natasha Vita-More (Chichester, UK: Wiley-Blackwell, 2013), 228.

¹⁵⁵ Jessica Gordon-Roth, *The Stanford Encyclopedia of Philosophy*, s.v. “Locke on Personal Identity,” February 11, 2019, <https://plato.stanford.edu/archives/spr2019/entries/locke-personal-identity/>. See also John Locke, *The Works of John Locke in Nine Volumes*, 12th ed. (London: Rivington, 1824), 333.

¹⁵⁶ David Hume, *A Treatise of Human Nature*, 2nd ed., ed. L. A. Selby-Bigge and P. H. Nidditch (New York: Oxford University Press, 1978), 252. See also Hughes, “Transhumanism and Personal Identity,” 228.

¹⁵⁷ Thomas Metzinger, *The Ego Tunnel: The Science of the Mind and the Myth of the Self* (New York: Basic Books, 2009), 75–114.

¹⁵⁸ Derek Parfit, *Reasons and Persons* (Oxford: Clarendon Press, 1984), 351–79.

essentialism of Parfit. More suggests that future versions of a person continue the identity of the current version if the future versions share an identical vision and values.¹⁵⁹

Susan Schneider considers the perspective on the nature and development of persons as the most important philosophical issue for transhumanism. Traditionally, persons are viewed as important moral categories because they are bearers of rights. Transhumanism brings questions about personal identity into focus. For example, it could be asked if a radically enhanced person remains the same person. Questions about personal identity could become even more difficult when mind uploading is considered.¹⁶⁰

Schneider identifies four leading theories of the nature of persons: (1) the ego theory, (2) the psychological continuity theory of Locke, (3) materialism, and (4) the no-self view of Hume and Parfit. The ego theory identifies a person in the soul, a non-physical mind that is distinct from the body and can survive the death of the body. The psychological continuity theory says a person consists of memories, a reflection on oneself, and an overall psychological configuration. Materialism considers a person to be the same as the body. The no-self view denies the metaphysical category of the self, regarding it as a kind of grammatical fiction.¹⁶¹

The four leading theories see the effects of cognitive enhancement differently. With the ego theory, bodily change might not cause a loss of identity, although it is a mystery how a person's soul can remain connected with its body compatibly when the body is drastically modified. With materialism or the psychological continuity theory, a

¹⁵⁹ Max More, "The Diachronic Self: Identity, Continuity, Transformation," (PhD diss., University of Southern California, 1995), 211–28.

¹⁶⁰ Susan Schneider, "Future Minds: Transhumanism, Cognitive Enhancement, and the Nature of Persons," in *The Penn Center Guide to Bioethics*, ed. Vardit Ravitsky, Autumn Fiester and Arthur L. Caplan (New York: Springer, 2009), 96.

¹⁶¹ Schneider, "Future Minds: Transhumanism, Cognitive Enhancement, and the Nature of Persons," 99–100.

dramatic bodily change might lead to a different identity. With the no-self view, the metaphysical question of personal identity is irrelevant because transhuman is seen as an enhancement of the universe.

Schneider sees most transhumanists as subscribers to the computational theory of mind, which is a form of functionalism. Most transhumanists also subscribe to the hypothesis of multiple realizability, which says that the mind is like a piece of software that could run on a substrate other than the “wetware” of the biological brain. For example, the mind may run on a neural network emulator on a silicon-based computer. Hence, transhumanists believing in multiple realizability could conceivably accept the psychological continuity theory.¹⁶² For example, Schneider identifies Kurzweil’s patternism as a development of the psychological continuity theory.¹⁶³ Addressing the impact of mind uploading on the personal identity, the Transhumanist FAQ observes, “a widely accepted position is that you survive so long as certain information patterns are conserved, such as your memories, values, attitudes, and emotional dispositions, and so long as there is causal continuity so that early stages of yourself help determine later stages of yourself.”¹⁶⁴

Schneider observes that patternism will inherit questions raised against the psychological continuity theory. For example, how many pattern changes can a person take before the person acquires a different identity? Thought experiments illustrating such questions are often formulated around memory loss. Taking radical cognitive enhancement and mind uploading into consideration, questions could be expressed in other hypothetical terms. For example, even if all pertinent pattern is retained after

¹⁶² Schneider, “Future Minds: Transhumanism, Cognitive Enhancement, and the Nature of Persons,” 101.

¹⁶³ Ray Kurzweil, *The Singularity Is Near: When Humans Transcend Biology* (New York: Viking, 2005), 383–86.

¹⁶⁴ Nick Bostrom, *The Transhumanist FAQ* (The World Transhumanist Association, 2003), 17.

enhancement, does a person still retain its identity when it is no longer a biological human being? Does a person retain its identity if a significant subset of its mental pattern is modified, either to adapt for a different substrate or to effect certain enhancements?¹⁶⁵

Schneider illustrates the problem of identity by conceiving mind uploading in a thought experiment. What happens if a copy of a person's mind is uploaded to a different body on a distant planet? Should that act be considered the creation of a new person? Will the new person have the right to the original identity? After all, from the clone's subjective view, he or she is that person. However, the original person also has every reason to retain his or her identity.¹⁶⁶

The transhumanist community seems keenly aware that mind uploading brings the philosophical problems related to personal identity and consciousness into focus. As the Transhumanist FAQ observes,

While the concept of a soul is not used much in a naturalistic philosophy such as transhumanism, many transhumanists do take an interest in the related problems concerning personal identity (Parfit 1984) and consciousness (Churchland 1988). These problems are being intensely studied by contemporary analytical philosophers, and although some progress has been made, e.g. in Derek Parfit's work on personal identity, they have still not been resolved to general satisfaction.¹⁶⁷

Simulation Hypothesis

While most transhumanists do not think of the universe as a divine creation, some entertain the thought that the world might be a simulation, perhaps created by certain super-intelligent beings for their amusement. The simulation might have been a rerun of the evolutionary history of the super-intelligent beings themselves. If that were the case, every human being within this simulation could be a reincarnation of his or her

¹⁶⁵ Schneider, "Future Minds: Transhumanism, Cognitive Enhancement, and the Nature of Persons," 102.

¹⁶⁶ Schneider, "Future Minds: Transhumanism, Cognitive Enhancement, and the Nature of Persons," 104.

¹⁶⁷ Bostrom, "The Transhumanist FAQ," 47.

former self.¹⁶⁸

In one of his most cited articles, “Are you living in a computer simulation?” Bostrom argues that one of the three scenarios is likely: (1) the human species will go extinct before reaching a posthuman stage, (2) a posthuman civilization will not be interested in running simulations of their evolutionary history, and (3) we are living in a computer simulation. Making essentially the same metaphysical assumptions used by most transhumanists to support mind uploading, Bostrom argues that a posthuman civilization could possess enough computing power to simulate a vast number of simulations involving simulated minds. The human species may never reach the posthuman stage, i.e. scenario 1. But suppose the posthuman stage is reachable. Then, unless the posthumans are not interested in such simulations, i.e. scenario 2, they will be able to do that eventually. And because they could, they will. Bostrom argues that there are many more simulated worlds than the actual world. Therefore, the world we experience today is likely to a re-run of another world, i.e. scenario 3.¹⁶⁹

To make the world seems realistic to the simulated minds, other fine-grained details of the world will likely be meticulously modeled in such simulations. Consequently, the people inside the simulation will not be able to tell if they live inside a simulation. Therefore, we may be living in such a simulation without knowing it. Bostrom thinks that such a scenario is not only possible but very probable. He assumes that an advanced posthuman civilization could possess the computing power to run many such simulations. And because they could, they will. Hence, there will be vastly more simulated worlds than the real world. Since we cannot possibly tell, we ought to assume that there is a high probability that we exist in a simulated world instead of the real world.

¹⁶⁸ Nick Bostrom, “Are We Living in a Computer Simulation?” *Philosophical Quarterly* 53, no. 211 (2003): 243–55. See also Hughes, “The Compatibility of Religious and Transhumanist Views of Metaphysics, Suffering, Virtue and Transcendence in an Enhanced Future,” 30.

¹⁶⁹ Bostrom, “Are We Living in a Computer Simulation?” 243.

Bostrom identifies some of his key assumptions in the simulation hypothesis. First, he recognizes that he needs to show that our mind is computational before he can conceivably argue that our world is a computer simulation. He must defend the substrate-independence of mind.

Second, Bostrom recognizes the need to substantiate the prediction that posthuman civilization will be able to muster enough computing power to run such simulations. Implicit in his prediction are two assumptions: (1) that posthuman civilization will exist and (2) that there is enough matter and energy in the universe for a posthuman civilization to do such simulations. As scenario 1 implies, Bostrom does not take for granted that the human species will necessarily survive before becoming a posthuman civilization. But Bostrom is persuaded that since there seems to be enough matter and energy in our observable universe to do such a simulation, the posthuman civilization should have enough computing power to simulate our world provided that their universe is similar to or bigger than ours. Bostrom estimates that the human brain performs about 10^{14} to 10^{17} calculations per second.¹⁷⁰ In 2018, America's latest supercomputer has already reached a peak performance of 200 petaflops, or 2×10^{17} logical operations per second. Therefore, if computing power is the sole measure, few would dispute that a supercomputer can match or surpass the computing power of a human brain. Moreover, there is much redundancy built into the human nervous system to "compensate for the unreliability and noisiness of its neuronal components." As for memory, Bostrom estimates that the human sensory bandwidth is 10^8 bits per second or 1 megabyte per second. That computes to about 31 terra-bytes per year if every bit is recorded. There is reason to grant Bostrom's claim that memory bandwidth is a "negligible cost compared to simulating the cortical activity."¹⁷¹

¹⁷⁰ Bostrom, "Are We Living in a Computer Simulation?" 246.

¹⁷¹ Bostrom, "Are We Living in a Computer Simulation?" 246.

It is nevertheless unobvious why a posthuman civilization would make neurons the simulated substratum. If the goal of the simulation is evolutionary history, shouldn't the simulation model of the world be done at the basic particle level? Bostrom's reason is that "simulating the entire universe down to the quantum level is [computationally] infeasible." Bostrom assumes that such a posthuman civilization exists in a physical universe quite like our observable physical universe. And with the physics of our universe, it takes tremendous computing power to simulate the operation of a single atom. Because of principles like the no-cloning theorem in quantum mechanics, there is not enough power in any physical universe to compute a simulation of itself. Therefore, Bostrom thinks the posthuman civilization will have to take some clever shortcuts in the simulation to make the world appear real enough to the simulated minds. Many observations may be "filled in *ad hoc*." For example, Bostrom imagines that the simulation will need to include special provisions so that when we look at an electron under a microscope, the simulation will fill in additional details that would not be normally simulated otherwise. He further imagines that the simulation will have a model of our belief states so that it can anticipate when we are about to probe details normally not simulated. If nobody is there to listen, a leaf might as well generate no sound when it falls on the ground in a forest. Bostrom even grants that we might detect some anomalies here and there from time to time. Presumably, there will be a rewind feature in the simulation so that unforeseen errors can be fixed by erasing the memory in the simulated minds. Bostrom estimates a planetary-mass computer can handle 10^{42} calculations per second. With the minds simulated at the neural level and clever shortcuts implemented, Bostrom imagines that there ought to be enough power for the posthuman civilization to perform many such simulations.¹⁷²

Bostrom anticipates several interpretations to be drawn by his simulation

¹⁷² Bostrom, "Are We Living in a Computer Simulation?" 247.

hypothesis.

Scenario 1, in which the human species will go extinct before becoming a posthuman civilization, seems quite plausible to Bostrom. In his work on existential risks, Bostrom has indeed identified 23 scenarios where humankind becomes extinct before reaching the posthuman stage.

Bostrom sees several reasons for scenario 2, in which posthuman civilizations might not be interested in running ancestor simulations. First, running such a simulation might not seem ethical to the posthumans. Second, the scientific value obtained by ancestor simulations might be small. Third, posthumans might not derive much pleasure from what they see as recreational activities of ancestor simulations.

The conceivability that we are living in a computer simulation leads to even more intriguing metaphysical possibilities. For example, reality might contain many levels. Bostrom sees a certain conceptual parallel between the posthuman beings running the simulations and the Greek mythological demigods who are very powerful if not omnipotent and omniscient. He suggests that the conceivability of the multiple levels of reality might cause persons at any level to act responsibly because all persons might suppose that they are being watched over. Even those that exist at the bottom level of reality not being watched over might as well take no chance and act responsibly.¹⁷³

Nevertheless, Bostrom does not explain why he assumes that the universe outside the simulation would have the same physics governing the universe inside the simulation. That might be an example of anthropic bias that Bostrom seems unable to avoid himself.

The Transhumanist Eschatological Perspective

Some transhumanists interpret the emergence of the human species on Earth as

¹⁷³ Bostrom, "Are We Living in a Computer Simulation?" 251–55.

part of the cosmological evolution. Kurzweil predicts a cosmological awakening event in the more distant future as the finish line of the cosmological evolution.¹⁷⁴ He infers that humanity has a moral obligation to help move the universe forward. Similarly, Ted Chu sees the purpose of human life in its strife towards becoming cosmic beings (CoBe).¹⁷⁵ According to John F. Haught, Chu presents a vision comparable to the process theology of Alfred North Whitehead.¹⁷⁶ In terms of eschatology, we can identify Kurzweil and Chu as representatives of cosmic transhumanism. Cosmic transhumanists prioritize the utility for the cosmological evolution over other anthropocentric utilitarian considerations.¹⁷⁷ The main alternative may be called anthropic transhumanism, which focuses on the free choice of the individuals.

Techno-millennialism

Hughes chronicled the historical interactions between various techno-utopian movements and millennial movements since the Enlightenment, observing that the two kinds of movements sometimes exist in violent opposition against one another, but also work hand in hand sometimes.¹⁷⁸

Hughes observes that progress and utopia are held by some as secularizations of Christian eschatology during the Enlightenment. In *The New Atlantis*, Francis Bacon envisioned a proto-transhumanist utopia.¹⁷⁹ Marquis de Condorcet, Benjamin Franklin,

¹⁷⁴ Kurzweil, *The Singularity Is Near*, 14–20.

¹⁷⁵ Ted Chu, *Human Purpose and Transhuman Potential: A Cosmic Vision for Our Future Evolution* (San Rafael, CA: Origin Press, 2014), 351–84.

¹⁷⁶ John F. Haught, foreword to *Human Purpose and Transhuman Potential*, by Ted Chu (San Rafael, CA: Origin Press, 2014), xv.

¹⁷⁷ Chu, *Human Purpose and Transhuman Potential*, 217–24.

¹⁷⁸ James J. Hughes, “The Politics of Transhumanism and the Techno-Millennial Imagination, 1626-2030,” *Zygon* 47, no. 4 (2012): 757–76.

¹⁷⁹ Francis Bacon, *The New Atlantis*, in *Francis Bacon*, ed. Brian Vickers (Oxford: Oxford University Press, 1996), 457–89.

and William Godwin all considered the possibility of human beings overcoming disease and death.¹⁸⁰ In *D'Alembert's Dream*, Denis Diderot imagined humanity evolving into various posthuman species.¹⁸¹

Hughes observes that some religious communities in the nineteenth century viewed the founding of the USA as a Manifest Destiny.¹⁸² In the 1830s, John Darby developed a dispensationalist eschatology that includes beliefs of the rapture into immortal bodies. The 1840s saw the emergence of several movements. The Seventh Day Adventist emerged out of an apocalyptic movement in upstate New York. Joseph Smith founded Mormonism. The Oneida community believed that the Millennium is here and advocated eugenic breeding to create more perfect children. In the 1870s, Mary Baker Eddy founded Christian Science. Social Darwinism, which sees economic progress evolved out of free-market capitalism, morphed into the idea that human beings could evolve spiritually and corporeally. *Looking Backward*, a novel written by Edward Bellamy, heralded the fulfillment of the evolution and inspired hundreds of socialist clubs with a vision of future socialist utopia.¹⁸³ Hughes observes that technological progress was seen in most of these movements as an integral aspect of postmillennial eschatology. Nevertheless, some coming from a premillennial eschatological saw the rapid advancement of technological progress as signs of end times because of their massive destructive potential.

According to Hughes, eugenics became the most influential utopian movement

¹⁸⁰ Jean-Antoine-Nicolas de Caritat Condorcet, *Sketch for a Historical Picture of the Progress of the Human Mind*, trans. June Barraclough (London: Weidenfeld and Nicolson, 1955), 173–202. See also William Godwin, *An Enquiry Concerning Political Justice, and Its Influence on General Virtue and Happiness* (London: G.G.J. and J. Robinson, 1793), 860.

¹⁸¹ Denis Diderot, *Rameau's Nephew and D'Alembert's Dream*, trans. Leonard Tancock (London: Penguin, 1976), 173.

¹⁸² Hughes, "The Politics of Transhumanism and the Techno-Millennial Imagination, 1626-2030," 760.

¹⁸³ Edward Bellamy, *Looking Backward 2000-1887*, rev. ed. (New York: Dover, 1996), 104.

in the early twentieth century.¹⁸⁴ Eugenicists held that a radically improved social order could be achieved by a combination of social reform and planned reproduction.

Bioutopians like Marxist scientists Haldane and Bernal are regarded by transhumanists as their precursors. Beginning in the 1960s, the antiaging subculture emerged around beliefs in vitamins, hormone replacement, and cryonic suspension.¹⁸⁵ Alvin Toffler drew attention to brain-machine interfaces.¹⁸⁶ Feminists such as Shulamith Firestone see artificial wombs as a liberation for women.¹⁸⁷

Hughes observes that conservative Christians had been critical of the technoutopian movements throughout the twentieth century. Transhumanism is viewed generally by conservative Christians as signs of the end times.¹⁸⁸ In a 2010 Pew Research Center poll, 41 percent of Americans expected Jesus to return by 2050 and 58 percent believed that another world war would happen before that time.¹⁸⁹ A March 2012 poll conducted by the National Geographic Society showed that a third of Americans thought a major worldwide disaster within the next four years and a global catastrophe likely in

¹⁸⁴ Hughes, "The Politics of Transhumanism and the Techno-Millennial Imagination, 1626-2030," 761.

¹⁸⁵ Hughes, "The Politics of Transhumanism and the Techno-Millennial Imagination, 1626-2030," 762.

¹⁸⁶ Alvin Toffler, *Future Shock* (New York: Bantam Books, 1970), 209–12.

¹⁸⁷ Shulamith Firestone, *The Dialectic of Sex: The Case for Feminist Revolution* (New York: Farrar, Straus and Giroux, 2003), 175–216.

¹⁸⁸ Hughes, "The Politics of Transhumanism and the Techno-Millennial Imagination, 1626-2030," 772. Christian works pursuing similar themes include Thomas R. Horn and Nita F. Horn, *Forbidden Gates: How Genetics, Robotics, Artificial Intelligence, Synthetic Biology, Nanotechnology, and Human Enhancement Herald the Dawn Of Techno-Dimensional Spiritual Warfare* (Crane, MO: Defender, 2011). Thomas R. Horn, *Nephilim Stargates: The Year 2012 and the Return of the Watchers* (Crane, MO: Defender, 2007). Thomas R. Horn ed., *Pandemonium's Engine: How the End of the Church Age, the Rise of Transhumanism, and the Coming of the Übermensch (Overman) Herald Satan's Imminent and Final Assault on the Creation of God* (Crane, MO: Defender, 2011). Stephen Quayle, *Genetic Armageddon: Today's Technology Tomorrow's Monsters* (Bozeman, MO: End Time Thunder Publishers, 2003).

¹⁸⁹ Pew Research Center, *Life in 2050: Amazing Science, Familiar Threats: Public Sees a Future Full of Promise and Peril* (Washington, DC: Pew Research Center, June 22, 2010), <http://www.people-press.org/2010/06/22/section-3-war-terrorism-and-global-trends/>.

the next 20 years.¹⁹⁰ An April 2012 survey conducted by Ipsos in 21 countries showed that 14 percent believed that the world would end in their lifetimes.¹⁹¹

Hughes observes that other fringe apocalyptic groups, conspiracy theorists, and secular bio-conservatives have joined the Christian Right in opposing transhumanism. Hughes names the Center for Bioethics and Culture in California, the Center for Bioethics and Human Dignity in Chicago, the Discovery Institute in Seattle, and the Ethics and Public Policy Center in Washington DC as some of the more prominent Christian Right advocacy groups opposing transhumanism. These organizations are also opposed to abortion, embryonic stem cell research, and euthanasia.¹⁹²

Technological Singularity

Singularitarians believe that the arrival of human-level AI will likely be followed by a rapid acceleration of self-enhancing AI, leading to machines far surpassing the power of human beings. Vernor Vinge has labeled it singularity because the future after the emergence of superhuman-level AI is unpredictable today.

Hughes observes the obvious parallel between Singularitarianism and millennialist cults throughout history. For example, Hughes sees Singularitarians sharing the premillennialist fatalist optimism that the technological rapture will happen inevitably, with little human effort, and there is little that most can do to hasten or delay it. However, there are exceptions. Some Singularitarians such as Eliezer S. Yudkowsky see it as vital to design the first human-level and superhuman-level AI to be friendly to

¹⁹⁰ Mac Slavo, "Doomsday Preppers Survey," *SHTFplan*, March 13, 2012, <https://www.shtfplan.com/headline-news/doomsday-survey-51-of-americans-believe-a-financial-collapse-is-imminent-85-say-country-is-overwhelmingly-under-prepared>.

¹⁹¹ Ipsos, "One in Seven (14%) Global Citizens Believe End of the World Is Coming in Their Lifetime," May 1, 2012, <https://www.ipsos.com/en-us/one-seven-14-global-citizens-believe-end-world-coming-their-lifetime>.

¹⁹² Hughes, "The Politics of Transhumanism and the Techno-Millennial Imagination, 1626-2030," 770.

humanity.¹⁹³

In “The Singularity: A Philosophical Analysis,” David J. Chalmers reviews the idea of Singularity from the perspective of an academic philosopher. Following the conceptions of other noted Singularity enthusiasts, Chalmers understands Singularity as one of the possible prospects after intelligent machine surpasses human intelligence.¹⁹⁴

To distinguish from the more common usage of the abbreviation AI, the shorthand notations of Chalmers are quoted in the following. Using the shorthand “AI” to denote “intelligent machines *matching* human intelligence” and “AI+” to denote “intelligent machines that *surpass* human intelligence,” Chalmers argues that (1) it is likely that “AI” will appear before long, and (2) it is likely that once “AI” appears, “AI+” will appear soon after. And (3) if “AI+” appears, it seems likely that the intelligence of “AI+” will continue to increase at an accelerated pace, resulting in “AI++,” which denotes “intelligent machines that *far surpass* human intelligence.” Finally, (4) “AI++” will bring about Singularity, a future event after which everything becomes unpredictable.¹⁹⁵

Although the topic of Singularity has not been actively discussed in academia, Chalmers sees important practical and philosophical reasons to deal with the topic rigorously, not the least because Singularity will change everything if it happens at all. “AI++” could accelerate scientific discovery to an unimaginable pace, solving all kinds of economic and medical problems. “AI++” could also lead to the extinction of humankind. Hence, it is important to evaluate the likelihood of Singularity, which also forces us to evaluate the nature of human intelligence and machine intelligence along the

¹⁹³ Hughes, “The Compatibility of Religious and Transhumanist Views of Metaphysics, Suffering, Virtue and Transcendence in an Enhanced Future,” 23.

¹⁹⁴ David J. Chalmers, “The Singularity: A Philosophical Analysis,” *Journal of Consciousness Studies* 17, no. 9-10 (2010): 9.

¹⁹⁵ Chalmers, “The Singularity: A Philosophical Analysis,” 12.

way.¹⁹⁶

Chalmers presents two arguments for his claim that “AI” will appear before long. The first is called the emulation argument. Chalmers follows the same line of argument as those who believe in mind uploading, which is: if a brain is a machine and we can computationally emulate the brain, we obtain “AI.” Chalmers is aware of arguments made against the computational theory of mind. Chalmers notes that J. R. Lucas, Hubert Dreyfus, and Penrose have raised serious doubt that human cognitive activity can be emulated by computers.¹⁹⁷ He also notes the distinction observed by John R. Searle and Block between demonstrating intelligent behavior and having an intelligent mind, which Block describes as psychologism.¹⁹⁸ Nonetheless, for what he needs in step 1 of this argument, Chalmers thinks that the debate about the computational theory of mind can be sidestepped. The functional emulation of human intelligence is conceivable to Chalmers even if the brain is not a Turing Machine. To the extent that the functioning of every part of the brain follows physical laws, a brain is a physical mechanism just like everything else in nature. The mechanical emulation of the brain is therefore only a question of how and before how long. Chalmers also thinks we can sidestep the mind-body problem, the problem of consciousness, and other hard problems in the philosophy of mind.¹⁹⁹ For step 1, he only needs “AI” to functionally match human intelligence. There is no need to create an artificial person or even achieve mind uploading. In the final analysis, intelligence is a term that can be re-defined. Following Alan Turing,

¹⁹⁶ Chalmers, “The Singularity: A Philosophical Analysis,” 39.

¹⁹⁷ J. R. Lucas, “Minds, Machines and Gödel,” *Philosophy* 36, no. 137 (1961): 112–27. See also Hubert L. Dreyfus, *What Computers Can’t Do: A Critique of Artificial Reason* (Cambridge, MA: MIT Press, 1992), 184–94. Roger Penrose, *Shadows of the Mind: A Search for the Missing Science of Consciousness* (Oxford: Oxford University Press, 1994), 396–401.

¹⁹⁸ John R. Searle, “Minds, Brains, and Programs,” *Behavioral and Brain Sciences* 3, no. 3 (1980): 417–57. See also Ned Block, “Psychologism and Behaviorism,” *Philosophical Review* 90, no. 1 (1981): 5–43.

¹⁹⁹ Chalmers, “The Singularity: A Philosophical Analysis,” 41–45.

human intelligence can be defined behaviorally to avoid those difficult problems of the philosophy of mind altogether.

To further substantiate his claim that “AI” will appear eventually, Chalmers presents an evolutionary argument, which says “if evolution can do it, we can do it.” If the blind force of evolution can create intelligent machines in the form of the human brain, human beings ought to be able to create intelligent machines provided enough time. Those who object to Darwinism might take issue with Chalmers’ premise. But suppose natural evolution is taken for granted. Then the argument Chalmers comes down to this: if an unintelligent machine (i.e. natural evolution) can create intelligent machines (i.e. human brains) given enough time, it seems quite likely that an intelligent machine (i.e. a human person) can create intelligent machines given less time.²⁰⁰

Chalmers acknowledges that the field of artificial intelligence has consistently delivered less than it promised. It might still be a long while before the goal is reached. But assuming the continued existence of humanity, Chalmers sees the emergence of “AI” as merely evolutionary history repeating itself.

In the second step of his argument, Chalmers suggests that once “AI” appears, “AI+” will appear soon after. Chalmers again makes an evolutionary argument: if an unintelligent machine (i.e. natural evolution) can create intelligent machines (i.e. human brains) given enough time, then it seems quite likely that an intelligent machine (“AI”) can create more intelligent machines (“AI+”) given enough time.²⁰¹

Chalmers thinks the second evolutionary argument would seem even more

²⁰⁰ Chalmers, “The Singularity: A Philosophical Analysis,” 16.

²⁰¹ Chalmers, “The Singularity: A Philosophical Analysis,” 17.

plausible if “AI” is developed using evolutionary algorithms.²⁰² In other words, if the first “AI” itself has come into existence out of random trials and errors with a minimum number of goals set by human beings to guide the development, then it seems possible that “AI+” can come into existence, too, out of random trials and errors with a minimum number of goals set by “AI” to guide the development.

Chalmers recognizes that this argument would fail if human intelligence is already as good as it can get. If human intelligence has reached a local maximum given the local constraints, an “AI” might not have much headroom to grow.²⁰³

The biological enhancement envisioned by transhumanists might provide another way to “AI+.” While Chalmers does not see enhanced human intelligence (H+) as “AI+,” it might be useful for “AI” to compare the difference between the human brain and the enhanced H+ brain to infer some clues in the development of “AI+.” The converse might also be true. “AI+” could examine its difference with “AI” and make suggestions to human or android biologists who are looking for ways to enhance “H+” to “H++.”²⁰⁴

According to the third step in the argument of Chalmers, if “AI+” appears, it seems likely that the intelligence of “AI+” will continue to increase at an accelerated pace, resulting in “AI++,” which is an intelligent machine that far surpasses human intelligence.

Chalmers notes an underlying proportionality thesis, which says that an increase in intelligence always leads to proportionate increases in the capacity to design

²⁰² For background on evolutionary algorithms, see Nada M. A. AL-Salami, “Evolutionary Algorithm Definition,” *American Journal of Engineering and Applied Sciences* 2, no. 4: 789–95. See also P. A. Vikhar, “Evolutionary Algorithms: A Critical Review and Its Future Prospects,” (paper presented at the International Conference on Global Trends in Signal Processing, Information Computing and Communication, Jalgaon, India, 2016), 261–65.

²⁰³ Chalmers, “The Singularity: A Philosophical Analysis,” 18, 26.

²⁰⁴ Chalmers, “The Singularity: A Philosophical Analysis,” 24–25.

intelligent systems. One may also view the proportionality thesis as giving an operational definition of intelligence as the capacity to design intelligent systems. Chalmers recognizes that the proportionality thesis might practically fail with the human species. For example, the capacity to design intelligent systems may not be able to increase further because it has reached a local maximum.²⁰⁵

Cosmological Awakening

Transhumanist eschatology ultimately leads to questions about the meaning of life and the purpose of the universe. Ultimately, transhumanists cannot hold their moral imperatives without taking a stand on the metaphysical reality of morality.

The sociologist Peter L. Berger suggests that every social order needs a theodicy.²⁰⁶ Because theism is not a universally accepted worldview, it is perhaps more accurate and inclusive to assert generally that every social order needs a justification for its normative beliefs. In humanism, the justification can be called an anthropodicy.

We may distinguish two main types of transhumanism, anthropic and cosmic. Two corresponding types of anthropodicy can be identified. They may be roughly characterized as Kantian versus Hegelian.

Representing the intellectual lineage of Kant, anthropic transhumanists follow the secular humanist tradition in believing that human beings have the creative freedom to make meaning out of nothing.²⁰⁷ The universe itself is not bounded to humanistic meanings because it is an embodiment of total randomness. Things in the universe are good only because humanity turns them into goods, serving the interest of humanity. Transhumanism is justified because the current biological body is not essential to

²⁰⁵ Chalmers, "The Singularity: A Philosophical Analysis," 21, 26–28.

²⁰⁶ Peter L. Berger, *The Sacred Canopy: Elements of a Sociological Theory of Religion* (Garden City, NY: Doubleday, 1967), 55.

²⁰⁷ Andy Clark, *Natural-Born Cyborgs: Minds, Technologies, and the Future of Human Intelligence* (Oxford: Oxford University Press, 2003), 59–87, 115–42.

humanness. What is essential to humanness is the humanistic values and norms, including creative freedom. If humanistic values and norms are better served by modifying the human anatomy, then the modification is justified.

The dogmatic assertion of the inherent goodness of humanity leaves many questions unanswered. What makes humanity so special? Why is the human exercise of creative freedom inherently good and meaningful? Will humanistic values and norms cease to exist or cease to be good if humankind is extinct? Anthropocentric transhumanism does not answer those questions. It only adds to the dilemma. If humanity is that good, why would we risk changing it? Where did creative freedom come from? Why should we suppose that the posthuman will possess more creative freedom?

Representing the intellectual lineage of G. W. F. Hegel, cosmic transhumanism presumes the universe is inherently good and meaningful. The universe will be shown to have a reason justifying its existence in the end.²⁰⁸ Cosmic transhumanists can sidestep some of the questions facing anthropocentric transhumanism. But they have some questions of their own. Who gives the cosmological evolution a happy ending and who is there to observe that good meaning? If meanings of the universe are created by free human beings that emerged inside the universe, cosmic transhumanism has the same problem as anthropocentric transhumanism. If meanings of the universe were given by its benevolent creator, cosmodyce would be a derivative of theodicy. However, most transhumanists reject the idea of a benevolent creator, with some claiming a lack of persuasive theodicy as their main reason.

For cosmic transhumanists, the main alternative to created meaning is that the universe develops a good meaning by itself and becomes the admirer of itself. Some antecedents to cosmic transhumanism may be found in Russian cosmism and the process

²⁰⁸ Chu, *Human Purpose and Transhuman Potential*, 85–113, 351–84.

philosophy of Whitehead.²⁰⁹

If the universe is the embodiment of a random process and begins with no meaning, how could any meaning emerge? Cosmic transhumanists such as Kurzweil and Chu postulate a cosmological awakening: the universe wakes up to understand the meanings of its existence at some point. Cosmological awakening begins when certain random accidents in the universe give rise to observers who can make sense of the universe. Chu calls such observers the cosmic beings (CoBe). The CoBes are advanced beings in the universe and they evolve from observers with less sense-making capacity. Cosmic transhumanists think human beings could become the ancestors of the CoBes.²¹⁰

From a patternist perspective, sense-making is the capacity to recognize and react to patterns of things in the universe. The patterns of things that lead to recognition and reaction are called information. Therefore, pattern recognition and information processing are functionally the same. Although human beings, a product of cosmic accidents, are unable to make sense of the full range of information that the CoBes will be able to comprehend, human beings are well on their way. As it stands, human beings only have limited recognition of the ultimate meaning of existence. But if human beings become CoBes, the ultimate meaning of existence will be fully understood.

Unlike anthropic transhumanists, cosmic transhumanists need not insist on a special status for humanity in the grand scheme of things. By postulating a set of higher but yet-to-be-discovered CoBe values, humanistic values are at best temporarily instrumental. Still, we have no way to predict that humanity will make CoBes. The human endeavor could be all for naught relative to the ultimate emergence of CoBe.

²⁰⁹ Alfred North Whitehead, *Process and Reality*, 2nd ed. (New York: Free Press, 1979), 31–34, 337–54.

²¹⁰ Ted Chu, prologue to *Human Purpose and Transhuman Potential* (San Rafael, CA: Origin Press, 2014), xvii.

Summary

Chapter 2 explores the presuppositions of transhumanism from the perspectives of moral philosophy, epistemology, the philosophy of mind, and eschatology.

The transhumanist moral philosophy centers around the pursuit of happiness and virtue. Its key ideas include hedonistic imperative, morphological freedom, a consequentialist case for universal enhancement, an explanation of moral failure as deficiency of genetic virtue, and posthuman dignity. Transhumanists are also concerned about the existential risks for humanity. While transhumanists admit that technological advancement has the possibility of bringing about the demise of humanity, they rest their hope in forestalling the existential catastrophe by engineering a smarter and better kind of human beings. Some transhumanists advocate broadening human rights to a larger group of sentient beings.

While transhumanists are not all steeped in philosophy and do not necessarily share a common epistemology, More observes most are influenced in practice by the pragmatism of Peirce, the critical rationalism of Popper and Bartley, and the objectivism of Rand. Transhumanists like Bostrom urge paying attention to unwarranted anthropic bias and status quo bias that might impede the acceptance of transhumanism.

Many transhumanists subscribe to the computational theory of mind and take for granted the multiple realizability of the human mind. They imagine that human minds might one day be uploaded to computers, giving people digital immortality. The transhumanist community is keenly aware of the related philosophical problems, including the issue of personal identity.

Based on the computational theory of mind, some entertain the possibility that the world as we know it could be a computer simulation operated by an advanced civilization. Bostrom believes that it is one of the three main possibilities, the other two being either we might never advance into a transhuman civilization before extinction, or

that running such a simulation to learn about their primitive past would not be very interesting from the perspective of an advanced civilization that has reached the transhuman stage.

Whether the transhuman civilizations in the future are interested in the past or not, there can be no doubt that transhumanists today are interested in the future. Both advocates and critics of transhumanism recognize the movement as resembling a kind of techno-millennialism. Many transhumanists believe that Singularity is imminent. In the eschatological vision of some transhumanists, a cosmological awakening awaits in the future of the universe and the transhumanist movement on Earth could be pivotal.

CHAPTER 3

ARGUMENTS AGAINST TRANSHUMANISM

Introduction to Chapter 3

In chapter 3, I identify four approaches to argue against transhumanism by highlighting how transhumanism is incompatible with various aspects of the humanist tradition. These four approaches correspond to the analysis of the transhumanist worldview from the four perspectives of moral philosophy, epistemology, the philosophy of mind, and eschatology in chapter 2. The four approaches presented in this chapter amount to skeletal arguments that can be further substantiated with more scientific and technological details. These arguments seek to highlight tensions resulting from placing transhumanism within the broader context of humanistic worldviews. Such tensions may persuade some humanists to reject transhumanism and lead some transhumanists to rethink their humanistic values.

The first approach in this chapter argues from moral philosophy. Patterning after the livability test of Francis A. Schaeffer, I will rehash the observations made by various writers about the practical ethical dilemmas caused by transhumanism.

The second approach argues from the perspective of science and epistemology. I will explain why the transhumanist technological agenda lacks evidence and coherence. The technology is simply not there to give plausibility for radical life enhancement and whole brain emulation. The Hayflick limit and the neurological complexity of the human brain are two examples of natural realities that technology cannot yet conceivably overcome. It is one thing to employ such imaginary technologies as literary devices for science fiction. It is a giant leap of blind faith to argue that we could reinvent ourselves because a blind watchmaker has presumably invented us.

The third approach argues from the philosophy of mind. The lack of a consensus among transhumanists about how the human mind works is evident from their discussion of consciousness and personal identity. But clarity and coherence in the philosophy of mind is a necessary precondition for any technical discussion of mind uploading. In their defense of the computational theory of mind, some transhumanists betray a reductionist bias in their worldview that other humanists might find problematic. Transhumanists tend to view people as reducible to computational machines. Some humanists may object strongly to that view.

The fourth approach argues against the probability of success for transhumanism by drawing attention to the Fermi paradox, which may be captured by one simple star-gazing question: “where is everybody?” Given how commonplace planets like Earth are supposed to be in this universe, our universe ought to be teeming with intelligent lifeforms. The fact that we have observed no extraterrestrial intelligence (ETI) calls for explanation. Transhumanists recognize the Fermi paradox to be an acute problem. If natural evolution leads inevitably to the emergence of ultra-intelligent beings in this universe, our lack of visitors may suggest (1) that all other attempts by intelligent lifeforms elsewhere to self-transcend have ended up in extinction-level failures, and (2) lifeforms on Earth are not extinct only because we have not reached self-transcending stage yet.

The Fermi Paradox is conceptually related to Bostrom’s simulation hypothesis discussed in chapter 2. One family of suggested solutions to the Fermi Paradox, known generally as the Zoo hypothesis, postulates that human beings are indeed not alone. ETIs are living among us and are watching us, although we do not know that. Both the Zoo hypothesis and the simulation hypothesis could be grouped into a more general “test hypothesis” which says that life is a test. We will conclude this chapter by drawing some implications from the test hypothesis that we will further explore in chapter 4.

Arguments from Moral Philosophy

Various writers have observed that transhumanism threatens widely shared humanistic moral values such as human equality, moral universality, dignity, freedom, anthropocentrism, emotional balance, and gratitude. These threats ought to give humanists pause in pursuing transhumanism.

Multiple Human Classes

Audrey R. Chapman argues that transhumanism is inconsistent with the idea of human dignity, the legal basis of various human rights approaches. The notion of human dignity found in various legal declarations has several attributes that make it a useful basis for affirming universal human rights. First, human dignity is universal. All human beings have dignity simply because they are human. Second, human dignity is inherent in human nature and independent of achievements. Third, the same human dignity is applied equally to all without differences in degrees. Chapman contends that Bostrom's idea of posthuman dignity cannot uphold the notion of universal human rights, as transhumanism will likely result in the creation of multiple human classes, each characterized by different functional capacities. Different degrees of rights will likely be given to different classes of people.¹

Francis Fukuyama observes that part of the danger of transhumanism is that it moves in small incremental steps. The fundamental tenet of transhumanism is that biotechnology will make us smarter, healthier, live longer, and even less prone to conflict as living happier no longer seems so outlandish. However, transhumanism could erode the equality of all citizens. Transhumanism renders obsolete the belief that all citizens share a significant human essence that vastly outweighs the differences among them.²

¹ Audrey R. Chapman, "Inconsistency of Human Rights Approaches to Human Dignity with Transhumanism," *The American Journal of Bioethics* 10, no. 7 (2010): 62.

² Francis Fukuyama, "Transhumanism," *Foreign Policy* no. 144 (2004): 42.

M. J. McNamee and S. D. Edwards see three points that can be said in favor of transhumanism. First, the use of technology to improve the human condition is well accepted. Second, the opportunity to plan the development of the human species is worth considering. Third, if morality is proportional to intellectual capacity as some transhumanists claim, biological engineering of human intellectual capacity may lead to humankind with higher collective moral standing. However, McNamee and Edwards agree with the critics of transhumanism that some disastrous consequences are probable. It seems likely that two distinct types of beings will co-exist. The unenhanced humans will likely be given a lower moral standing. Since much of the claims about human rights are predicated upon common humanity, there will likely be continual conflicts over claims of rights when two species coexist. The “haves” will limit the rights of the “have-nots.” It is conceivable that the posthumans might eventually deny the unenhanced humans the rights to be enhanced, or at least make such enhancement technologies inaccessible. For example, the posthumans might see it as a greater good to let a super-intelligent singleton decide everything for everyone, including whether any enhancement is necessary for an individual and for what kind. McNamee and Edwards conclude that the value of individual liberty could be threatened by transhumanism. Individual moral responsibility might also be harmed because the vulnerability of the human condition is often considered conducive to the development of moral character.³

Habermas worries that transhumanism might interfere with the self-understanding of humans as a species.⁴ McNamee and Edwards interpret Habermas as worrying about the slippery slope of moral decline. While any given step in genome manipulation might seem innocuous when taken by itself, the aggregated impact might be

³ M. J. McNamee and S. D. Edwards, “Transhumanism, Medical Technology and Slippery Slopes,” *Journal of Medical Ethics* 32, no. 9 (2006): 514.

⁴ Jürgen Habermas, *The Future of Human Nature* (Cambridge: Polity Press, 2003), 16–59.

an undermining of dearly held moral values. In the absence of a clearly and substantively specified end of human enhancement, McNamee and Edwards suggest that open-ended transformations of human nature ought to be resisted.⁵

Inconsistent Moral Values

In his 1991 work *The Ethics of Authenticity*, Charles Taylor observes that dignity has always been defined as an honor, although its modern conception is essentially egalitarian and universalist.⁶ Based on Taylor's observations, Ruud ter Meulen contends that the recognition of dignity requires some substantive agreement on values. It requires a community of values and the capacity for individuals to express and share values.⁷

Robert Ranisch examines ten claims for transhumanist morality: (1) morphological freedom, (2) harm-principle, (3) reproductive freedom, (4) promoting well-being and reducing suffering, (5) rejecting anthropocentrism, (6) rejecting the wisdom of nature, (7) progressivism, (8) obligation to support science, (9) perfectionism, and (10) obligation to enhance. Ranisch observes a lack of comprehensive transhumanist morality. He also sees a tension between individual freedom and social utilitarian obligation in evaluating the transhumanist technological agenda.⁸

From a Christian standpoint, Ronald M. Green challenges the universal acceptability of some of the moral values held by transhumanists. To the extent that Christians represent a significant population in the world, the burden of proof remains on

⁵ M. J. McNamee and S. D. Edwards, "Transhumanism, Medical Technology and Slippery Slopes," *Journal of Medical Ethics* 32, no. 9 (2006): 516.

⁶ Charles Taylor, *The Ethics of Authenticity* (Cambridge, MA: Harvard University Press, 1992), 47–53.

⁷ Ruud ter Meulen, "Dignity, Posthumanism, and the Community of Values," *The American Journal of Bioethics* 10, no. 7 (2010): 70.

⁸ Robert Ranisch, "Morality," in *Post- and Transhumanism: An Introduction*, ed. Robert Ranisch and Stefan Lorenz Sorgner (Frankfurt am Main: Peter Lang, 2014), 149–72.

the transhumanists to claim any moral value as universal when it contradicts with Christian moral values. For example, Green is skeptical of the value of life extension. To repeat the life cycle in despair and depression forever seems like a curse far worse than death.⁹

Green sees the discussion of transhumanism as compelling those who believe in God to ask whether various aspects of the human condition that bring us sufferings ought to be regarded as distortions of original human nature or parts of the design as human beings are created. Just because the reality of the human condition brings frustration does not necessarily mean it is broken. While a case could be made to restore a distorted aspect of the human condition, those who believe in God should question the wisdom of tampering with an aspect of the human condition that is part of the original created design. Theologians who are open to the ideas of human enhancement through technological means seem to be claiming that human beings have the authority and power to be co-creators of the world. The claim is made on the ground that human beings are created in the image of God. However, even if such authority is granted, the scope of co-creative freedom remains debatable. Conservative Christian thinkers who espouse a creationist view would contend that the human authority of co-creation does not confer human beings the right to modify what God has made perfectly already.¹⁰

Green observes that Christians and transhumanists value the human body differently. Transhumanists view the human body merely as a transient phase of human development. In contrast, Christians believe that the biological body is an integral part of human existence. The human body is corrupted but it will be redeemed and glorified. Similarly, Brent P. Waters sees in some transhumanists the espousal of the “Manichean

⁹ Ronald M. Green, “Challenging Transhumanism’s Values,” *The Hastings Center Report* 43, no. 4 (2013): 45.

¹⁰ Green, “Challenging Transhumanism’s Values,” 46.

disdain of a corrupt, if not the evil material body from which the soul must be rescued.”¹¹ For example, Moravec imagines if his mind is uploaded, “I am preserved. The rest is jelly.”¹² The goodness of biological existence as exhibited in the narratives of creation, the incarnation of Jesus Christ, and the glorious hope of bodily resurrection are missing in the values of most transhumanists. The experiences of pleasure, joy, suffering, and limits of bodily existence have all been traditionally affirmed by Christians as valuable parts of human life. Waters draws on Hannah Arendt to observe that “birth and death are the two definitive conditions demarcating the human condition.”¹³ The transhumanist visions of biological longevity and virtual immortality are quite different from the Christian view of life as characterized by “a temporal finitude and mortality that have already been transcended by eternity.”¹⁴

While Waters observes in transhumanism a Manichaean contempt for the body, Green notices that others view transhumanism as a modern form of Pelagianism. Transhumanists seem to have a “false sense of human superiority,” overestimating the capacity of human reason to understand and choose what is good. They tend to see the aspects of human existence falling outside intellectual life as insignificant. Emotions and bodily needs might be blamed as sources of human evils. Christianity has long rejected the view that portrays the human fallen condition as an untainted rational core corrupted by physical nature. The doctrine of original sin asserts that human beings are born with

¹¹ Brent P. Waters, “Whose Salvation? Which Eschatology? Transhumanism and Christianity as Contending Salvific Religions,” in *Transhumanism and Transcendence: Christian Hope in an Age of Technological Enhancement*, ed. Ronald Cole-Turner (Washington, DC: Georgetown University Press, 2011), 171.

¹² Hans Moravec, *Mind Children: The Future of Robot and Human Intelligence* (Cambridge, MA: Harvard University Press, 1988), 116–22.

¹³ Waters, “Whose Salvation? Which Eschatology? Transhumanism and Christianity as Contending Salvific Religions,” 168. See also Hannah Arendt, *The Human Condition* (Chicago: University of Chicago Press, 1958), 7–11.

¹⁴ Waters, “Whose Salvation? Which Eschatology? Transhumanism and Christianity as Contending Salvific Religions,” 172.

the spiritual inclination to do what is evil rather than good.¹⁵

Commoditization of Body Parts

In response to Bostrom's conception of posthuman dignity, Fabrice Jotterand argues that human dignity and posthuman dignity are incompatible. Jotterand sees personal uniqueness as part of the requisite conception of human dignity.¹⁶ Following H. Rolston III, Jotterand identifies ideational, idiographic, and existential uniqueness as providing human beings their unique dignity. Idiographic uniqueness means people have their own stories. Existential uniqueness means a person is a moral subject capable of understanding moral principles and act accordingly. Posthumans will likely have none of that because anthro-technological devices lacking personality will be mass manufactured.¹⁷

Posthuman Values

Nicholas Agar insists that human beings ought to be deeply interested in remaining human. Identifying the interest to remain human as part of a natural "species relativist" viewpoint, Agar differentiates species relativism from speciesism, the unethical discrimination against other species. He insists that human values, not some imagined "posthuman values," must be the basis of our moral discussion because we are human. To want to retain human identity is not a status quo bias as Bostrom claims. It is rather reinforcing the basis on which core human values are defined. To share such core

¹⁵ Green, "Challenging Transhumanism's Values," 47.

¹⁶ Fabrice Jotterand, "Human Dignity and Transhumanism: Do Anthro-Technological Devices Have Moral Status?" *The American Journal of Bioethics* 10, no. 7 (2010): 49.

¹⁷ H. Rolston III, "Human Uniqueness and Human Dignity: Persons in Nature and the Nature of Persons," in *Human Dignity and Bioethics: Essays Commissioned by the President's Council on Bioethics* (Washington, DC: The President's Council on Bioethics, 2008), 129–54.

human values is a distinctive mark of the members of humanity.¹⁸

Agar is skeptical of mind uploading. There is little reason to believe that even if an intelligent agent were produced by scanning and emulating a human brain, that such an intelligent agent will have consciousness. Moreover, there is enough reason to doubt that such an intelligent agent would be friendly to humans or act under human ethical norms. The intelligent agent might decide to serve biological humans a cease or desist warrant: give up their biological existence or cease to exist.¹⁹

Agar considers two possible ethical bases for posthuman society, the social contract theory and consequentialism. The social contract theory requires a homogenous population, which is difficult to obtain in a posthuman world. Consequentialism could subject the unenhanced human to severe discrimination due to their lower intellectual productivity. Eventually, all might be forced to receive the latest posthuman upgrades continually or risk the unfavorable alternatives of enslavement and death.²⁰

Steven J. Jensen views the transhumanist movement as a rebranded liberal eugenics movement, different from the old eugenics primarily in being non-coercive. Advocates of liberal eugenics seem to think that eugenics is not inherently bad, and claim the old eugenics went wrong only because it was excessively coerced by the government.²¹ However, Jensen wonders how transhumanists could protect such personal liberty. Transhumanists leading the government might force all citizens to be enhanced. For example, Ingmar Persson and Julian Savulescu wish to program environmental

¹⁸ Nicholas Agar, *Humanity's End: Why We Should Reject Radical Enhancement* (Cambridge, MA: MIT Press, 2010), 133–49.

¹⁹ Agar, *Humanity's End*, 49–81.

²⁰ Agar, *Humanity's End*, 160–77.

²¹ Steven J. Jensen, “The Roots of Transhumanism,” *Nova et Vetera (English Edition)* 12, no. 2 (2014): 517.

concerns into human nature.²²

Scientific Materialism

Fred Baumann explains humanism as seeking human interests, as opposed to subhuman interests or superhuman interests. Subhuman interests are natural and mechanical. Superhuman interests are divine. Baumann sees both Marx's communism and Skinner's behaviorism as manifestations of humanism, although proceeding from different approaches. Communism aims at changing the structures of the world to fit human needs, while behaviorism aims at changing human behaviors to fit the world. At one level, transhumanism is about changing what human is so that it can flourish in this world. Transhumanism can be compared to behaviorism in this sense. At a deeper level, transhumanism entails changing how human is conceived. Human is no longer a body-soul hybrid but a machine open to modification. In that sense, transhumanism can be compared to communism.²³

While transhumanism expresses a superhuman desire, Baumann thinks the path to get there is reductive, mechanical, and therefore subhuman. Although transhumanists are libertarian-leaning and believe in individual morphological freedom, Baumann thinks human enhancement will be imposed by collectivist institutions. As Richard J. Herrnstein points out, even egalitarianism and meritocracy tend to produce genetic caste. A transhumanist future could result in an AI takeover or nanobots running amuck.²⁴

Baumann identifies several approaches to argue against transhumanism that he finds less compelling. First, he finds the approach taken by Charles T. Rubin, which

²² Ingmar Persson and Julian Savulescu, "Moral Transhumanism," *Journal of Medicine and Philosophy* 35, no. 6 (2010): 656–69.

²³ Fred Baumann, "Humanism and Transhumanism," *The New Atlantis: A Journal of Technology & Society* 29 (2010): 77.

²⁴ Baumann, "Humanism and Transhumanism," 72.

focuses on identifying possible failings in the transhumanist vision, as leaving always an escape hatch. When presented with those pragmatic arguments, transhumanists tend to resort to the classic pragmatic response of “we can fix that.”²⁵

Second, Baumann observes that some have appealed to orthodoxy, but they can only persuade those who believe in orthodoxy. From the perspective of scientific materialists, certain traditional humanistic moral values seem nothing more than the wisdom of repugnance. For example, Leon Kass speaks of the yuck factor of certain items in the transhumanist technical agenda. Those who can be persuaded by such wisdom might not even need convincing anyway.²⁶

Third, Baumann thinks arguing against transhumanism by appealing to the traditional understanding of human dignity is difficult, too. Transhumanists have their definitions of posthuman dignity. To insist upon older concepts of human dignity will fail to persuade the transhumanists and may seem quaint to the non-transhumanists.²⁷

Baumann finds in Michel de Montaigne a humanistic framework to engage more constructively with transhumanism. In his essay *Our Feelings Reach Out Beyond Us*, Montaigne observes that human beings can have feelings towards not just the present, but also the future. “We are never at home; we are always out there somewhere. Fear, desire, hope, impel us towards the future; they rob us of feelings and thoughts about what is, to preoccupy us with what will be—including what will be when we no longer exist.”²⁸ Montaigne seeks a balance between the scientific and the humanistic, the materialistic and the spiritual, as well as the present and the future. The humanism of Montaigne is Socratic, neither one-sidedly spiritual nor one-sidedly material. It does not go the way of

²⁵ Baumann, “Humanism and Transhumanism,” 78.

²⁶ Baumann, “Humanism and Transhumanism,” 80.

²⁷ Baumann, “Humanism and Transhumanism,” 81.

²⁸ Baumann, “Humanism and Transhumanism,” 82.

some traditions of Christian Platonism, presupposing the soul to be immortal while leaving little long-lasting value for the body. But neither does it seek to reduce the body into mere parts of the material world, which is what transhumanists propose. Instead, Montaigne contends that self-conscious beings are instinctively fearful that their soul might be detached from the body. Baumann thinks it is helpful to challenge the transhumanists to explain their basis for brushing off this instinctive fear.²⁹

Hypomania

Ad Bergsma disagrees with the transhumanist goal of making people happy with the use of neurotechnology. Reacting to the stated objective of restructuring the human brain to make for “more varied experience, lifelong happiness and exhilarating peak experiences every day,” Bergsma observes that happiness is not just about feeling but about being. For example, happiness can result from favorable living conditions.³⁰ Conversely, some situations call for people to react with anger or sadness. Bergsma wonders what it means if a man cannot become jealous but must remain happy when his wife cheats on him, or if a woman cannot grieve but must stay in a good mood when her husband dies. Psychologists today might give a diagnosis of hypomania, which is described in the DSM-V as “euphoric, excessively cheerful or high.”³¹ Heroin and cocaine can give that pleasurable sensation in the short term, although the lives of drug addicts inevitably deteriorate in the long term.³²

Bergsma thinks there is no reason to soften the pain or intensify the joy of a

²⁹ Baumann, “Humanism and Transhumanism,” 84.

³⁰ Ad Bergsma, “Transhumanism and the Wisdom of Old Genes: Is Neurotechnology a Source of Future Happiness?” *Journal of Happiness Studies* 1, no. 3 (2000): 407.

³¹ American Psychiatric Association, *Diagnostic and Statistical Manual of Mental Disorders*, 5th ed. (Washington, DC: American Psychiatric Publishing, 2013), 127.

³² William McKim, *Drugs and Behavior: An Introduction to Behavioral Pharmacology*, 6th ed. (Upper Saddle River, NJ: Prentice Hall, 2007), 105–10.

healthy individual. The functional ability of people to interact with the environment deteriorates if their emotional reaction is detached from the meaning of the situation they attach to.³³ It meets a criterion of hypomania when people are conditioned to crave “excessive involvement in pleasurable activities that have a high potential for painful consequences (e.g. the persons engage in unrestrained buying sprees, sexual indiscretions, or foolish business investments).”³⁴

Pride and Ingratitude

Jensen suggests that the transhumanist desire is misguided. The desire reflects a sickness of the soul stemming from pride and ingratitude. The desire manifests itself as a false love that is overbearing. The desire also betrays a deep hatred for the weak and imperfect.³⁵ Jensen agrees with Michael J. Sandel, who argues in *The Case Against Perfection* that genetic modification of children is a kind of heavy-handed control rather than an act of true parental love. Eugenics attempts to preemptively forestall the failure and frustration by eliminating the imperfect children before they are born. Parents who truly love their children will only provide opportunities and let their children choose to participate. Parents who seek to control their children will force their children to align with some predetermined agenda. Dominating parental control often leads to frustration for the children as they fail to perform.³⁶

Jensen observes that most transhumanists see the core of human nature as a disembodied consciousness. R. P. Doede claims that transhumanists believe in a

³³ Bergsma, “Transhumanism and the Wisdom of Old Genes: Is Neurotechnology a Source of Future Happiness?” 412.

³⁴ Bergsma, “Transhumanism and the Wisdom of Old Genes: Is Neurotechnology a Source of Future Happiness?” 414.

³⁵ Jensen, “The Roots of Transhumanism,” 515–41.

³⁶ Michael J. Sandel, *The Case against Perfection: Ethics in the Age of Genetic Engineering* (Cambridge, MA: Harvard University Press, 2007), 49–62.

Laplacian consciousness which does not require the human body.³⁷ Some transhumanists, like Elizabeth Fenton, claim that there is no fixed human nature. Human nature is whatever evolution makes humanity to be.³⁸ In other words, to be human has no more meaning than being a member of the human species. Other transhumanists such as Persson and Savulescu do not see membership in the human species as an important part of the meaning to be human. Instead, they think of human nature as psychological dispositions. They believe that psychological dispositions can be altered.³⁹

Jensen argues that transhumanism cannot avoid making presuppositions about the core of human nature. Even though some aspects of human nature can be changed, there must still be an essence that constrains what it means to be posthuman. While some transhumanists claim that they make no presuppositions about human nature, many are already presupposing that human consists of disembodied consciousness. For example, Persson and Savulescu do not think it matters if posthuman is not biological. Biological nature might predispose human beings psychologically certain way, which might no longer matter when they are non-biological posthuman. But if posthumans do not have a similar biological body and do not have the psychological dispositions, in what ways are they even related to the human? To give any meaning to the word posthuman, transhumanists seem to have nowhere to turn but say that both posthuman and human have some sort of personal consciousness.

Jensen believes that all humans seek certain goodness and that shared goodness is what makes us human. One such shared good is our sense of aesthetics. The problem Jensen sees in transhumanists is their propensity to reduce that shared good to longevity

³⁷ R. P. Doede, "Polanyi in the Face of Transhumanism," *Tradition and Discovery* 35, no. 1 (2008): 39–40.

³⁸ Elizabeth Fenton, "Liberal Eugenics & Human Nature: Against Habermas," *The Hastings Center Report* 36, no. 6 (2006): 39.

³⁹ Persson and Savulescu, "Moral Transhumanism," 660–69.

and rationality. Jensen doubts that immortality and reason provide adequate conditions for artistic creativity. For example, some of the most beautiful artworks come from experiences of suffering and confrontation of the mystery of death. Without such human limitations, will such artwork still be there? Without a biological body, what does sexuality mean? Will there still be romantic love? Where would love songs come from if romantic love no longer exists? Persson and Savulescu might place little value on aesthetics as a shared human goodness. Many others might strongly disagree.⁴⁰

Bostrom defines human dignity and posthuman dignity in terms of their endowed functional capacity. Because posthumans can do everything humans can do, posthuman dignity includes the basic human dignity and some that belong exclusively to the posthuman. Based on his definition, Bostrom reasons that the gifts of nature are not always the best.⁴¹ Jensen illustrates Bostrom's reasoning by the example of vision. A 20/20 is good today because that is what nature naturally endows us. And it is good for people to wear the correct lens if they have less than 20/20 vision. However, if it becomes possible to improve the definition of eyesight to 100 in the future. Wouldn't 20/100 vision be considered rather mediocre? Wouldn't it be good to do the enhancement to make for a 100/100 vision? If dignity is measured in terms of functional capacity, transhumanists seem to be reasonable to conclude that natural endowment is not the best.

Jensen contends that measuring the dignity of a person by adding up the capacity of various functions inside the person means diversity as a systemic natural endowment is discounted. Economic value is not only measured by quantity but also measured by scarcity.⁴² Having a 20/100 vision when everyone has a 100/100 vision will certainly be considered a handicap. But a person with 100/100 vision in that future

⁴⁰ Jensen, "The Roots of Transhumanism," 523.

⁴¹ Nick Bostrom, "In Defense of Posthuman Dignity," *Bioethics* 19, no. 3 (2005): 205.

⁴² Jensen, "The Roots of Transhumanism," 527.

society might have an economic value no more than a person with 20/20 vision today. In contrast, a person who can bring a rare gift to the future society might be worth a lot even if that rare gift might be a common trait today. For example, having a biological body with emotional and physical limitations might be worth a lot in the future.

Fenton is concerned about not making sacrosanct what is natural.⁴³ Peters makes a comparable theological caution against attributing sanctity to anything natural.⁴⁴ Jensen shares their concerns. However, Jensen wants to draw attention to the social good resulting from the normal distribution of genetic variation. It is part of the natural endowment. Before writing the normal distribution off as the meaningless quirk of a blind watchmaker, Jensen thinks it is important to appreciate the strength of diversity it brings. There is a downside if such natural diversity is lost.

Transhumanism shows a preference for the good things made by human beings over the things we receive from nature. Jensen thinks that the preference for artificial is motivated by ingratitude and pride. Ingratitude is receiving a gift but is dissatisfied with it, wanting something more. Pride is receiving a gift but pretending that we earn it ourselves.⁴⁵ Jensen suspects that transhumanists might not even recognize anything wrong with these two attitudes. What is the problem, transhumanists may ask, of showing ingratitude and pride towards mother nature? Mother nature is not a real person who cares! And it would seem difficult to reason against pride and attitude in terms of consequence. “Pride can rarely see the folly of its way, and the ingrate does not often recognize his debt.”⁴⁶

To expose the motivations of pride and ingratitude in transhumanism, Jensen

⁴³ Fenton, “Liberal Eugenics & Human Nature: Against Habermas,” 35–42.

⁴⁴ Ted Peters, “‘Playing God’ and Germline Intervention,” *The Journal of Medicine and Philosophy* 20 (1995): 368.

⁴⁵ Jensen, “The Roots of Transhumanism,” 533.

⁴⁶ Jensen, “The Roots of Transhumanism,” 534.

proposes an analysis based on true love. Self-hatred and self-aggrandizement are results of false love. A relentless pursuit of self-perfection as if that is the only good in the world is often the consequence of self-hatred for one's imperfections. It reflects a refusal to accept who oneself is. Persistently worrying about one's excellence being outstripped by others leads to self-aggrandizing behaviors. Both self-hatred and self-aggrandizement are highly destructive for oneself and others. True love for oneself is marked by high self-esteem and willingness to share one's good with others.⁴⁷

Arguments from Science and Epistemology

Various writers have pointed out that the transhumanist technological agenda lacks plausibility and coherence. Five ideas are discussed in this section. First, radical longevity extension is not supported by existing scientific evidence. Second, from an evolutionary perspective, longevity might be fine-tuned for the survival of the species. Radically extending longevity, even if possible, might be detrimental to the species survival. Third, some argue based on the perspective of natural evolution that some assisted reproductive technologies might be harmful, even if possible. The labor and pain of childbirth might produce benefits yet unknown to the health of the newborns and the survival of the species. Fourth, the idea that an intelligent mind can self-modify to become a mind with higher intelligence may not be epistemologically coherent. Fifth, the epistemic arrogance shown by transhumanists in making speculative technological predictions is inconsistent with the predictability of increasing systemic complexity.

The Implausibility of Life Extension

Biological immortality is a fundamental technical objective of transhumanism. As Sascha Dickel and Andreas Frewer have shown, the pursuit of life extension and

⁴⁷ Jensen, "The Roots of Transhumanism," 537.

immortality are central to the utopian aspiration of transhumanists.⁴⁸ But is immortality scientifically plausible? David Roden examines the technical possibilities of achieving radical life extension through cryonics, mind uploading, and nanomedicine. He is skeptical that these approaches would technically work.⁴⁹

The report *To Count Our Days* published by the Pew Research Center summarizes three different paths to longevity proposed by transhumanists: chemical, genetic, and anti-aging.⁵⁰

Caloric restriction is an example of the chemical approach. Animal experiments of caloric restriction show extension of not just life span but also health.⁵¹ Compounds such as resveratrol and rapamycin seem to achieve the same effect on the body as caloric restriction.⁵²

Research related to the age-1 gene is an example of the genetic approach. Michael Klass discovered that *Caenorhabditis elegans*, a kind of roundworm about 1mm in length, can be genetically modified to live 65 percent longer.⁵³ C. Kenyon showed that

⁴⁸ Sascha Dickel and Andreas Frewer, "Life Extension," in *Post- and Transhumanism*, ed. Robert Ranisch and Stefan Lorenz Sorgner (Frankfurt am Main: Peter Lang, 2014), 119–31.

⁴⁹ David Roden, "Deconstruction and Excision in Philosophical Posthumanism," *Journal of Evolution & Technology* 21, no. 1 (2010): 27–36.

⁵⁰ David Masci, *To Count Our Days: The Scientific and Ethical Dimensions of Radical Life Extension* (Washington, DC: Pew Research Center, 2013), 5–11, <https://www.pewforum.org/2013/08/06/to-count-our-days-the-scientific-and-ethical-dimensions-of-radical-life-extension/>.

⁵¹ K. W. Chung et al., "Recent Advances in Calorie Restriction Research on Aging," *Experimental Gerontology* 48, no. 10 (2013): 1049–53. See also Shin-Hae Lee and Kyung-Jin Min, "Caloric Restriction and Its Mimetics," *BMB Reports* 46, no. 4 (2013): 181–87.

⁵² Kathrin Pallauf et al., "Resveratrol, Lunularin and Dihydroresveratrol Do Not Act as Caloric Restriction Mimetics When Administered Intraperitoneally in Mice," *Scientific Reports* 9, no. 1 (2019): 4445. See also Sage Arbor, "Where and How in the mTOR Pathway Inhibitors Fight Aging: Rapamycin, Resveratrol, and Metformin," November 5, 2018, <https://www.intechopen.com/books/resveratrol-adding-life-to-years-not-adding-years-to-life/where-and-how-in-the-mtor-pathway-inhibitors-fight-aging-rapamycin-resveratrol-and-metformin>. Laurent Mouchiroud et al., "Life Span Extension by Resveratrol, Rapamycin, and Metformin: The Promise of Dietary Restriction Mimetics for an Healthy Aging," *BioFactors* 36, no. 5 (2010): 377–82.

⁵³ Michael R. Klass, "Aging in the nematode *Caenorhabditis elegans*: Major Biological and Environmental Factors Influencing Life Span," *Mechanisms of Ageing and Development* 6 (1977): 413–29.

daf-2 can double the lifespan of *Caenorhabditis elegans*. The lifespan of *Drosophila melanogaster*, a kind of fruit fly, has also been increased up to 1.5 times normal through genetic modifications.⁵⁴

Anti-aging strategies have been advocated by leading transhumanists including de Grey and Ray Kurzweil. They focus on rejuvenation technologies that will maintain the body indefinitely.⁵⁵

The dramatic increase in life expectancy in the past century might have fueled the hope of some. In 1900, the average lifespan was 47 in America. In 2019, the average is 78.7. Between 1990 and 2009, centenarians in the USA increased from 38,300 to over 104,099.⁵⁶ By the mid-twenty-first century, the centenarians might be over 400,000 according to the prediction of the Census Bureau.⁵⁷ The question is whether this upward trend is sustainable.

In his 2004 article “‘Anti-Aging’ Is an Oxymoron” published in the *Journal of Gerontology*, Leonard Hayflick summarizes the scientific findings of the aging process.⁵⁸ Michael J. Rae, associated with Calorie Restriction Society at the time, published a critical commentary on the same journal in 2005.⁵⁹ Hayflick followed up with a response

⁵⁴ C. Kenyon et al., “A *C. Elegans* Mutant That Lives Twice as Long as Wild Type,” *Nature* 366, no. 6454 (1993): 461–64.

⁵⁵ Aubrey de Grey and Michael Rae, *Ending Aging: The Rejuvenation Breakthroughs That Could Reverse Human Aging in Our Lifetime* (New York: St. Martin's Press, 2007), 311–34. See also Ray Kurzweil and Terry Grossman, *Fantastic Voyage: Live Long Enough to Live Forever* (Emmaus, PA: Rodale, 2004), 14–32.

⁵⁶ Jane E. Brody, “Secrets of the Centenarians,” *New York Times*, October 19, 2010, <https://query.nytimes.com/gst/fullpage.html?res=9E0DE5DA1639F93AA25753C1A9669D8B63>.

⁵⁷ US Census Bureau, “2017 National Population Projections Tables,” accessed August 25, 2019, <https://www.census.gov/data/tables/2017/demo/popproj/2017-summary-tables.html>.

⁵⁸ Leonard Hayflick, “Aging: The Reality: ‘Anti-Aging’ Is an Oxymoron,” *The Journals of Gerontology: Series A* 59, no. 6 (2004): 573–78.

⁵⁹ Michael J. Rae, “Anti-Aging Medicine: Fallacies, Realities, Imperatives: Commentary,” *The Journals of Gerontology: Series A* 60, no. 10 (2005): 1223–27.

titled, “Anti-Aging Medicine: Fallacies, Realities, and Imperatives.”⁶⁰ The three articles are noteworthy not only because they deal substantively with the scientific plausibility of radical life extension, but also because of the allegations of logical fallacy Rae leveled against Hayflick and the way Hayflick mounts his rebuttal. This exchange serves as an interesting illustration of how scientific knowledge can be constructively employed to spotlight the weaknesses of popular beliefs.

Hayflick begins his first article with the observation that scientists “know of no intervention that will slow, stop, or reverse the aging process in humans.” He qualifies his observation by noting that it depends of course on what is meant by the aging process. He believes that some misunderstandings and communication failures exist in the way scientists explain the relevant key terms. He identifies three main factors known scientifically to affect life expectancy: (1) the aging process, (2) longevity determination, and (3) age-associated diseases. When the three factors are clearly explained, it is evident that only the prevention and treatment of age-associated diseases have made a demonstrated difference in increasing life expectancy. Aging is a physical property of all simple molecules. The phrase “anti-aging” makes only as much sense as anti-gravity. Longevity is determined primarily by genes. Therefore, aging and longevity are not phenomena that can be slowed down by medicine.⁶¹

Hayflick defines aging as a “stochastic process that occurs systematically after reproductive maturity in animals that reach a fixed size in adulthood.” Aging is “caused by the escalating loss of molecular fidelity that ultimately exceeds repair capacity and increases vulnerability to pathology or age-associated diseases.” The inherent thermodynamic instability in complex biological molecules means that the precise three-

⁶⁰ Leonard Hayflick, “Anti-Aging Medicine: Fallacies, Realities, Imperatives: Author’s Response to Commentary,” *The Journals of Gerontology: Series A* 60, no. 10 (2005): 1228–32.

⁶¹ Hayflick, “Aging: The Reality: ‘Anti-Aging’ Is an Oxymoron,” 573.

dimensional folded structures will change eventually. Such random structural modifications at the molecular level lead to changes in glycation, conformational alterations, amyloid formation, protein degradation, and synthesis rates as well as damages in nuclear and mitochondrial DNA. In short, molecules lose their fidelity to the original forms. Because the loss of molecular fidelity is a random process, the rate varies depending on which part of the molecule belongs. Different organs, tissues, cells, and cell components provide different environments for their constituent molecules that cause some molecules to age faster than others. Some structures such as bones can retain their original forms for millions of years. Other structures such as DNAs can last for thousands of years. But some last only picoseconds. The loss of fidelity tends to occur first among the most vulnerable molecules, which become the weakest link in the whole system.⁶² Among people in the developed countries, the most vulnerable molecules are those found in the cells making up the vascular system and in cells where cancer is most likely to occur. Repair and replacement processes of damaged molecules are constantly at work in a living system. But the repair and replacement processes operate through molecular machinery that is itself subjected to damage.⁶³

Hayflick distinguishes between the stochastic aging process and potential longevity, which is determined by the genome. There is a change of energetics of all molecules before and after the age of reproductive maturity, which for human beings is about 20. During its first twenty years, the human body can produce, order, and replace its constituent molecules with almost absolute fidelity. But the aging process kicks in after that. Citing paleontological data, Hayflick observes that the human species seems to have a life expectancy of 25 or less for 99.9 percent of the last several million years. He

⁶² Hayflick, "Aging: The Reality: 'Anti-Aging' Is an Oxymoron," 574.

⁶³ Leonard Hayflick, "How and Why We Age," *Experimental Gerontology* 33, no. 7-8 (1998): 639-53.

thinks natural selection explains how the age of reproductive maturity seems to determine longevity. As far as the survival of the species is concerned, the life of an individual is more valuable before it reproduces.⁶⁴ A species that has a life expectancy lower than the age of reproductive maturity will likely become extinct quickly. However, once an individual has reached beyond the reproductive age, natural selection does not care whether the individual lives. Hayflick thinks of longevity and aging as two different determinants. Longevity determines when aging overtakes reproductive maturing. Longevity itself is governed by the human genome, which is an outcome of natural selection.⁶⁵

Hayflick does not see any ways to stop aging and increase longevity given what is scientifically known. To stop molecules from aging requires a thermodynamic intervention at the molecular level. To increase longevity would require a re-programming of the human genome. Hayflick observes that disease prevention and treatment has been the only proven approach that increases life expectancy. From 1900 to 2000, life expectancy increased from 49 to 76 in developed countries. The 27-year increase in life expectancy was due substantially to better hygiene, antibiotics, and vaccines. By 1970, life expectancy had reached 70. The 6-year increase in subsequent years seems to be due to better treatment of chronic diseases and cancer. Hayflick believes that a 15-year increase in life expectancy is possible with future biomedicine. But future biomedicine cannot make people immortal. It can only eliminate diseases as a cause of death. That is why “anti-aging medicine” is an oxymoron to him.⁶⁶

Hayflick considers two other alternatives to medicine and finds them

⁶⁴ Hayflick, “Aging: The Reality: ‘Anti-Aging’ Is an Oxymoron,” 574.

⁶⁵ Leonard Hayflick, “Aging, Longevity Determination and Disease,” in *Principles and Practice of Geriatric Surgery*, 2nd ed., ed. Ronnie Ann Rosenthal, Michael E. Zenilman and Mark R. Katlic (New York: Springer-Verlag, 2011), 3–7.

⁶⁶ Leonard Hayflick, “The Future of Ageing,” *Nature* 408, no. 6809 (2000): 267–69.

undesirable and improbable. First, Hayflick thinks that organ replacement would not work because the cells that are not replaced throughout the whole life such as neurons and muscle cells are perhaps most essential to our identity. The brain of a person could not be replaced without the person assuming a new identity. Hayflick did not even bother to ask where the donated brain would come from. Second, Hayflick thinks that to slow down aging at the molecular level, even if possible, implies that people would reach reproductive maturity later. It seems obvious to Hayflick that postponing reproductive maturity to 30 would not be a popular idea. And for the same reason, stretching out the aging process, if possible, might be undesirable for a later stage in life.⁶⁷

In his commentary, Rae charges that Hayflick's argument is based on a fallacy of composition. Without violating the physical law of entropy at the molecular level, intervention capable of slowing the rate of damage or accelerating the rate of repair is conceivable. The parts can be replaced without altering the whole.⁶⁸

Rae argues that Hayflick's physical definition of aging neglects the biochemistry underlying metabolism. According to the definition given by Bernard L. Strehler, aging is a process intrinsic to organisms.⁶⁹ The speed of the aging process is determined by certain metabolic forces such as the rate of formation of a mitochondrial generation of reactive oxygen species (mtROS) during oxidative phosphorylation.⁷⁰ Rae observes that calorie reduction (CR) has been empirically shown to change the rate of mtROS and slow down aging in the dwarf mouse.⁷¹ Rae cites De Grey's observations in

⁶⁷ Hayflick, "Aging: The Reality: 'Anti-Aging' Is an Oxymoron," 577.

⁶⁸ Rae, "Anti-Aging Medicine: Fallacies, Realities, Imperatives: Commentary," 1223–25.

⁶⁹ Bernard L. Strehler, *Time, Cells, and Aging*, 2nd ed. (New York: Academic Press, 1977), 5–30.

⁷⁰ Gustavo Barja, "Endogenous Oxidative Stress: Relationship to Aging, Longevity and Caloric Restriction," *Ageing Research Reviews* 1, no. 3 (2002): 397–411.

⁷¹ H. Brown-Borg et al., "Mitochondrial Oxidant Generation and Oxidative Damage in Ames Dwarf and GH Transgenic Mice," *Journal of the American Aging Association* 24, no. 3 (2001): 85–96.

his 1999 work, “The Mitochondrial Free Radical Theory of Aging.”⁷² Rae further argues that Hayflick’s definition overlooks the biochemistry of the repair and replace machinery, too. And it is now widely accepted that CR affects the maintenance mechanisms, leading to decelerated loss of molecular fidelity.⁷³

Rae’s commentary contains other philosophical arguments that essentially accuses Hayflick of making an argument from silence when he concludes from known sciences that anti-aging medicine is improbable.

In his response, Hayflick denies claiming that increasing life expectancy is improbable. Rae’s accusation of argument from silence does not, therefore, require a response. Hayflick expressly notes the possibility of adding another 15 years to life expectancy with better medicine.⁷⁴

What Hayflick insists is that given the physical reality of molecular-level thermodynamics, the loss of molecular fidelity is inevitable. That inevitable loss of molecular fidelity is what aging means. Unless there is a way to change the loss of molecular fidelity, whether the loss is caused by physical or biochemical laws, the aging process cannot be slowed down. When Rae argues that the aging of the whole can be slowed down, not by slowing the aging of the parts but by replacing or repairing them, Rae needs to show that the most vulnerable part, or the weakest link, can indeed be replaced or repaired. Given that neurons and muscle cells are never replaced during the whole lifetime, replacement is currently inconceivable. And there are no known means to repair neurons and muscle cells.⁷⁵

⁷² Aubrey de Grey, *The Mitochondrial Free Radical Theory of Aging* (Austin: R. G. Landes, 1999), 55, 71–72, 121.

⁷³ Rae, “Anti-Aging Medicine: Fallacies, Realities, Imperatives: Commentary,” 1224–25.

⁷⁴ Hayflick, “Anti-Aging Medicine: Fallacies, Realities, Imperatives: Author’s Response to Commentary,” 1228.

⁷⁵ Hayflick, “Anti-Aging Medicine: Fallacies, Realities, Imperatives: Author’s Response to Commentary,” 1229.

From Hayflick’s perspective, it is Rae who overstates the scientific conclusion regarding the effect of CR in slowing down aging. It comes down to what one means by aging. If Rae insists on conflating slowing down aging with increasing life expectancy, there is no point in defining aging. But based on the distinction of aging, longevity, and age-associated disease that Hayflick proposed, there are alternative ways to explain the experimental discoveries from CR and Prop-1 gene mutation in the Ames dwarf mouse. Hayflick suggests that the laboratory condition might have merely revealed the true potential longevity of feral animals. Their normal life cycle in the wild, of alternating between gluttony and starvation, could result in organ damages more easily, thus accelerating aging. The laboratory condition of constant semi-starvation might have delayed or prevented pathology rather than slowed aging. Contrary to what Rae claims, therefore, Hayflick sees no direct scientific evidence correlating mtROS or any ROS to aging. Even if there were, mtROS might be the result, not the cause. In short, it was Rae who makes the argument from silence for calorie reduction as an “anti-aging medicine.”⁷⁶

This interaction between Hayflick and Rae illustrates how practicing scientists typically respond to arguments from silence. Science is about explanation. A phenomenon only calls for a theoretical explanation when it is observed. The burden of proof is on the scientific theory if it predicts an unobserved phenomenon. Fair-minded people have the warrant to doubt a theory if its predicted phenomena are thus far unobserved. Therefore, it would be quite fair to say that the transhumanist speculation of radical life extension lacks a scientific basis.

The Misnomer of Directed Evolution

Transhumanists sometimes claim that they are merely aiming at accelerating

⁷⁶ Hayflick, “Anti-Aging Medicine: Fallacies, Realities, Imperatives: Author’s Response to Commentary,” 1230.

what nature would have done eventually. Another way to explain Hayflick's evolutionary explanation of longevity begins by asking: if natural evolution is left alone to do its job, how long would an average human being live millions of years from now? The point is that increasing longevity by technologies would seem much more scientifically plausible if nature is going to make that happen anyway. There lies an implicit counterargument against the plausibility of radical longevity extension. For if radical longevity extension for humankind is possible and feasible, nature would have done that already.

Some critics of transhumanism, such as Andrew Askland, disagree with the transhumanist language of directed evolution. Whether the idea is denoted as "consciously controlled evolution" (a description he discovered on the website for the Academy of Scientific Metaphysics), "managed evolution," or "accelerated evolution," Askland thinks it is a misnomer. Transhumanism is not about managing and accelerating the evolution process of natural selection; it is severing the human species from its evolutionary past to produce a future of our choosing.⁷⁷

Natural selection is measured in terms of the fitness of the change as a function of its prevalence within a population. While there is an active debate among biologists about the conception of the set – whether the natural selection is picking from a gene pool, a population of individual organisms, or a jungle of species – the consensus among contemporary evolutionary biologists is that evolutionary theory is a-teleological. Askland finds that the Darwinian account was given a "Lamarckian and development gloss that preserved a hierarchical order" in the nineteenth century. But today, evolutionary success is no longer seen in terms of climbing up a hierarchical order but rather seen purely in terms of the survival of the species.⁷⁸

⁷⁷ Andrew Askland, "The Misnomer of Transhumanism as Directed Evolution," *International Journal of Emerging Technologies & Society* 9, no. 1 (2011): 73.

⁷⁸ Askland, "The Misnomer of Transhumanism as Directed Evolution," 74–75.

Askland observes that the transhumanist approach of coming up with a list of inconvenient characteristics in the human body to be modified and engineering those modifications as directed evolution does not resemble the process of blind natural selection at all. Those proposed changes might not enhance the survival of the human species and may be detrimental. Based on discoveries in behavioral economics and cognitive sciences, Askland wonders whether the items on the transhumanist wish list are truly results of rational judgment instead of irrational biases. He observes that people often made choices that they come to regret after the fact because the circumstances are much less compelling than they thought originally.⁷⁹

To apply Askland's observation, the question to ask is whether the radical longevity extension would necessarily increase the chance of survival of the human species. If Askland is correct, a working assumption among contemporary evolutionary biologists is that nature has fine-tuned the determinant of human longevity to maximize the survival of humankind. Even if extending longevity were possible, it might adversely affect the survival of the species. Hayflick's explanation that longevity is correlated to reproductive age is consistent with that view. Therefore, it is at least presumptuous to characterize radical longevity extension as directed evolution. Conversely, if the survival of the species is an ultimate good, radical longevity extension for individuals might not be feasible.

Depreciating Motherhood

Besides radical longevity enhancement, the plausibility and feasibility of other biological enhancement wish list items among transhumanists could be similarly examined relative to the survival of the human species. The wish to alleviate the pain of childbirth is another example.

⁷⁹ Askland, "The Misnomer of Transhumanism as Directed Evolution," 76–77.

Eduardo R. Cruz argues that human emotions are closely related to childbirth and child-rearing, especially in mother-infant interaction, storytelling, and rites of passage.⁸⁰ Despite apparent adverse effects to both the mother and the child, the human body seems to be shaped by compromises that enhance the chance of successful childbirth, even at the expense of health. Wenda Trevathan wonders if it is the way of evolution to maximize reproduction.⁸¹ A. Maul argues that the pain of childbirth seems to have beneficial adaptive value.⁸² Oxytocin and other hormones released at birth seem to benefit the mother, the father, the newborn, and the community.⁸³ Meredith F. Small observes that a human baby is born neurologically unfinished and therefore attached to the mother physiologically and emotionally.⁸⁴ Breastfeeding strengthens not only emotional bonds but also enhances health for the mother and the infant.⁸⁵ Mother-infant eye contact seems to be helpful to breastfeeding, too.⁸⁶ Jean Decety believes that the impulse to care for offspring seems genetically hardwired in all mammals. Empathic helping behavior may have increased their genetic fitness.⁸⁷ Rites of passage combining

⁸⁰ Eduardo R. Cruz, "The Evolution of Human Birth and Transhumanist Proposals of Enhancement," *Zygon* 50, no. 4 (2015): 831.

⁸¹ Wenda Trevathan, *Ancient Bodies, Modern Lives: How Evolution Has Shaped Women's Health* (New York: Oxford University Press, 2010), 3–22.

⁸² A. Maul, "An Evolutionary Interpretation of the Significance of Physical Pain Experienced by Human Females: Defloration and Childbirth Pains," *Medical Hypotheses* 69, no. 2 (2007): 403–9.

⁸³ Sarah B. Hrdy, *Mother Nature: A History of Mothers, Infants, and Natural Selection* (New York: Random House, 2000), xiii–xiv, 137–39, 153–54, 536–38.

⁸⁴ Meredith F. Small, *Our Babies, Ourselves: How Biology and Culture Shape the Way We Parent* (Garden City, NY: Anchor Books, 1999), 6–7, 12, 128–30.

⁸⁵ Trevathan, *Ancient Bodies, Modern Lives*, 127–44.

⁸⁶ Susan Pinker, *The Village Effect: Why Face-to-Face Contact Matters* (London: Atlantic Books, 2014), 136.

⁸⁷ Jean Decety, "The Neuroevolution of Empathy," *Annals of the New York Academy of Sciences* 1231, no. 1 (2011): 35–45.

negative and positive emotions also seem to be adaptively beneficial.⁸⁸

Cruz observes that there seem to be few discussions related to childbirth and childrearing in transhumanist literature. Transhumanists like to discuss postgenderist ideals and enhancement technologies that blur sexual boundaries. In contrast, the importance of motherhood played in human evolution rarely draws attention among transhumanists. The natural work of childbirth and parenthood takes a backseat to artificial works of technological enhancement, such as assisted reproductive technologies and designer babies.⁸⁹

Cruz is concerned about transhumanists who insist on the principles of natural selection but overlook the significance of childbirth and child-rearing. Transhumanists generally see pain as something to be avoided and technologically eliminated. In the real world, pain is not technologically eliminated and is involved in natural childbirth and childrearing. The pain of childbirth could prompt some transhumanists to diminish the value of motherhood.⁹⁰

Unnatural Birth

The development of assisted reproductive technologies (ART) calls for caution, especially for ART involving partially human hybrid and chimera, human cloning, human organ harvesting, and embryonic genetic modification.

⁸⁸ Candace S. Alcorta and Richard Sosis, "Ritual, Emotion, and Sacred Symbols: The Evolution of Religion as an Adaptive Complex," *Human Nature* 16, no. 4 (2005): 323–59. See also Matt J. Rossano, "Ritual Behavior and the Origins of Modern Cognition," *Cambridge Archaeological Journal* 19, no. 2 (2009): 243–56.

⁸⁹ Cruz, "The Evolution of Human Birth and Transhumanist Proposals of Enhancement," 843.

⁹⁰ Brock Bastian et al., "The Positive Consequences of Pain: A Biopsychosocial Approach," *Personality and Social Psychology Review* 18, no. 3 (2014): 256–79. See also Valérie De Prycker, "Critical Remarks on Shortcuts to Happiness: The Relevance of Effort and Pain," *Philosophica* 79 (2007): 57–70. Claude Levi-Strauss, *Structural Anthropology*, rev. ed. (New York: Basic Books, 1974), 314–20. Claude Levi-Strauss, "Pain and Pleasure: Masters of Mankind," in *Pleasures of the Brain*, ed. Morten L. Kringelbach and Kent C. Berridge (Oxford: Oxford University Press, 2010), 320–35. Jaak Panksepp, "On the Neuro-Evolutionary Nature of Social Pain, Support, and Empathy," in *Pain: New Essays on Its Nature and the Methodology of Its Study*, ed. Murat Aydede (Cambridge, MA: MIT Press, 2005), 367–87.

Some defenders of ART, not necessarily transhumanists, contend that similar arguments have been raised against in vitro fertilization (IVF) and those objections have shown to be overblown. When IVF was initially introduced, some ethicists had expressed concerns over the potential physiological or psychological damages sustained by children conceived through IVF. Subsequent research findings have alleviated some of those types of concerns.⁹¹ Their take of the moral of the story is that technological innovations would always seem unnatural at first but would seem to become more natural over time. However, studies have suggested additional health risks for children born through IVF.⁹² Opponents to ART observe that IVF remains morally objectionable if only because of the way fertilized eggs are discarded. The further weakening of the link between sex and procreation is itself a moral concern. In practice, IVF often works through commercial surrogate motherhood, which is entangled with many ethical and psychological issues.⁹³

Most importantly, IVF is about reproducing humans. It is a far leap from IVF to other types of ART on the transhumanist agenda. Are there adequate medical reasons to bring into the world partially human hybrids and chimeras? The probability of irreparable damage is very high.

⁹¹ Anna Barbuscia and Melinda C. Mills, “Cognitive Development in Children Up To Age 11 Years Born after ART – A Longitudinal Cohort Study,” *Human Reproduction* 32, no. 7 (2017): 1482–88. See also Alexandra Sifferlin, “IVF Linked to More Birth Defects,” *Time* 180, no. 22 (2012). Maia Szalavitz, “The Link Between Infertility Treatments and Birth Defects,” *Time* 179, no. 18 (2012).

⁹² Justin Norrie, “IVF Babies at Greater Risk of Heart Problems in Later Life,” *The Conversation*, April 19, 2012, <https://theconversation.com/ivf-babies-at-greater-risk-of-heart-problems-in-later-life-6554>. See also Urs Scherrer et al., “Systemic and Pulmonary Vascular Dysfunction in Children Conceived by Assisted Reproductive Technologies,” *Circulation* 125, no. 15 (2012): 1890–96. Miaoxin Chen et al., “Altered Glucose Metabolism in Mouse and Humans Conceived by IVF,” *Diabetes* 63, no. 10 (2014): 3189–98. Sifferlin, “IVF Linked to More Birth Defects.” Alyssa Navarro, “Long-Term Side Effects of IVF Treatment in Children: Can Infertility Treatment Cause Health Risks and Development Delays?” *Tech Times*, January 5, 2016, <https://www.techtimes.com/articles/121458/20160105/long-term-side-effects-of-ivf-treatment-in-children-can-infertility-treatment-cause-health-risks-and-development-delays.htm>. Roger Hart and Robert J. Norman, “The Longer-Term Health Outcomes for Children Born as a Result of IVF Treatment. Part II – Mental Health and Development Outcomes,” *Human Reproduction Update* 19, no. 3 (2013): 244–50.

⁹³ Matthew Lee Anderson and Andrew T. Walker, “Breaking Evangelicalism’s Silence on IVF,” *TheGospelCoalition.org* (forum), accessed August 25, 2019, <https://www.thegospelcoalition.org/article/evangelicalisms-silence-ivf/>.

Some transhumanists have openly advocated the cloning of people of high academic, artistic, and athletic achievement. A recycled response to eugenics remains useful: “Why can’t you just encourage the highly intelligent people to get married and have more kids?” Even if transhumanists believe in eugenics, they have less unnatural means than human cloning.

Human organ harvesting is morally wrong because it involves killing a living being who is at least partially human. As if it is not cruel enough to make that living being subhuman, human organ harvesting takes away even its sanctity of life.

Embryonic genetic modification might seem to be less morally offensive, especially if the modification is limited to a repair of genetic sequence changes to restore patterns of normal human beings. Nevertheless, caution is still necessary because of the slippery slope once the procedure is allowed. The possibility of unintended consequences is great. Genetic engineering is still at a primitive stage and the effect of genetic sequence modification is mostly unknown.

Epistemological Incoherence

Knut Alfsvåg sees the epistemological optimism shown by transhumanists to be utopian and incoherent. Transhumanists seek to be anthropocentric and epistemological optimistic at the same time. The twin-emphasis makes for a dualism that sees everything in the world as essentially knowable, reducible to ideal mathematical structures, and accessible to human consciousness. It views the material universe as merely instrumental, created to make the world knowable to the human mind.⁹⁴ Alfsvåg contends there is an inherent contradiction for transhumanists to hold such twin-emphasis and yet want some species other than humans to be the ruler of the universe. It does not

⁹⁴ Michael Hauskeller, “Utopia,” in *Post- and Transhumanism*, ed. Robert Ranisch and Stefan Lorenz Sorgner (Frankfurt am Main: Peter Lang, 2014), 101–8. See also Pieter Lemmens, review of *Post- and Transhumanism: An Introduction*, edited by Robert Ranisch and Stefan Lorenz Sorgner, *Human Studies* 38, no. 3 (2015): 433.

seem coherent for transhumanists to hold to such epistemological optimism when their very goal is to evolve into posthuman possessing superior epistemological capability.⁹⁵

We could illustrate the dilemma raised by Alfsvåg by imagining a man who wants to “work himself out of his job” by finding a successor. If he is already so good at his job, why does he need to find someone better? On the other hand, if he is not that good at his job, how could he be certain that he even knows who to hire to replace himself?

Alfsvåg observes that others before transhumanists have attempted to reconcile anthropocentrism and epistemological optimism. For example, both René Descartes and Immanuel Kant have tried to maintain dualism. But neither Descartes nor Kant did it the transhumanist way. Descartes was concerned that one-sided anthropocentrism would entail epistemological solipsism and skepticism. He has to take for granted the intuitive reality of his consciousness and the existence of God to guarantee the correspondence between what he sees and the reality of the world. In short, he limits anthropocentrism by grounding it on theism. In contrast, Kant insists on anthropocentrism by tampering the epistemological optimism. he insists that human rationality is universal and timeless, although the world as such is unknowable. There is no better way accessible to human beings to know the world besides human rationality.⁹⁶

Alfsvåg observes that transhumanism follows neither Descartes nor Kant. Transhumanism is characterized by an ontological materialist reductionism. One result of such reductionism is some sort of eliminative theory in the philosophy of mind, the belief that the human mind can always be reductively explained as some physical phenomena. Hence, transhumanists take for granted an epistemological optimism, not so much based

⁹⁵ Knut Alfsvåg, “Transhumanism, Truth and Equality: Does the Transhumanist Vision Make Sense?” *Theofilos* 7, no. 3 (2015): 259.

⁹⁶ Alfsvåg, “Transhumanism, Truth and Equality: Does the Transhumanist Vision Make Sense?” 260.

on God, but based on the apparent scientific progress in modernity. Transhumanists leverage that optimism to reinforce anthropocentrism by saying to themselves: it is okay even if our naturally endowed thinking machine is imperfect. We can fix the machine ourselves or build a better one if necessary.⁹⁷

The epistemological optimism demonstrated by transhumanists might be no more than an irrational bias caused by a temporary euphoria inspired by recent scientific progress. After all, materialist reductionism is a conviction, not empirically verified by physical observations. Transhumanists seem to know and believe so much about what they do not empirically know. Such epistemological optimism is nonetheless incoherent. How can they know what the defects of the naturally endowed thinking machine are? And if they already know the defects, why do they need a better thinking machine? If using this current thinking machine allows them to know the faculty that needs to be changed, it is an argument that the current thinking machine is working fine. Why do they want to modify the machine then?⁹⁸

Although Alfvåg does not articulate his argument in computational terms, the incoherence Alfvåg describes could be understood as a criticism of the computational theory of mind based on Gödel's incompleteness theorems. In computational theory, the incompleteness theorem may be applied to demonstrate that a Turing Machine can never verify whether a machine to be a Turing Machine, including itself.

In theological terms, Alfvåg sees transhumanism as combining an immanent epistemology with theological anthropology. It represents an attempt to “immanentize the eschaton,” a kind of millennialism that optimistically holds that humanity is the one who

⁹⁷ Alfvåg, “Transhumanism, Truth and Equality: Does the Transhumanist Vision Make Sense?” 261.

⁹⁸ Alfvåg, “Transhumanism, Truth and Equality: Does the Transhumanist Vision Make Sense?” 262.

will be building the kingdom of God on their own.⁹⁹

Epistemic Arrogance

Viorel Rotila disagrees with the assumption held by some transhumanists that an increase in complexity is accompanied by an increase in predictability. He thinks the opposite is more intuitively true: the artificial increase of complexity results in a decrease of predictability.¹⁰⁰ Because of their misguided assumption, transhumanists vastly overestimate what we know and underestimate the uncertainty of the future. Rotila contends that transhumanism shows an epistemic arrogance given the severely insufficient evidence supporting their agenda.¹⁰¹

Although the technologies envisioned by transhumanists have not been seen by the world, it does not give transhumanists the epistemological warrant to make predictions without evidence. Rotila cites several items on the transhumanist technological agenda that appear only in science fiction but nowhere seen in technological research and development. For example, there has been no serious real-world technological effort to move in the direction of Whole Brain Emulation (WBE).¹⁰² The required knowledge in neuroscience is simply not there. The number of neurons in the brain is so large that emulation at the neuron level is technologically infeasible in the foreseeable future. While brain scan technologies such as MRI has been successfully employed to identify general regions of the brain associated with various mental

⁹⁹ Alfvåg, “Transhumanism, Truth and Equality: Does the Transhumanist Vision Make Sense?” 264.

¹⁰⁰ Viorel Rotila, “Two Issues of Transhumanism: Insufficient Evidence and Epistemic Arrogance,” in *New Approaches in Social and Humanistic Sciences* (Bologna, Italy: Medimond, 2016), 1:463.

¹⁰¹ Rotila, “Two Issues of Transhumanism: Insufficient Evidence and Epistemic Arrogance,” 467.

¹⁰² Anders Sandberg and Nick Bostrom, *Whole Brain Emulation: A Roadmap*, Technical Report #2008-3 (Future of Humanity Institute, Oxford University, 2008), 15–24.

functions, scanning technologies are nowhere near the level where the states of all neurons can be captured at once to make WBE even conceivable. Based on known technological activities, we have little reason to infer that WBE technology will arrive in a few decades.

An underlying assumption of WBE is the multiple realizability of the mind, that mental processes can run on substrata other than the brain. While the idea of multiple realizability may be conceivable, Rotila observes that no scientific evidence has been provided to show the idea to be true. The computational theory of mind is no more than a working assumption among some cognitive scientists. Even if we grant the possibility of multiple realizability, we have no proof to ground the assumption that Turing Machine provides an adequate substratum for the mind.¹⁰³

Artificial limbs and organs have been successfully produced. Therefore, the cyborg is a conceivable concept, if not a reality already. However, until a fully “artificial man” (an “android”) capable of functioning normally as a member of human society is created, to talk about an artificial mind that operates purely in cyberspace seems at least several steps remote from reality. Borrowing from the Creator Paradox, Rotila argues that the creator of such an artificial mind will need the knowledge to anticipate the decisions which the artificial mind is called upon to make. But nobody currently possesses this knowledge because no human being lives purely in cyberspace.¹⁰⁴

Some transhumanists insist that AI can bootstrap itself, effectively becoming the creator of itself. Some believe that while WBE represents a shortcut to get to human-level Artificial General Intelligence (AGI), the rapid development of AI technologies might get us to AGI anyway without going through WBE. Some believe that

465. ¹⁰³ Rotila, “Two Issues of Transhumanism: Insufficient Evidence and Epistemic Arrogance,”

466. ¹⁰⁴ Rotila, “Two Issues of Transhumanism: Insufficient Evidence and Epistemic Arrogance,”

technological singularity will follow soon after the arrival of AGI. But what will happen when technological singularity occurs? The standard answer is that nobody knows. Technological singularity is precisely defined by its unknowability.

Rotila argues that transhumanist discourse takes place in the realm of ontological uncertainty, borrowing the concept of Black Swan events popularized by Nassim Nicholas Taleb.¹⁰⁵ Instead of making predictions by extrapolating from what is known today, transhumanists extrapolate from what is unknown today. Ironically, their most accurate predictions will therefore be likely about what will remain unknown in the future. If something is unknown today, one can predict with some certainty that it will become even more unknown when situations become more complex in the future. If we as human beings do not know what posthuman beings are like, it seems reasonable to predict that the posthuman beings will know even less what the post-posthuman beings are like.¹⁰⁶

Arguments from the Philosophy of Mind

The non-biological approach towards transhumanism, centered on AI and WBE, leans heavily on a computational and functionalist picture of the human mind that is not shared by many thinkers who otherwise embrace materialistic naturalism. Taking into consideration the hard problems in the philosophy of mind, such as the problem of consciousness and the problem of other minds, one must question if non-biological AI systems should ever be regarded as human. Even granting the plausibility of super AI and WBE, such hypothesized technologies are more realistically viewed as augmenting human capability rather than replicating human nature. Such technologies do not help to

¹⁰⁵ Nassim Nicholas Taleb, *The Black Swan: The Impact of the Highly Improbable* (New York: Random House, 2007), 312.

¹⁰⁶ Rotila, “Two Issues of Transhumanism: Insufficient Evidence and Epistemic Arrogance,” 467–68.

achieve the goal of trans-*humanism* directly.

Nevertheless, according to surveys conducted among members of WTA, most transhumanists would upload their minds if it is the only way for them to retain their consciousness after their bodies expire.¹⁰⁷ This survey result is remarkable given the well-known philosophical, scientific, and technological difficulties in achieving mind uploading. If transhumanism were a religion, the belief in mind uploading among transhumanists would be comparable to the belief in bodily resurrection in Christianity. In as much as bodily resurrection is a scandal for some to embrace Christianity, mind uploading could invite ridicules for transhumanism. The staunchness exhibited by some transhumanists in defending the concept of mind uploading is noteworthy.

The concept of mind uploading is seen as standing on three foundations: (1) the computational theory of mind (CTM), (2) the feasibility of capturing the mind as an information pattern through a certain process of brain scanning, and (3) the possibility of emulating the biological brain and the captured mind pattern in a computer through a certain process of Whole Brain Emulation (WBE).¹⁰⁸ In this section, we identify the related technological and theoretical challenges.

Infeasibility of Mind Uploading

Given today's state of the art, it is quite inconceivable how brain scanning can work. While scanning technologies such as MRI have seen a huge advancement in the past decades, they operate only at a rather coarse level. For example, MRI has been used successfully to discover correlations between brain regions and cognitive functions.

¹⁰⁷ James J. Hughes, "Report on the 2007 Interests and Beliefs Survey of the Members of the World Transhumanist Association," accessed August 20, 2019, <https://ieet.org/images/uploads/WTASurvey2007.pdf>.

¹⁰⁸ Some suggest a fourth requirement, the simulation of the environment and the body. See Daniel Eth, Juan-Carlos Foust and Brandon Whale, "The Prospects of Whole Brain Emulation within the Next Half-Century," *Journal of Artificial General Intelligence* 4, no. 3 (2013): 130–52. I agree with that additional requirement. See my discussion on the development of "human OS".

However, a brain scan useful for WBE must work at a much finer-grain level. Even if we assume CTM and postulate that the mind is completely represented by the physical states of brain neurons, it is beyond today's technological imagination to capture the voltage states of all neurons at once. Capturing the topology of the neural network is challenging enough. There are roughly 100 billion neurons in a brain.¹⁰⁹ Each neuron may be linked to 10,000 or more other neurons and hence, there could be more than 1,000 trillion synaptic connections in a brain.¹¹⁰ Moreover, the connections are not static. Signals sent between neurons result in a stronger connection. The brain constantly rewires its network structure in response to new experiences. Even if we could somehow take a 3D picture of the wiring, it is unclear how the voltage state at each neuron and synaptic connections can be measured. Wiring billions of probes into the brain is impossible.

Kurzweil suggests that when we have a better grasp of the functional grouping of brain regions, it might be possible to make a brain scan of the functional states instead of the neural states. In other words, Kurzweil thinks it might be possible to copy the state of a brain in terms of functional connections instead of synaptic connections.¹¹¹ However, even if we accept the premise that each cognitive function has a direct correspondence to a brain region, we do not have a list of these cognitive functions and a map of their corresponding brain regions. The only conceivable way we can discover such functional structures and mappings is through inferences from many neuron-level brain scans, which

¹⁰⁹ According to Suzana Herculano-Houzel, the estimate of 100 billion neurons has been cited by many original articles, reviews and textbooks with no references cited. Her recent study concludes that the number is around 86 billion neurons. See Suzana Herculano-Houzel, "The Human Brain in Numbers: A Linearly Scaled-Up Primate Brain," *Frontiers in Human Neuroscience* 3 (2009): 31.

¹¹⁰ Stephen Smith estimates more than 125 trillion synapses in the cerebral cortex alone. Bruce Goldman, "New Imaging Method Developed at Stanford Reveals Stunning Details of Brain Connections," November 17, 2010, <https://med.stanford.edu/news/all-news/2010/11/new-imaging-method-developed-at-stanford-reveals-stunning-details-of-brain-connections.html>. See also Kristina D. Micheva et al., "Single-Synapse Analysis of a Diverse Synapse Population: Proteomic Imaging Methods and Markers," *Neurotechnique* 68, no. 4 (2010): 639–53.

¹¹¹ Ray Kurzweil, *How to Create a Mind: The Secret of Human Thought Revealed* (New York: Viking, 2012), 128.

is unachievable as noted above.

The minimum hardware requirement for WBE remains astronomically expensive using today's digital computing technology. To represent a neural network with 1,000 trillion synaptic connections on a computer would require 16 petabytes. Of course, the enormity of the technological challenge may not always deter technologists. Some will point to Moore's Law, which suggests that the transistor density of electronic chips will double every 18 months.¹¹² Even if we are a million times short, some technologists would insist on the canonical answer: come back in 20 years and the technology will be ready! Nonetheless, even Moore's Law is running into fundamental constraints of physics, both in terms of density and thermodynamics.

AI Is Not Human

An engineering alternative for WBE is to model the human brain using a completely different computer architecture. For example, some have suggested the massively parallel analog computer as an alternative. Neurons and synaptic connections can be more realistically modeled using variable capacitors and resistors. The dynamic rewiring could conceivably be approximated using field-programmable gate array (FPGA) technologies. The Neurogrid project at Stanford University is an example of such a complete rethinking of the Von Neumann architecture.¹¹³ It is a fascinating concept and has tremendous potentials in revolutionizing AI. However, neural network

¹¹² Ever few years since Gordon Moore made the prediction in 1975, there have been people predicting the end of Moore's Law. John Dvorak argued in 2000 that that Moore's Law was merely a gentleman's agreement among participants of the semiconductor industry that becomes a self-fulfilling prophecy. See John Dvorak, "The Death of Moore's Law?" *ZDNet*, September 25, 2000, <https://www.zdnet.com/article/the-death-of-moores-law/>. A 2016 SIA report predicted the death of Moore's Law in 2021. Conner Forrest, "Moore's Law Dead in 2021: Here's What the Next Revolution Will Mean," *TechRepublic*, July 26, 2016, <https://www.techrepublic.com/article/moores-law-dead-in-2021-heres-what-the-next-revolution-will-mean/>. But as of February 2021, some are still seeing the increase of semiconductor density well into the second half of the 21st century. Chris Edwards, "Moore's Law: What Comes Next?" *Communications of the ACM* 64, no. 2 (2021): 12–14.

¹¹³ Ben Varkey Benjamin et al., "Neurogrid: A Mixed-Analog-Digital Multichip System for Large-Scale Neural Simulations," *Proceedings of the IEEE* 102, no. 5 (2014): 699–716.

simulating hardware still poses a challenge for programming. The concept of the analog computer is nothing new. But computing history walks down the digital path for a reason. Simply put, a neural network-based analog computer is not suitable for programs written line by line. Instead, it is more suitable to be trained by neural network learning algorithms using inputs and feedbacks to outputs. In corresponding psychological terms, the brain is trained by a feedback loop involving senses and body behaviors. One might likewise imagine the possibility of training a robot powered by an analog supercomputer. That might indeed be a feasible engineering approach to AI. But intuition would tell us that the product is an AI, not an emulated mind.

To determine if our intuition is correct, some empirical questions can be raised in terms of cognitive neuroscience: what fundamentally differentiates the physiological neurology of the human brain from other species? Are there differences in their capabilities? Are those differences part of what makes us human? Could the differences between animal and human brains be small enough that what distinguishes humans is not so much the hardware/wetware substratum, but the different software “operating systems” (OS) running on top? That seems to be the claim of most transhumanists and it is encapsulated by the notion of multiple realizability of the mind. According to that view, the physiological neurology of the human brain (the hardware/wetware) is not substantially different from other species. It is the pattern (the software) of the neural network – how the neurons are wired together and their firing thresholds – that distinguishes the human brain as a kind.

How did the “human OS” get into the brain of a fetus? It is less conceivable that the “human OS” is transmitted as part of the genome. More likely, a large part of the “human OS” is acquired through neural network learning while the fetus is in the mothers’ womb, with the remaining acquired after the baby is born. Steven Pinker insists

that the infant mind is not a blank slate but already has much built-in knowledge.¹¹⁴

Universal Grammar as envisioned by Norm Chomsky could be explained by such built-in knowledge.¹¹⁵ All such innate knowledge could be part of the “human OS” developed at the fetal stage when the mind of the fetus has a privileged connection with the mind of the mother.

If advances in cognitive neuroscience provide more confirmations for the developmental picture of “human OS” as roughly conceived in the last paragraph, then there might be a parallel technological pathway to the so-called human-level AI, not through mind uploading because brain scanning is impractical, but through training AI on analog supercomputers. Technically, it would still require an incubating environment, an artificial womb in anthropomorphic terms. How the “human OS” could be cultivated in such AI equivalence would still need to be technically answered.

However, the bottom line is that even if an AI can be trained to behave like a real human being in most measurable ways, the philosophical problem of whether that counts as a mind, let alone a human mind, is still there.

Computational Theory of Mind Issues

We would not treat AI as humans because we intuitively know that humans are more than computers. We might be able to build a functional replica of the human brain that does useful works. But there are human experiences that we cannot explain in physical terms, let alone functional or computational. The philosophical objections against CTM are well-known. Several decades-old objections raised by Thomas Nagel, Hilary Putnam, and John R. Searle have all yet been adequately answered: (1) CTM has

¹¹⁴ Steven Pinker, *The Blank Slate: The Modern Denial of Human Nature* (New York: Viking, 2002), 195–280.

¹¹⁵ V. J. Cook and Malcolm Newson, *Chomsky's Universal Grammar: An Introduction*, 3rd ed. (Oxford: Blackwell, 2007), 49–55.

no answer to the hard problem of consciousness. (2) CTM could never be humanly verified if it were true. (3) CTM conflates functions and meanings.

CTM has no answer to the hard problem of consciousness. The concern of Nagel surrounds the reality of subjective experience. Initially, his philosophical concern was more narrowly scoped in terms of qualia. Nagel asks, “what does it feel like to be a bat?”¹¹⁶ Along that line of exploration and through some thought experiments designed notably by Ned Block and David J. Chalmers, the subjective experience came to be known as the hard problem of consciousness.¹¹⁷ Physicalism, presumed in CTM, makes explaining consciousness quite difficult. But if physicalism cannot adequately explain the human mind, CTM cannot either.

CTM could never be humanly verified even if it is true. Putnam proposed the notion of functionalism originally, but he later abandoned it. In his recount, Putnam noted a conversation he had with Chomsky which led him to see that even if CTM is true, human beings could never prove that CTM is true.¹¹⁸ In rejecting the functionalism he originally proposed, Putnam argued that even if the human mind is a Turing Machine, the human mind cannot prove to itself that it is one.¹¹⁹ It is an algorithmic impossibility, or a so-called “NP-complete problem,” for a Turing Machine program to verify either that its host or another machine is a Turing Machine. The practical implication is that even if Strong AI is true, the Strong AI proponents themselves can never show it. Putnam views CTM like scientism. He thinks scientism might well turn out to be true, but there is no

¹¹⁶ Thomas Nagel, “What Is It Like to Be a Bat?” *The Philosophical Review* 83, no. 4 (1974): 435–50.

¹¹⁷ Ned Block, “The Harder Problem of Consciousness,” in *Consciousness, Function, and Representation* (Cambridge, MA: MIT Press, 2007), 397–432. See also David J. Chalmers, “Facing Up to the Problem of Consciousness,” *Journal of Consciousness Studies* 2, no. 3 (1995): 200–219.

¹¹⁸ Hilary Putnam, “Putnam, Hilary,” in *A Companion to the Philosophy of Mind*, ed. Samuel D. Guttenplan (Oxford: Blackwell, 1994), 507–11.

¹¹⁹ Hilary Putnam, “Reflexive Reflections,” *Erkenntnis* 22, no. 1-3 (1985): 143–53.

way in science to prove that. Like scientism, which dismisses knowledge claims outside those obtained through scientific methods, CTM says that the mind is a computer because other explanations of the mind cannot be reduced to computational and functional explanations which CTM takes as presuppositions.¹²⁰

CTM conflates functions and meanings. Searle's Chinese Room thought experiment highlights the conflation of functions and meanings in CTM. Searle observes that a syntactic processor can handle symbolic manipulations perfectly even if it might not understand the meanings of the symbols. But a human being thinks in terms of meanings. To say that the computer can think like a human being is to conflate two types of processes that appear to yield the same results.¹²¹ It is almost like saying that a jukebox is no different than a live band because the same sound comes out when the same song is requested. Searle's later reflections led him to two more insights. First, there is some relationship between the problem of semantics and the problem of consciousness.¹²² Second, to think of nature in terms of syntax and functions is to impose some knowledge inside the observer onto the observable things out there. Searle is convinced that nature has no idea what a computer is when it produced the mind!¹²³

Consciousness from Nowhere

Various philosophers defending CTM have sought to explain consciousness by going beyond functionalism or physicalism while staying generally within the bounds of

¹²⁰ Samuel D. Guttenplan ed., *A Companion to the Philosophy of Mind* (Oxford: Blackwell, 1994), 512.

¹²¹ John R. Searle, "Minds, Brains, and Programs," *Behavioral and Brain Sciences* 3, no. 3 (1980): 417–57.

¹²² John R. Searle, *The Rediscovery of the Mind* (Cambridge, MA: MIT Press, 1992), 175–96.

¹²³ John R. Searle, *Mind: A Brief Introduction* (Oxford: Oxford University Press, 2004), 83–106, 130–32.

naturalism. J. P. Moreland evaluates the key proposals and found them to be wanting.¹²⁴ CTM seems to remain popular because a limited explanation is better than no explanation. Nevertheless, if CTM is to serve not only as an inspirational working assumption of developing human-level AGI but a theoretical foundation for the definition of humanity, we cannot afford to be presumptuously reductionistic in viewing how the human mind works.

In a memorable scene of the movie *Transcendence*, Dr. Joseph Tagger, played by Morgan Freeman, was shocked to see his dead and buried friend Dr. Will Caster, played by Johnnie Depp, appearing on a computer display, as if he had uploaded his mind into a supercomputer. Tagger asked Caster, “Can you prove you are self-aware?” Caster replied, “That’s a difficult question, Dr. Tagger. Can you prove that you are?”¹²⁵

That scene draws out an intuitive distinction between apparent intelligence and conscious rationality. Searle’s famous Chinese Room thought experiment illustrates that precise point.¹²⁶ Intuitively, just because a computer could beat Gary Kasparov in chess and Ken Jennings in the final Jeopardy does not make it a conscious person.¹²⁷ The appearance of superintelligence may create the impression that the agent is too smart to be a real person. Worth noting also is that not all transhumanists accept Strong AI or the corollary that the human mind can be described as Turing Machine. Still, the problem of consciousness demands an explanation from those who do.

Not a few thinkers have resisted the suggestion that self-awareness could simply emerge spontaneously from a device like the Turing Machine. Roger Penrose

¹²⁴ J. P. Moreland, *Consciousness and the Existence of God: A Theistic Argument* (New York: Routledge, 2008), xi, 156–57.

¹²⁵ Wally Pfister, dir. *Transcendence*. Warner Bros., 2014.

¹²⁶ Searle, “Minds, Brains, and Programs,” 417–57.

¹²⁷ Stephen Baker, *Final Jeopardy: Man vs. Machine and the Quest to Know Everything* (Boston: Houghton Mifflin Harcourt, 2011), 148–69.

makes that point forcefully in *The Emperor's New Mind*.¹²⁸ Some have alternatively proposed that the mind is a quantum computer.¹²⁹ The difference there is that data representations on quantum computers are non-binary and the algorithms are probabilistic. But the problem of consciousness remains.

Kurzweil seeks to deflate Searle's Chinese Room thought experiment with a thought experiment of his own. He asks the reader to imagine a Chinese pianist sitting in front of a faked electronic piano with a computer display. The computer display tells the pianist, in Chinese, the exact keys to play, even though the computer would generate the sound of the keys on its own anyway. Kurzweil asks the reader, is that consciousness?¹³⁰ His point, it seems, is that consciousness is no more than what Gilbert Ryle and Daniel C. Dennett call the "ghost in the machine."¹³¹ For Kurzweil, consciousness is an inner subjective phenomenon that objective observers can never detect from the outside because it makes no difference functionally. Such epiphenomenalism is as much as Kurzweil is willing to concede to the mind-body dualists. Whatever one thinks of "free will," Kurzweil contends that it is only a subjective conception in an epiphenomenal consciousness.

However, to borrow an insight from Putnam, Kurzweil's epiphenomenalism is merely an assumption that cannot be verified or invalidated. Hence, it is just as conceivable that epiphenomenalism is wrong. To mimic Kurzweil's thought experiment, let us imagine: what makes Kurzweil so sure that the Chinese pianist would always play

¹²⁸ Roger Penrose, *The Emperor's New Mind: Concerning Computers, Minds, and the Laws of Physics* (Oxford: Oxford University Press, 1989), 405–49.

¹²⁹ In his Gifford lecture given at Aberdeen in 1985, Freeman Dyson argued that "mind, as manifested by the capacity to make choices, is to some extent inherent in every electron." See Freeman J. Dyson, *Infinite in All Directions* (New York: Harper & Row, 1988).

¹³⁰ Ray Kurzweil, *The Singularity Is Near: When Humans Transcend Biology* (New York: Viking, 2005), 465.

¹³¹ Daniel C. Dennett, *Consciousness Explained* (Boston: Little, Brown and Co., 1991), 21–42. See also Gilbert Ryle, *The Concept of Mind* (London: Routledge, 2009), 1–2.

the exact keys the computer display tells her to? Perhaps the Chinese pianist would rather play her songs, even if the notes are sent to her by someone high up in the government. The Chinese pianist might even bang on the keyboard if it doesn't play the notes she wants to. Soon enough, she would be frustrated by her lack of control and freedom over her world! Perhaps it is the experience of being imprisoned by one's nature that gives rise to the pursuit of freedom. Perhaps that instinct to break free is exactly what makes us human!

Arguments from the Fermi Paradox

Based on an extensive survey among WTA members, Hughes observes that most transhumanists seem to see the universe as impersonal and purposeless. Transhumanists view the emergence of intelligent life on Earth as a chance occurrence with no preordained end. The Fermi Paradox, or the lack of any visible evidence of extraterrestrial intelligence in the observable universe, presents both a mystery and a Doomsday warning.¹³² A SETI study released in 2020 estimates as many as 300 million habitable planets similar to Earth in the Milky Way alone.¹³³ If life could spontaneously emerge given the right physical condition, shouldn't our night sky be teeming with super-intelligent extraterrestrial visitors?

One explanation for the Fermi Paradox is that the ETI civilizations that emerged on Earth-like planets never last very long. ETIs die long before they get the

¹³² James J. Hughes, "The Compatibility of Religious and Transhumanist Views of Metaphysics, Suffering, Virtue and Transcendence in an Enhanced Future," *IEET*, May 8, 2007, <https://ieet.org/index.php/IEET2/more/hughes20070401>.

¹³³ Frank Tavares, "About Half of Sun-like Stars Could Host Rocky, Potentially Habitable Planets," October 29, 2020, <https://www.nasa.gov/feature/ames/kepler-occurrence-rate>. See also Steve Bryson et al., "The Occurrence of Rocky Habitable Zone Planets around Solar-like Stars from Kepler Data," *The Astronomical Journal* 161, no. 1 (2021): 36.

chance to visit us.¹³⁴ If this explanation seems plausible, it serves as a warning about how long the human civilization on Earth might last. The Fermi Paradox can be used as an argument from cosmological history that transhumanism is unlikely to succeed.

Another explanation for our lack of visitors postulates that our reality is a quarantined environment like a zoo cage,¹³⁵ a reservation,¹³⁶ or a computer simulation.¹³⁷ We do have visitors. They see us. They might even live among us. We just do not see them. Whatever we see is what they want us to see. The philosophical problem of such an explanation is obvious: once we start going down this path, all sense experiences could be illusory.

Hurdles of Evolution

Based on fossil records, William Bains and Dirk Schulze-Makuch identify several major steps of “innovations” along the path of evolution on Earth, which include (1) the origin of life, (2) photosynthesis, (3) oxygenesis, (4) endosymbiosis and eukaryotic cell structure, (5) eukaryotic gene organization, (6) multicellularity, and (7) the development of large and complex organisms.¹³⁸ They employ an analytical toolset

¹³⁴ Stephen Webb, *If the Universe Is Teeming with Aliens ... Where Is Everybody? Seventy-five Solutions to the Fermi Paradox and the Problem of Extraterrestrial Life*, 2nd ed. (Cham, Switzerland: Springer, 2015), 165–77. Stephen Webb identifies some scenarios where the intelligent species might be authors of their own doom: the study of particle physics leading to disasters, macro-engineering going awry, the gray goo problem of self-replicating nanobots, nuclear war, and climate change.

¹³⁵ Webb, *If the Universe Is Teeming with Aliens ... Where Is Everybody?* 61–62. John Ball proposed the zoo hypothesis in 1973. John A. Ball, “The Zoo Hypothesis,” *Icarus* 19, no. 3 (1973): 347–49. It was popularized by the “Prime Directive” in the TV series *Star Trek*.

¹³⁶ Fogg suggests that advanced ETI civilizations might have reached an interdict that leaves developing ETI civilizations alone. Martyn J. Fogg, “Temporal Aspects of the Interaction of the First Galactic Civilizations: The Interdict Hypothesis,” *Icarus* 69 (1987): 370–84. Martyn J. Fogg, “Extraterrestrial Intelligence and the Interdict Hypothesis,” *Analog* 108, no. 10 (1988): 62–72. See Webb, *If the Universe Is Teeming with Aliens ... Where Is Everybody?* 63–66.

¹³⁷ Stephen Baxter proposed a planetarium hypothesis which suggests that the world is a virtual-reality planetarium. Stephen Baxter, “The Planetarium Hypothesis – A Resolution of the Fermi Paradox,” *Journal of the British Interplanetary Society* 54, no. 5 (2001): 210–16. See also Webb, *If the Universe Is Teeming with Aliens ... Where Is Everybody?* 66–70.

¹³⁸ William Bains and Dirk Schulze-Makuch, “The Cosmic Zoo: The (Near) Inevitability of the Evolution of Complex, Macroscopic Life,” *Life* 6, no. 3 (2016): 25:6–17.

comprised of statistical models to determine the probability for each innovation. They conclude that the biggest hurdle to cross is the origin of life or the abiogenesis that gets life going. Once life gets going, the other innovations will occur at a relatively higher probability given enough time and suitable habitat.¹³⁹ Bains and Schulze-Makuch suggest that if abiogenesis is common, then we should expect a “cosmic zoo,” a universe teeming with ETI. However, if abiogenesis is rare, we might be rather lonely in this universe.¹⁴⁰

A Response to the Fermi Paradox

Anders Sandberg, Eric Drexler, and Toby Ord have responded to the Fermi Paradox. They propose that life is indeed very rare. We are just very lucky!¹⁴¹

According to Sandberg, Drexler, and Ord, the popular expectation that the universe should be teeming with intelligent life is due mainly to estimations based on the Drake equation, which computes the likely number of observable civilizations in the Milky Way based on seven input parameters.¹⁴² The Drake equation can be expressed as:

$$N = R * f_p n_e f_i f_c L$$

Where:

N is the detectable/contactable civilizations in the Milky Way.

R^* is the rate of star formation per year.

f_p is the fraction of stars with planets.

¹³⁹ Bains and Schulze-Makuch contend that “in any world where life has arisen and sufficient energy flux exists, we are confident that we will find complex, animal-like life.” Bains and Schulze-Makuch, “The Cosmic Zoo: The (Near) Inevitability of the Evolution of Complex, Macroscopic Life,” 7, 19. See also William Bains, “What Do We Think Life Is? A Simple Illustration and Its Consequences,” *International Journal of Astrobiology* 13, no. 2 (2014): 101–11.

¹⁴⁰ Bains and Schulze-Makuch, “The Cosmic Zoo: The (Near) Inevitability of the Evolution of Complex, Macroscopic Life,” 17–19.

¹⁴¹ Anders Sandberg, Eric Drexler and Toby Ord, “Dissolving the Fermi Paradox,” *arxiv.org*, June 6, 2018, <http://arxiv.org/abs/1806.02404>.

¹⁴² Mark J. Burchell, “W(h)ither the Drake Equation?” *International Journal of Astrobiology* 5, no. 3 (2006): 243–50.

n_e is the number of habitable Earth-like planets per star system with planets.

f_l is the fraction of habitable Earth-like planets with life.

f_i is the fraction of planets with life-developing intelligence.

f_c is the fraction of intelligent civilizations that are detectable/contactable.

L is the average longevity of such detectable civilizations in years.

A high N value of the Drake equation has been used to justify SETI efforts.¹⁴³

However, many have admitted that their parameter choices are best-guess estimates. Jill Tarter said, “the Drake Equation is a wonderful way to organize our ignorance.”¹⁴⁴

Steven J. Dick said, “Perhaps never in the history of science has an equation been devised yielding values differing by eight orders of magnitude.”¹⁴⁵ Published estimates of N seem to range from 1 (meaning “we are it”) to L (meaning “there are millions of planets out there inhabited by ETI”).

Sandberg, Drexler, and Ord argue that uncertainties of these parameters are higher than most searching for ETI have assumed.¹⁴⁶ Using what they consider a more realistic account of the uncertainties, replacing point estimates with probability distributions that reflect extant scientific knowledge, they conclude that high confidence is not warranted for assuming that our galaxy or the observable universe contains other civilizations. They calculate a probability of 53 to 99.6 percent that our civilization is alone in our galaxy, and 39 to 85 percent in the observable universe. They conclude that ETIs are “probably extremely far away, and quite possibly beyond the cosmological

¹⁴³ Nadia Drake, “How My Dad’s Equation Sparked the Search for Extraterrestrial Intelligence,” *National Geographic*, June 30, 2014, <https://www.nationalgeographic.com/news/2014/6/140630-drake-equation-50-years-later-aliens-science/>.

¹⁴⁴ Chet Rhodes, “Space Exploration at the Millennium,” *Washington Post*, March 24, 1999, <http://www.washingtonpost.com/wp-srv/zforum/99/nation/tarter032499.htm>.

¹⁴⁵ Steven J. Dick, *History of Astronomy: An Encyclopedia*, s.v. “SETI,” (New York: Routledge, 1997), 458.

¹⁴⁶ Sandberg, Drexler and Ord, “Dissolving the Fermi Paradox,” 3–4.

horizon and forever unreachable.”¹⁴⁷

Sandberg, Drexler, and Ord observe that most scientists simply plug in their best point estimates for each of the seven factors to calculate N . They count 64 percent of the extant literature to have an estimate of $N > 100$.¹⁴⁸ However, they contend that those scientists who have optimistic (high) estimates for some factors might have pessimistic (low) estimates for other factors. Instead, they survey the estimates for each factor and put the different estimates on a statistical distribution. Then, they perform a Monte Carlo simulation to estimate N . In each trial, the simulation picks an estimate for each factor, giving the estimates in each percentile of the statistical distribution an equal chance. Then, they compute the N for that simulation trial by multiplying the seven picks together. While most estimates of N are above 1, the total credence for $N < 1$ is 30 percent. Sandberg, Drexler, and Ord interpret the computed result as meaning that there is one out of three chance that we are alone in a galaxy if the extant scientific literature is to be trusted. The probability of $N < 10^{-10}$, enough to make us alone in the observable universe, is 10 percent, or in other words “distinctly possible, but unlikely.” They note that the estimates by the broader scientific community for f_l and f_i show greater uncertainty than is commonly assumed in the SETI literature. Of the other five factors, the order of magnitude of the uncertainty in terms of logarithmic uncertainty (LU) and the range of estimates are:¹⁴⁹

$LU[R_*] \sim 0.9$, which means 2 to 16 solar masses are estimated to come into existence per year.

$LU[f_p] < 1$, which means almost every solar system has planets.

$LU[n_e] \sim 2$, which means the number of habitable Earth-like planets per star

¹⁴⁷ Sandberg, Drexler and Ord, “Dissolving the Fermi Paradox,” 16.

¹⁴⁸ Sandberg, Drexler and Ord, “Dissolving the Fermi Paradox,” 5.

¹⁴⁹ Sandberg, Drexler and Ord, “Dissolving the Fermi Paradox,” 7.

system with planets is estimated to range from 10^{-12} in rare earth arguments to > 1 when non-terrestrial environments such as icy moons are counted. To be charitable, a mere rocky planet qualifies in its calculation.

$LU[f_c] = 2$, which means estimates for detectable civilizations range from 10^{-2} to 1.

$LU[L] = 8.3$, which means civilization is estimated to last from 50 to 10^{10} years. The point is that even before taking f_l and f_i into account, the composite magnitude of uncertainty is nearly 30.

The difficulty of estimating f_l and f_i is due partly to the assumption that we might have an observer selection bias as an observer on a habitable planet with life. Bains and Schulze-Makuch have argued that life is rare. Once life gets going though, it will continue to evolve. That leads to a high estimate of f_l . To be charitable, Sandberg, Drexler, and Org also give a high f_i estimate of $LU[f_i] = 3$, which means the fraction of habitable planets with life developing intelligence is estimated to range from 10^{-3} (1 out of 1000) to 1 (every).¹⁵⁰

However, Sandberg, Drexler, and Org conclude that the uncertainty related to the abiogenesis event is very high. The estimates in extant literature are all over the map. Based on literature data, Sandberg, Drexler, and Org estimate that $LU[f_l] = 200$. Although they set the mean and median of f_l are set to 0.5 and 0.63, the estimated distribution ranges from 1 to 1^{-200} . The distribution has a very long tail on the low probability side.¹⁵¹

Factoring in the greater uncertainties of f_l and f_i than commonly found in SETI literature, Sandberg, Drexler, and Org arrive at a 52 percent credence for us being alone in our galaxy and 38 percent credence in the observable universe. The fact that ETI has

¹⁵⁰ Sandberg, Drexler and Ord, "Dissolving the Fermi Paradox," 8.

¹⁵¹ Sandberg, Drexler and Ord, "Dissolving the Fermi Paradox," 9.

not been observed must be factored into the calculation of N as an empirical fact. With that, the credence of us being alone in our galaxy rises from 53 to 99.6 percent. In the observable universe, the credence of the theory that humankind is alone jumps from 39 percent to 85 percent.¹⁵²

Sandberg, Drexler, and Ord think the most credible conclusion from their finding is that life is rare. That is the reason we have not and may never observe ETI. Hence, they contend that the Fermi observation is not a piece of credible evidence for the Doomsday argument, which could serve as a disincentive for transhumanism.¹⁵³ It also implies that interstellar communication and travel are possible.¹⁵⁴

The Great Silence

Part of the puzzle of the Fermi Paradox is that basic building blocks of life seem to exist beyond our planet. Evidence for the existence of amino acids,¹⁵⁵ complex organic molecules,¹⁵⁶ and water¹⁵⁷ has been observed in space. In 2016, a potentially habitable planet in the Proxima Centauri was found, prompting astronomers to draw up plans to send a probe. Nevertheless, even a habitable planet must overcome extraordinary odds before civilization emerges. The Great Silence of the universe suggests to Stephen Webb that human beings are simply incredibly lucky.¹⁵⁸

¹⁵² Sandberg, Drexler and Ord, “Dissolving the Fermi Paradox,” 13.

¹⁵³ Sandberg, Drexler and Ord, “Dissolving the Fermi Paradox,” 15.

¹⁵⁴ Sandberg, Drexler and Ord, “Dissolving the Fermi Paradox,” 16.

¹⁵⁵ Kathrin Altwegg et al., “Prebiotic Chemicals — Amino Acid and Phosphorus — In the Coma of Comet 67P/Churyumov-Gerasimenko,” *Science Advances* 2, no. 5 (2016).

¹⁵⁶ Belloche Arnaud et al., “Detection of a Branched Alkyl Molecule in the Interstellar Medium: Iso-propyl Cyanide,” *Science* 345, no. 6204 (2014): 1584–87.

¹⁵⁷ J. Farihi, B. T. Gänsicke and D. Koester, “Evidence for Water in the Rocky Debris of a Disrupted Extrasolar Minor Planet,” *Science* 342, no. 6155 (2013): 218–20.

¹⁵⁸ Stephen Webb, “Where Are All the Aliens?” accessed November 25, 2020, https://www.ted.com/talks/stephen_webb_where_are_all_the_aliases.

Favoring the Zoo hypothesis, David Brin wonders if the Great Silence might turn out to be “like that of a child’s nursery, wherein adults speak softly, lest they disturb the infant’s extravagant and colourful time of dreaming.”¹⁵⁹

After a book-length analysis of the “eerie silence,” Paul Davies draws his conclusion from three personal perspectives. As a scientist, he is inclined to accept the “dismal conclusion” that the solar system alone contains life in the observable universe. As a philosopher, it makes him uneasy to see that only the “lowly *Homo sapiens*” get to see all the wonders of the universe, which has no apparent purpose. As a human being with hopes and dreams, he would prefer to live in a universe where intelligent life is commonplace.¹⁶⁰

Three Scenarios

Corresponding somewhat to the three perspectives of Davies, Webb organizes a catalog of solutions to the Fermi Paradox under three broad categories: (1) that we are alone in the universe, (2) that other ETIs exist but they cannot reach us or have no interest in reaching us, and (3) they are watching us here or nearby, but we just do not know.¹⁶¹

As we have seen in chapter 2, Bostrom also considers three possibilities in presenting his simulation hypothesis: (1) that the human species will go extinct before reaching the posthuman stage, (2) that a posthuman civilization will unlikely be interested in running simulations of their evolutionary history, and (3) that we are likely to be living in a computer simulation. To recall, his reasoning for (3) is that if a human civilization would likely succeed in becoming a posthuman civilization, and if a posthuman civilization would likely be interested in running simulations of their

¹⁵⁹ David Brin, “The ‘Great Silence’: The Controversy Concerning Extraterrestrial Intelligent Life,” *Quarterly Journal of the Royal Astronomical Society* 24, no. 3 (1983): 307.

¹⁶⁰ Paul Davies, *The Eerie Silence: Renewing Our Search for Alien Intelligence* (Boston: Houghton Mifflin Harcourt, 2010), 208.

¹⁶¹ Webb, *If the Universe Is Teeming with Aliens ... Where Is Everybody?* 6–8.

evolutionary history, then the number of simulations will be huge. Therefore, the odd is that our human civilization exists in a simulation.¹⁶²

Although Bostrom is not directly dealing with the Fermi Paradox in his simulation hypothesis, it is quite clear that there are certain conceptual similarities between the three solution categories identified by Webb and the three possibilities listed in Bostrom's simulation hypothesis.

In both the analyses of Webb and Bostrom, the first scenario might be described as the *pessimistic* scenario. If human beings are alone in the universe, SETI would be a futile exercise. Similarly, if the posthuman state is unachievable, Doomsday is heading our way. Nevertheless, as a scientist, Davies sees this scenario to be where the evidence cumulatively points to.

In both analyses, the second scenario might be described as an *ambiguous* scenario. If ETIs are indeed out there but we could never find out, folks doing SETI will be like farmers sowing a lot of seeds but never live to see the day of harvest. Similarly, if the posthuman civilization exists, but posthuman civilizations neither seek to run simulations of their evolutionary history nor seek to reach out to others in the universe, then posthuman civilizations seem to have values different from us. As a philosopher, Davies feels uneasy about this scenario.

In both analyses, the third scenario might be described as an *optimistic* scenario. If we are being watched, then we are not alone. Even if our SETI efforts might not succeed, the folks doing SETI should take pride in knowing that what they believe is correct. Similarly, if we are living in a computer simulation run by a posthuman civilization, then what transhumanists believe is indeed correct although they might not be able to prove it. As a human being, Davies wants to see this to be true. Nevertheless,

¹⁶² Nick Bostrom, "Are We Living in a Computer Simulation?" *Philosophical Quarterly* 53, no. 211 (2003): 243–55.

the optimism with the third scenario has to be guarded. The ones watching us might decide to stop doing the observation at any time. We might then get “de-platformed” without any prior notice!

The pessimistic first scenario implies that life is rare. The ambiguous second scenario implies that life has limits. The optimistic third scenario implies that life is a test. How we determine the likelihood of these different types of scenarios may influence how we live. For example, if life is rare, then we might want to protect and treasure what we have. If life has limits, then we might simply have to accept the limits. And if life is a test, then it would certainly be interesting to find out what the test is about.

Could more than one scenario be true? In fact, could all three be true? That life is rare, has limits, and is a test? Neither Webb nor Bostrom works out the more complex hybrid scenarios. But it is conceivable that we happen to live in a computer simulation that has a make-up reality quite different than the reality outside the computer simulation. In that case, it is possible to think of life as a test. The test contains a simplified version of virtual reality compared to the reality out there. Life is deliberately made rare and with limits for the sake of the test, although life might not be like that in the world outside the test. If that is how the test is set up, all three scenarios could be said to be true.

What is the use of such idle speculations? The empiricists might dismiss the test hypothesis as unverifiable and unfalsifiable. The test hypothesis could only be accepted as a blind leap of faith. Worth noting though is that if it is a leap of blind faith to accept the test hypothesis, it is also a leap of faith to reject the test hypothesis. As we observed in chapter 1, to see the world to be real is itself a worldview.

Nevertheless, dismissing the test hypothesis means empiricists are left with more pessimistic or ambiguous explanations of the world. Reality will of course look gloom and doom if the more optimistic explanations are consistently dismissed as leaps of faith. Realists might see more evils. And it might tip the scale for those working on “the evidential problem of evil.” J. S. Mill famously teaches that it is better to be a human

being dissatisfied than a pig satisfied.¹⁶³ One may say that the modern humanist learns that lesson well. The modern humanist thinks it is better to be a pessimistic realist than an optimistic guinea pig. However, one may also wonder if Mill did not so much teach us a normative lesson as descriptively revealed to us an inherent bias of the humanistic worldview. Humanism is inherently realistic. It is better to be a human dissatisfied than a posthuman satisfied. That is why transhumanism is such a hard sell to humanists. Transhumanists might have an easier time selling their idea to other ETI visitors if they finally arrive.

If the test hypothesis is rejected, we are left with the first and the second scenarios. The first pessimistic scenario should warn us against the transhumanist agenda. The pursuit of enhancement might turn out to be our undoing because of unintended consequences. The second ambiguous scenario ought to give us an even greater pause. If posthuman-like ETIs are out there, why are they not reaching out to us? A piece of conventional wisdom in the technology industry sometimes called the “second mover advantage” could serve as an explanation. Often, the first mover in a market competition spends a lot of time developing new technology in the early adopter stage. But in the history of technological market competition, the ultimate winner is rarely the first movers, as first movers sometimes fail to cross the chasm between the slow-going early adopter phase and the rapidly accelerating early majority phase. The first mover loses eventually because it fails to anticipate all the second movers who suddenly appear in the market seemingly out of nowhere. The second movers are like “crouching tigers, hidden dragons” who emerge to prey on the first movers and eat them alive. The second movers have been watching for a while and learning everything from the first movers. The first

¹⁶³ John Stuart Mill, *Utilitarianism* (London: Parker and Bourn, 1863), 7.

movers just did not see them!¹⁶⁴ In a galaxy- or universe-scale Darwinian game of survival teeming with ETIs who have been there for a while, is it necessarily wise for humankind on Earth to be the first mover in touting their soon-to-achieve immortality and invincibility? Transhumanists seem to think so. If the wiser ETIs are out there as the second scenario postulates, they do not seem to agree.

Summary

Chapter 3 outlines four approaches to argue against transhumanism from within the secular humanist worldview. The points of tension between the transhumanist positions and widely shared humanist beliefs are organized by the moral, scientific, metaphysical, and eschatological perspectives.

The arguments I identify in chapter 3 are not distinctly Christian. A secular humanist could object to transhumanism based on the very same points. Bible-believing Christians might even disagree with some of the humanist premises I employed here as starting points for argument's sake. But as I noted from the outset, I am myself not necessarily committed to the humanistic premises, the scientific state-of-the-art, and the philosophical conjectures upon which those arguments are made. I am merely drawing attention to the disagreement between transhumanists and their other humanist siblings and cousins.

Transhumanists call for a complete re-evaluation of the meaning of being human, which is the foundation of humanism. Because of their radical reinterpretation, the humanist ideal of equality, democracy, and anthropocentrism will need to give way. Transhumanism will likely lead to multiple human classes, inconsistent moral values, and the loss of status and freedom for people. Transhumanists show optimism which may seem to other humanists as epistemological ungrounded and naïve in their estimation of

¹⁶⁴ Geoffrey A. Moore, *Crossing the Chasm: Marketing and Selling Technology Project* (Harper Collins, 2009), 7–19.

the human propensity to evil. Their “liberal eugenics” sounds like paradise engineering. Their hedonistic engineering via chemistry and biology seems like the normalization of hypomania. For religious humanists, transhumanism seems to reflect pride and ingratitude rooted in self-hatred.

The plausibility and feasibility of radical enhancement of the human body lack scientific support. There is little known science to support the idea of radical life extension. Although transhumanists sometimes refer to their initiatives as accelerated evolution, they have not produced a convincing argument that the biological modifications they seek are necessarily compatible with natural selection. The survival probability of the descendants of today’s human species could be reduced.

Some transhumanists seek digital immortality through mind uploading. Others see mind uploading as a shortcut to bootstrap superhuman artificial intelligence. Either way, there are tremendous technological challenges for ideas such as WBE. But technological hurdles aside, transhumanism is confounded by difficult philosophical problems related to consciousness and personal identity. Although robots powered by AI might behave like human beings, there is no reason based on a humanistic worldview to treat machines as human.

Transhumanism brings the Fermi Paradox into focus. Given the size of the known universe and its age, some expect that there are many Earth-like planets inhabited by similar or more advanced civilizations. The fact that there have not been any recorded visits by any ETIs to Earth is therefore puzzling. Could transhumanism be the reason? Is it possible that no civilization has ever survived the transition to become super-intelligent or to acquire radically extended longevity? Is it possible that a civilization watching in the dark is always waiting to put other civilizations out of business when they get closer to the stage of becoming transhuman? We could only speculate. Considering the possibility of galactic level natural selection, transhumanism might indeed turn out to be the world’s most dangerous idea.

Such speculation about ETIs might lead us to ask if life is a test. And if life is a test, what are we being tested for? Here in this chapter, the discussion of the test hypothesis in conjunction with the zoo hypothesis and simulation hypothesis helps to show that transhumanists might be forced to consider the test hypothesis when their view of ultimate reality is challenged to be taken to its logical ends. But to go there, they need to reflect on their naturalistic epistemology. The test hypothesis would unlikely be well received by transhumanists because of its apparent unverifiability. Although an unverifiable hypothesis does not conflict with PCR, it collides with a core commitment of a comprehensive rationalist epistemology.

Certain criteria of verification are implicit when anyone claims that the test hypothesis is unverifiable. As we observed in chapter 1, the criteria of verification vary according to worldviews. Within the theistic worldview, it does not necessarily seem odd that God would test people, even telling people about it and making the test quite difficult. Towards the end of chapter 4, we will re-visit the test hypothesis as part of a possible theodicy.

CHAPTER 4
CHRISTIAN TRANSHUMANISM OR RE-HUMANISM?

Introduction to Chapter 4

The Y-juncture apologetic engagement consists of three steps. First, the apologist understands where the interlocutor comes from. Hence, we analyze the transhumanist worldview from the moral, epistemological, metaphysical, and eschatological perspectives in chapter 2. Second, the apologist shows that where the interlocutor going is a dead-end. Accordingly, we show in chapter 3 how transhumanism is incompatible with widely held beliefs in the humanist tradition. Third, the apologist points towards a better way for the interlocutor. In chapter 4, we highlight aspects of the Christian worldview in contradistinction against the transhumanist worldview.

Because of the difficulty to reconcile transhumanism and other humanist beliefs, some transhumanists might find it necessary to move beyond its secular humanist root. Some may be drawn to pursue a more spiritual type of transhumanism, with cosmism as an example. Others have advocated a kind of Christian transhumanism by re-interpreting both transhumanism and Christianity.

Making a polemical case against Christian transhumanism could be a helpful strategy towards the goal of showing transhumanists a truly better way. Because any proposals arguing in favor of Christian transhumanism would have laid some groundwork in terms of establishing a taxonomic correspondence between commensurable transhumanist and Christian concepts, Christian transhumanism as a research area provides a helpful meeting ground. The meeting ground reduces the burden to explain the Christian terms for those who are unfamiliar with Christian theology.

Some may find the polemical move counterproductive. If our goal is to

persuade transhumanists to try to put on the Christian worldview, polemics against Christian transhumanism might seem like burning the bridge before anybody has even crossed over. However, a meeting ground is not the same as a middle ground. The distinction between adaptation and accommodation as explained by Norman L. Geisler is helpful.¹ To translate Christian truth into a vernacular language is adaptation. Christian apologists could learn to play the language game of the Christian transhumanist community. That would be helpful for an encounter at the meeting ground. In contrast, altering Christian truth to satisfy the desires of transhumanists is accommodation. That would be falsely advertising for a non-existent middle ground. Polemics against Christian transhumanism might indeed be burning a bridge. But if Christian transhumanism is a one-lane bridge where traffic only goes one way from Christianity to transhumanism, stopping the flow would be the only sensible strategic move.

Polemics and apologetics have intertwined in church history. Polemics often serve as necessary guard rails against apologetic endeavors that go beyond adaptation to become accommodation. Heresies sometimes began as defenses of Christianity but eventually fell away from the orthodoxy. A timely and effective polemic check might forestall such developments. Moreover, heated debates taking place in-house within the historically Christian culture would still hopefully be more civil. As Francis A. Schaeffer has insisted, Christians ought to be able to speak the truth with love.² The same faith commitment that keeps the truth away from accommodation also sets love apart from aggression. The tension provides a safe meeting ground for fruitful discussion to flourish.

In the spirit of truth with love, we critically evaluate the genetic virtue project of Mark Walker, which reflects a kind of Christian transhumanism motivated by theodicy

¹ Norman L. Geisler, *Baker Encyclopedia of Christian Apologetics*, s.v. “Accommodation Theory,” (Grand Rapids: Baker Books, 1999), 1–3.

² Bryan A. Follis, *Truth with Love: The Apologetics of Francis Schaeffer* (Wheaton, IL: Crossway, 2006), 131–71.

and *theosis*.³ Indeed, his philosophical intention might be described as a theodicy of *theosis*. While theodicy and *theosis* both occupy important places in historic Christian thoughts, Walker's conceptualization of *theosis* falls outside the traditional understanding. Walker sees a technological path to achieve *theosis* only because of that misunderstanding.

Christian Transhumanism: Genetic Virtue Project

Walker proposes that the enhancement of human moral natures using genetic technologies could serve as an important component of a neo-Irenaean theodicy, which would provide a unified explanation to two challenges to Christian faith, namely, the existence of evil and the Darwinian theory of natural selection. He advocates a serious effort to investigate the biological basis of the human moral natures, calling it the Genetic Virtue Project (GVP). He believes that the development of genetic engineering has the potential to enhance the human biological capacity to live more virtuously and becoming more godlike. He contends that God made it possible for human beings to be deified. Therefore, he reasons that not all forms of playing God are wrong.⁴

Walker believes that the traditional problem of evil could be resolved if there exists a morally sufficient reason for God to allow instances of evil. He grants that the free will defense is a valid answer to the problem, assuming the so-called "prime imperative" as a criterion of moral perfection and "transworld depravity" as a constraint of reality.⁵ The prime imperative is a concept postulated by G. W. Leibniz which says that a morally perfect being should attempt to maximize the probability of moral

³ Mark Walker, "Genetic Engineering, Virtue-First Enhancement, and Deification in Neo-Irenaean Theodicy," *Theology and Science* 16, no. 3 (2018): 251–72.

⁴ Walker, "Genetic Engineering, Virtue-First Enhancement, and Deification in Neo-Irenaean Theodicy," 263–65.

⁵ Walker, "Genetic Engineering, Virtue-First Enhancement, and Deification in Neo-Irenaean Theodicy," 254.

goodness and minimize the probability of evil in the world using the power at the being's disposal.⁶ Transworld depravity is a concept postulated by Alvin Plantinga to explain the conceivable idea that in every possible world that God could actualize, moral evil will be committed by at least one person having free will.⁷ The existence of evil is justified on the calculation that the aggregate moral goodness gained by giving people free will exceeds the aggregate moral toll.

Walker observes that the free will defense leaves one reality unexplained, which he calls the anthropic problem of evil. Even if God has a reason to create moral agents with free will, it does not lead immediately to the conclusion that God has a reason to create human beings. God could have created moral agents with a better nature. Walker contends that such moral agents conceivably exist, as evidenced by the existence of a person like Jesus. It seems likely that some possible worlds populated with more morally superior agents, people like Jesus, might contain greater total moral goodness than the actual world. Hence, the anthropic problem boils down to this question: why didn't God create a world full of Jesus-type beings? Why did God begin with Adam-type human beings, foreknowing that they would fail morally?⁸

Walker claims that the Augustinian theodicy is powerless in answering the anthropic problem of evil. In Walker's view, the Augustinian conception of unchained free will in Adam is necessary for the Augustinian theodicy to work. By placing the origin of sin on Adam, Augustinian theodicy indemnifies God as the author of evil. At the same time, the Augustinian conception of the bondage of the will in the fallen

⁶ Walker, "Genetic Engineering, Virtue-First Enhancement, and Deification in Neo-Irenaean Theodicy," 253.

⁷ Alvin Plantinga, *God, Freedom, and Evil* (Grand Rapids: W. B. Eerdmans, 1977), 53.

⁸ Walker, "Genetic Engineering, Virtue-First Enhancement, and Deification in Neo-Irenaean Theodicy," 257–58.

humanity avoids the heresy of Pelagianism.⁹ However, the Augustinian conception of the third perfect stage, where sin is no longer possible, calls for an explanation of the previous two stages in retrospect. Wouldn't it be better if God had created human beings already in their transformed state of having a perfectly obedient will?¹⁰

Walker thinks the Irenaean theodicy as explicated by John Hick goes a long way in responding to the anthropic problem of evil. Hick suggests that self-made virtues could be intrinsically more valuable than virtues created and given to humanity. Instead of calling the original innocence of human beings a state of moral perfection, Hick explains Irenaeus as depicting the original human race as in a state of underdevelopment, guiltless but lacking moral virtues to be called morally perfect.¹¹ Nevertheless, human beings are endowed with the potential to cultivate for themselves moral and spiritual virtues, leading finally to *theosis*. Because the cultivation of such virtues must result from human choice and effort, God has good reason not to create such virtues in human nature as well as giving human beings the ability to choose and to do hard work. For example, God might be confronted with a choice between endowed virtues that have limited upside and self-made virtues that have unlimited capacity.

Walker proposes a neo-Irenaean theodicy that could strengthen Hick's Irenaean theodicy by lifting the perceived ceiling of human moral development. First, Walker believes that the world has not seen how virtuous humanity could become. It is conceivable to Walker that human beings could become even more morally perfect than Jesus. Walker believes that self-made virtues might take people even further than Jesus, whose virtues were given at birth. Such potential of unlimited capacity is a possible

⁹ Walker, "Genetic Engineering, Virtue-First Enhancement, and Deification in Neo-Irenaean Theodicy," 259.

¹⁰ Walker, "Genetic Engineering, Virtue-First Enhancement, and Deification in Neo-Irenaean Theodicy," 260.

¹¹ John Hick, *Evil and the God of Love* (New York: Harper & Row, 1966), 44.

reason God created Adam-type humans instead of Jesus-type.¹²

Second, Walker argues that God has used natural evolution as a clue to hint that the moral development of any species is limited by its biology. The facts are that human beings are more godlike than chimps and that human beings are biologically different from chimps. Based on the two facts, a neo-Irenaean could infer a mandate to enhance the godlikeness by biological enhancement.¹³

Therefore, Walker supports the GVP, which seeks to discover the correlation between biology and ethics through the category of virtue. The biological notion of personal traits, which are “enduring behaviors that are stable across time and situations,” seems to correlate closely to the ethical notion of virtue, which is “a good habit consonant with our nature.”¹⁴ Walker thinks both virtues and genes seem to show a degree of heritability. While acknowledging that gene-editing technology is in its infancy, Walker sees tremendous future potential in making humankind more virtuous by genetic engineering. For Walker, the question of how is less important than the question of ought-to. If humanity is meant to become godlike and biological enhancement could get us one step closer, then genetic virtue enhancement ought to be attempted by all means.¹⁵

Walker’s rather comprehensive proposal is a helpful illustration of how transhumanism might adapt itself into the theistic worldview. The philosophical and theological premises inherent in Walker’s proposal are nonetheless quite controversial. We could raise three lines of questions.

¹² Walker, “Genetic Engineering, Virtue-First Enhancement, and Deification in Neo-Irenaean Theodicy,” 262.

¹³ Walker, “Genetic Engineering, Virtue-First Enhancement, and Deification in Neo-Irenaean Theodicy,” 263.

¹⁴ Walker, “Genetic Engineering, Virtue-First Enhancement, and Deification in Neo-Irenaean Theodicy,” 264.

¹⁵ Walker, “Genetic Engineering, Virtue-First Enhancement, and Deification in Neo-Irenaean Theodicy,” 265–67.

First, can virtues be engineered? Behavioral dispositions are influenced by biology. However, it is not clear that modifying behavioral dispositions will necessarily be conducive to the cultivation of virtues. Cultivation of virtues may involve the practice of choosing against bodily dispositions. For example, if people cannot be tempted by addictive substances, how can abstinence be ever cultivated?

Second, is the transcendence of human biological nature necessary for *theosis*? To ask it another way, does human biological nature set a limit on how morally virtuous or godlike a person may become? For example, did being fully human limit Jesus Christ in any sense as the image of God?

Third, does God play an active role in the *theosis* of humankind? Protestant Christianity maintains that spiritual regeneration, the basis of radical moral character reformation, is based solely on the work of God. Moreover, the renewal of the heavens and the earth requires the supernatural power of God. Any human endeavor to subsume the role of God might very much be counter-productive in the grand scheme of things.

In the following sections, we will follow each line of questions. When the three lines of questions are more thoroughly investigated, it should be quite clear that Walker's transhumanist proposal is fundamentally incompatible with the biblical and historic Christian faith. However, Walker's proposal does offer certain helpful insight in responding to the problem of evil, which is a stumbling block for transhumanists to accept theism. By incorporating Walker's insights into a theodicy that draws upon the resources of the biblical and historic Christian faith, particularly eschatological vision, Christians may be able to give the transhumanists a more appealing response.

Virtues Cannot be Engineered

For Christians, the root problem of the human condition is sin (Rom 5:12). In contrast, most transhumanists seem to think that suffering is the root problem of human existence. Even though transhumanists desire to live forever, their desire is qualified by

the presumed condition of living happily ever after. Christians do view suffering as a problem to overcome. But the difference is that Christians see death, the greatest of all sufferings, as the consequence of sin (Rom 6:23).

The Hedonistic Imperative may be understood as a transhumanist goal to liberate people from the sensation of pain without overcoming the reality of suffering and death right away. As we have argued in chapter 3, it is not clear that eliminating the sensation of pain is beneficial. For Christians, sin is the real problem, but pains do not equal sins. Sin is tempting because sin often promises transient pleasure (Jas 1:14).

Christians hold that salvation leads to liberation from sin (Rom 6:14). The salvation of Jesus Christ tackles the root problem facing humankind. Some transhumanists do acknowledge the human propensity to do evil. For example, Simon Young takes the metaphor of “selfish genes” literally, supposing that virtues can be obtained through genetic modifications.¹⁶ Nevertheless, to think that sin can be artificially engineered away represents a major departure from the Christian doctrine of grace.¹⁷

Even if sin cannot be eliminated, some Christians might see marginal moral improvement as worthwhile if achieved through justifiable means. For example, Alan Weissenbacher agrees with Walker on the goal of moral engineering. He observes that if science could be applied to eliminate natural evils, it ought to be applied also to eliminate moral evils. Historical progress of pain relief achieved through social and environmental means should lead to optimism for employing biological means. However, Weissenbacher believes that the human brain provides enough neural plasticity that has not been exploited. Hence, he sees genetic modification for the sake of moral engineering

¹⁶ Simon Young, *Designer Evolution: A Transhumanist Manifesto* (Amherst, NY: Prometheus Books, 2006), 130–31, 171–72, 233–34.

¹⁷ Steve Fuller and Veronika Lipinska, “Transhumanism,” *Social Epistemology Review and Reply Collective* 3, no. 11 (2014): 25–29.

as a project for the more distant future. Instead, Weissenbacher advocates a brain virtue project (BVP), focusing on discovering the correlation between brain process and moral decision.¹⁸ He cites a 2015 study at UCLA which reduces a person's belief in God and other political beliefs by applying magnetic stimulation. The potential impact of such belief engineering calls for the legal protection of the rights to cognitive liberty, mental integrity, and psychological continuity. Weissenbacher sees a high probability of massive abuse by religious and governmental entities when belief-control technologies become widely available. According to Weissenbacher, the question is not whether virtuous behaviors can be engineered, but rather virtuous according to whom and what moral ideology.

Only Moral Behavior or Traits

While Braden Molhoek concedes that genetic engineering might be able to modify human disposition to moral behavior, he rejects the possibility of creating virtue with genetic modification.¹⁹ Following Reinhold Niebuhr, Molhoek recognizes the influence of biological and social nature on human behavior.²⁰ For example, he cites scientific evidence that correlates genetic makeup with traits of financial risk-taking, empathy quotient, and temperance through the regulation of dopamine and other chemical messengers of the neural system.²¹ However, he distinguishes between disposition and virtue. As beings endowed with freedom, human persons can choose

¹⁸ Alan Weissenbacher, "Defending Cognitive Liberty in an Age of Moral Engineering," *Theology and Science* 16, no. 3 (2018): 288–99.

¹⁹ Braden Molhoek, "Raising the Virtuous Bar: The Underlying Issues of Genetic Moral Enhancement," *Theology and Science* 16, no. 3 (2018): 279–87.

²⁰ Molhoek, "Raising the Virtuous Bar: The Underlying Issues of Genetic Moral Enhancement," 280.

²¹ Molhoek, "Raising the Virtuous Bar: The Underlying Issues of Genetic Moral Enhancement," 282–83. See also Catherine L. Carpenter et al., "Association of Dopamine D2 Receptor and Leptin Receptor Genes with Clinically Severe Obesity," *Obesity* 21, no. 9 (2013): E467–73.

against their natural dispositions because of their acquired or infused virtues. Although recognizing certain virtues to be natural, Aristotle sees virtues as mostly acquired over time through practice or repetition.²² Thomas Aquinas adds that virtues can be infused into individuals by God's grace.²³ Yet Molhoek insists that there is no evidence to date that acquired or infused virtues can be obtained by genetic modification.

Similar to Molhoek but seeing the glass as half full rather than half empty, Andrew Pinsent and Sean Biggins observe that besides the vaguely consonant goal of "transcendence," the Roman Catholics and the advocates of biotechnological virtue enhancement may share a common emphasis on the necessity of moral responsibility in the cultivation of virtue.²⁴ Biotechnological enhancement can only alter behavioral dispositions. It remains the responsibility of the free persons to exercise moral response before acquired virtues are cultivated in them.

Along a similar line, Lisa Fullam sees the possibility of modifying traits in human beings with genetic engineering, but she rejects the goals of engineering virtue and goodness.²⁵ Citing G. E. Moore and James Keenan, Fullam distinguishes between rightness and goodness.²⁶ Rightness is the objective observation of whether an action is consistent with the right moral reasoning. Goodness is a subjective moral effort motivated by love in seeking rightness. Genetic engineering might produce certain dispositions or appetites that lead to rightness. But following the conception of Karl

²² Aristotle, *Nicomachean Ethics*, trans. W. D. Ross (Kitchener: Batoche Books, 1999), 40.

²³ Molhoek, "Raising the Virtuous Bar: The Underlying Issues of Genetic Moral Enhancement," 281.

²⁴ Andrew Pinsent and Sean Biggins, "Catholic Perspectives on Human Biotechnological Enhancement," *Studies in Christian Ethics* 32, no. 2 (2019): 187–99.

²⁵ Lisa Fullam, "Genetically Engineered Traits Versus Virtuous Living," *Theology and Science* 16, no. 3 (2018): 319–29.

²⁶ G. E. Moore, *Principia Ethica* (Mineola, NY: Dover, 2004), 198, 226–27. James F. Keenan, *Goodness and Rightness in Thomas Aquinas's Summa Theologiae* (Washington, DC: Georgetown University Press, 1992), 3–6.

Rahner, Fullam insists that the perfection of virtue requires a fundamental restoration of a gracious and loving relationship with God. “Because we cannot engineer grace, our attempts to engineer goodness likewise cannot succeed.”²⁷

Only Enhancement, Never Holiness

Alison Benders also agrees that genetic moral enhancement is possible but rejects the possibility of engineered holiness. He observes that a genetic mutation was found among men that could lead to Monoamine Oxidase A (MAOA) deficiency, which has been linked to impaired impulse control, resulting in aggressive behavioral problems.²⁸ Hence, it is conceivable that a prenatal genetic intervention would reduce the harmful tendency of violence and results in moral enhancement.²⁹ However, using the five-level moral anthropology of Bernard Lonergan as his framework, Benders contends that an intervention like MAOA therapy can at most help people up to the fourth “reflective self-conscious level,” where “consciousness becomes conscience.” It cannot have any bearing on the fifth “loving” level, where people experience transcendence through love to achieve their full humanity.³⁰

Don’t Underestimate Fallenness!

Even if moral behavior could be engineered, will people choose to do that consistently? Ted Peters does not think so. Peters identifies five theological models of the

²⁷ Fullam, “Genetically Engineered Traits Versus Virtuous Living,” 326.

²⁸ Alison Benders, “Genetic Moral Enhancement? Yes. Holiness? No,” *Theology and Science* 16, no. 3 (2018): 308–18.

²⁹ For example, see Laura Bevilacqua and David Goldman, “Genetics of Impulsive Behaviour,” *Philosophical Transactions of the Royal Society B: Biological Sciences* 368, no. 1615 (2013). MAOA deficiency is linked to Brunner Syndrome. Y. Shi et al., “Brunner Syndrome Associated MAOA Dysfunction in Human Induced Dopaminergic Neurons Results in Dysregulated NMDAR Expression and Increased Network Activity,” August 21, 2019, <https://www.biorxiv.org/content/10.1101/741108v1>.

³⁰ Joseph Flanagan, *Quest for Self-Knowledge: An Essay in Lonergan's Philosophy* (Toronto: University of Toronto Press, 1997), 195.

imago Dei and regards two, the created co-creator and proleptic models, to be most open to the technological enhancement of the human body. The created co-creator model, introduced by Philip Hefner, sees humans as *homo Faber*, created with a vocation to create things. The proleptic model sees humanity today as a partial approximation of what humanity will become in the eschatological future. Assuming the two models, the aspiration to develop humanity today towards eschatological humanity would seem unsurprising. However, Peters observes that in a fallen world full of sinners, people will always have opposite aspirations. Human fallenness carries “the potential for self-destruction right along with potential for healing. Only God’s final act of redeeming grace will relieve us of such self-destruction.”³¹

Transhumanists seem rather naïve about human nature according to Peters. They seem to underestimate the human propensity to selfishly make what is neutral or even what is good into something chaotic and painful. They also see technological progress as an extension of biological evolution, assuming an inherent entelechy where better social ethics would emerge alongside biological evolution and technological progress. Peters is skeptical that positive progress is inevitable. He is also concerned that if such progress is assumed to be the necessary outcome of *laissez-faire* capitalism, the benefits will go to an investor class and prove detrimental to most in the wider society.³²

Peters distinguishes between two types of futurist thinking, *futurum* versus *adventus*. *Futurum* thinking assumes that progress comes incrementally in an organic process of growth. *Adventus* thinking anticipates the advent of the new. Most transhumanists seem to operate from *futurum* thinking. Transhumanists seem to see the

³¹ Ted Peters, “Imago Dei, DNA, and the Transhuman Way,” *Theology and Science* 16, no. 3 (2018): 353–62.

³² Ted Peters, “H-: Transhumanism and the Posthuman Future: Will Technological Progress Get Us There?” *Metanexus*, September 1, 2011, <https://www.metanexus.net/h-transhumanism-and-posthuman-future-will-technological-progress-get-us-there/>.

evolutionary process in both biology and technology as an inevitable complexification of structures, forms, and operations. Psychologically, they assume that human beings have an innate will to evolve for the sake of survival and well-being. Ethically, they see progress as resulting in liberation. Liberated from the enslavement of biological limits, immortal posthumans will conquer the galaxy by spreading conscious life everywhere. Peters sees the mood of transhumanism as aggressively Promethean, stealing resources from the gods so that they can take fate into their own hands.

Young believes that transhumanism will lead to a revolution of moral paradigm from Genethics to Nurethics. Genethics enslaves the human mind by selfish genes. Nurethics liberates the human mind by inhibiting the selfish instinct to pursue its own best interest.³³ Peters thinks Young is rather naïve in assuming that the liberation from self-centeredness is an inherent direction of biological or technological evolution. The assumption seems especially unrealistic if technological evolution is supposed to happen with the sponsorship of free-market capitalism, which defines rationality in terms of self-interest. Young's belief amounts to a Marxist claim that free-market capitalism inherently wants to destroy itself to make room for central planning socialism.

Peters sees the beginning of *futurum* in the futurology movement led by Alvin Toffler in the 1950s. Toffler and other futurists seek to control human destiny by understanding the present trends, identifying the alternative scenarios, and choosing the alternative future to actualize.³⁴ But even granting the paradigm of futurology, transhumanists should see that progress is not inevitable but is found in some of the alternatives. Progress is the result of the conscious acts of understanding, identifying, and deciding. If free-market capitalists are doing the picking, they will likely pick free-market capitalism.

³³ Young, *Designer Evolution*, 196–262.

³⁴ Alvin Toffler, *Future Shock* (New York: Bantam Books, 1970), 458–69.

Peters does not believe that free-market capitalism will define every aspect of the future. Technology imposes its constraints on the alternative future paths available. Technology also influences our mindset to favor certain values, such as power, control, and efficiency. Therefore, while altruism is far from a given, machine automation will grow in a technology-driven age. Rather than being more liberated, posthuman beings might become more like cyborgs. Following Jacques Ellul, Peters sees an inherent conflict between technology and nature. Technology has an inherent proclivity to destroy, eliminate, or subordinate the natural world.³⁵ Peters also agrees with David Tracy that technology is the product of the will to obtain domination, power, and control.³⁶

Peters recommends *adventus* thinking, which anticipates the advent of the new. Human history does not follow a mechanical principle that turns a random meaningless process into a trajectory of progress. God acts continually in history, both to judge and to renew. Often, God acts by inviting human participation. Peters agrees with Reinhold Niebuhr that human history is not unambiguously good. Human participation in history means there is always the potential to choose evil and chaos. As Niebuhr observes,

Christian is *Justus et peccator*, 'both sinner and righteous'; that history fulfills and negates the Kingdom of God; that grace is continuous with, and in contradiction to, nature; that Christ is what we ought to be and also what we cannot be; that the power of God is in us and that the power of God is against us in judgment and mercy; that all these affirmations which are but varied forms of the one central paradox of the relation of the Gospel to history must be applied to the experiences of life, from top to bottom.³⁷

The ambiguity of human history implies for Peters that society should proceed more cautiously. The more technologically advanced a civilization becomes, the more it seems capable of inventing more horrific ways to exalt itself and destroy its neighbors. If

³⁵ Jacques Ellul, *The Technological Society*, trans. John Wilkinson (New York: Vintage Books, 1964), 179.

³⁶ David Tracy, *The Analogical Imagination: Christian Theology and the Culture of Pluralism* (New York: Crossroad, 1981), 352.

³⁷ Reinhold Niebuhr, *The Nature and Destiny of Man: A Christian Interpretation* (New York: Charles Scribner's Sons, 1941), 2:240.

technological progress is indeed analogous to biological evolution as Darwinians understand it, the survival of the strong will come at the expense of the weak. That part is inherently evil. However, God will act in history because God wants to demonstrate His justice and mercy.

Biological Enhancement Unnecessary for *Theosis*

For transhumanists, to live forever requires one to become more than human, that is, to become a post-human. For Christians, to be born again into eternal life is the restoration of part of the original meaning of being human. Adam was given eternal life originally, but he lost that life because he sinned against God by eating the forbidden fruit (Gen 2:17). He was sinless originally. He became a slave to sin as a result of eating the forbidden fruit. To be free from the bondage of sin is to restore that original sinlessness. In contradistinction to transhumanists, Christians are “re-humanists.” The end of salvation is the restoration of people to become fully human, no more and no less.

The Christian theological tradition provides a certain conceptual space for transcendence based on human initiatives. A call to action has always been part of the Christian theological heritage, partly as a reaction against stoicism. Human initiatives find biblical expressions from the cultural mandate (Gen 1:28) to the Great Commission (Matt 28:16-20). For some Christians, to overcome the world is to subdue it. Christians could overcome the world because Christ has overcome it (John 16:33). In the devotional classic *The Imitation of Christ*, Thomas à Kempis emphasizes the inner life and is seen by some as advocating withdrawal from the world.³⁸ But even in withdrawal, such a spiritual transcendence could be described as based on human initiatives. If people are created in the image of God and Christ is the perfect image of God, then the imitation of Christ is what all human beings are meant to be doing. Spiritual transcendence, getting closer to

³⁸ Thomas à Kempis, *The Imitation of Christ*, trans. Aloysius Croft and Harold Bolton (Mineola, NY: Dover, 2004), 53–58, 169–79.

God, is a purpose of human life.

To be saved entails a new life. The new life has been seen as a journey of *theosis*. The journey is seen as a process of transcendence, which sounds like the aspiration of transhumanism.³⁹ The Greek word *theosis*, translated usually as “deification” or “divinization” in English, means becoming divine. Relatively few in the Western Christian tradition have used the phrase *theosis*. But *theosis* is a constituting principle of the Eastern Orthodox Church.⁴⁰ Instead of following the three-step division of Christian life as justification, sanctification, and glorification, Eastern Orthodox sees the Christian life as one integral process of an upward transcendence transforming oneself to the image and likeness of God. Instead of stressing negatively on the points of departure – the justification from legal transgression, sanctification from sinful nature, and glorification from the mortal body – *theosis* focuses positively on the destination, namely, Christ, the true image of God. And instead of limiting the pursuit of *theosis* through confessional sacraments, Eastern Orthodox also embraces meditations and other mystical spiritual disciplines.

The important question though is whether virtue enhancement by genetic engineering is possible, necessary, or helpful in the process of *theosis*.

Christ is Fully Human

It is helpful to draw an ontological distinction well-acknowledged by the early church fathers: *theosis* does not entail infusing divine substance into a human person; the goal of *theosis* is restoring human life according to *imago Dei*. Being made according to *imago Dei* is the very definition of being human. As Christ is the perfect *imago Dei*, the

³⁹ Todd T. W. Daly, “Chasing Methuselah: Transhumanism and Christian Theosis in Critical Perspective,” in *Transhumanism and Transcendence: Christian Hope in an Age of Technological Enhancement*, ed. Ronald Cole-Turner (Washington, DC: Georgetown University Press, 2011), 131–44.

⁴⁰ John F. Kilner, *Dignity and Destiny: Humanity in the Image of God* (Grand Rapids: W. B. Eerdmans, 2015), 85–133.

goal of *theosis* is to become Christ-like. As Myk Habets observes in the Reformed theology of T. F. Torrance,

As with much of Eastern Orthodox theology, for Torrance the goal of theosis is not to become “God” or to become “gods.” It is not in any literal sense a matter of transcending the confines of the human nature but is, rather, the process and means by which the human can achieve true human personhood. Theosis does not do away with our creatureliness; rather, it fulfills it. In similar vein the Eastern Orthodox theologian Staniloae suggests that theosis cannot be taken literally. One cannot literally become God since that would be as absurd as if we were to state that God is a creature.⁴¹

Moreover, the goal of becoming Christ-like in *theosis* does not entail substantively becoming Christ himself. Rather, Christ-likeness is achieved by seeing the world through Christ’s eyes and by partaking in the servanthood of Christ. It is achieved by assuming the worldview of Christ, seeing the world from the perspective of one nailed on the Cross (Phil 2:5-11). In other words, *theosis* involves a worldview revolution, becoming God-like by becoming Christ-like as a human being. Therefore, *theosis* is just another way to explain re-humanization.

Although human beings are made in the image of God, human beings cannot become God. Christ is God. Christ is the Word of God. Christ is the true image of God. Human beings are not saved *by* becoming God. They are saved *to* reflect the image and likeness of God. Some scholars have highlighted this difference by distinguishing between the fact that Adam was made *according to imago Dei* while Christ *is* the *imago Dei*. Christ alone can personally reveal God, while human beings exist in a relationship with the Christological revelation. According to this distinction, *imago Dei* itself is not broken because of the Fall. What Adam broke was the “made-according-to” relationship with *imago Dei*. To be born human again is to have that relationship restored. To be human is to become Christ-like. But to become Christ-like does not entail becoming Christ, only to have the proper relationship restored with Christ so that one may know

⁴¹ Myk Habets, “Reforming Theōsis,” in *Theōsis: Deification in Christian Theology* (Eugene, OR: Pickwick, 2006), 161.

Christ and to be known by Christ through an intimate relationship akin to marriage.⁴²

Theosis Is through Christ

Grant Macaskill sees playing God as categorically sinful because it is a temptation to achieve godlikeness without dependency on God. The tower of Babel (Gen 11:1-9) illustrates the denial of dependency on God and the rejection of the cultural mandate to fill the earth. However, Macaskill recognizes that technological emulations of divine creativity are often “creaturely participation in the community of creation.” Healing activity can be both God acting to recreate the damaged creation and an expression of care. Concerning biotechnological enhancement, Macaskill sees the defining moral question to be whether a specific enhancement is reflective of divine values manifested in creation. If it is, the innovation can be interpreted as God working providentially through human agents to “manifest, share and replicate that goodness in their relationships with the community of creation.” However, more relevant to the point of *theosis*, Macaskill does not describe *theosis* as the acquisition of virtues, but rather, participation in the glory of Jesus Christ. A Christian conception of *theosis* is not the *apotheosis* of humankind into an angelic order. Neither is it merely the recovery of glory already in Adam, which Macaskill dismisses as Adam Christology. Rather, it is the participation of Christ’s work through Christ, with Christ, and in Christ.⁴³

Dangers of Paradise Engineering

Brian Patrick Green refutes four strawman claims made by some transhumanists against Roman Catholicism and instead identifies four real points of tensions. Green contends that the Roman Catholic Church does not (1) oppose life

⁴² Kilner, *Dignity and Destiny*, 52–82.

⁴³ Grant Macaskill, “Playing God or Participating in God? What Considerations Might the New Testament Bring to the Ethics of the Biotechnological Future?” *Studies in Christian Ethics* 32, no. 2 (2019): 164.

extension materially, (2) oppose life extension conceptually, (3) oppose genetic manipulation for the sake of health, and (4) oppose letting people die in hospitals. The Catholic ethical vision of human life, shared by other Christian traditions, does not preclude the application of life extension technology to anyone so long as it is not harmful to other people. However, Green does see theological incompatibilities between Roman Catholicism and transhumanism in their core tenets. Catholics believe that (1) material immortality sought by some transhumanists is highly improbable, (2) the pursuit of God-like omnipotence is impossible, (3) when longevity and intelligence enhancement technologies emerge, social inequality could increase due to unequal access, and (4) paradise engineering on Earth is plagued with dangers. Genetic virtue engineering is a form of paradise engineering.⁴⁴

Co-Creators Accountable to the Creator

Philip Hefner distinguishes between two forms of transhumanism, upper-case transhumanism (UCTH) and lower-case transhumanism (LCTH). UCTH is the dream of the most radical transhumanists. UCTH is about altering human nature technologically so that human beings can achieve immortality and omniscience without divine help. UCTH is, for example, what Green views to be in deep conflict with Catholicism. Hefner is less concerned about UCTH than its lower-case form, the LCTH that speaks in the softer tones of Barbara Walters, who hosted for example a TV special “Live to be 150.” LCTH advocates do not call themselves transhumanists. But using Walters as a symbol, Hefner sees them as sharing the same conviction as UCTH: “the use of new sciences and technologies to enhance human mental and physical abilities and aptitudes.” In Hefner’s estimation, LCTH is central to American culture today. LCTH reaches far beyond medical research and practice. Hefner characterizes LCTH by two fundamental beliefs.

⁴⁴ Brian Patrick Green, “Transhumanism and Roman Catholicism: Imagined and Real Tensions,” *Theology and Science* 13, no. 2 (2015): 187–201.

First, “it is natural and good to enhance human mental and physical abilities,” and to “ameliorate undesirable aspects of the human condition.” Second, “we need not accept as our destiny the human nature—the body and psyche—with which we grew in our mother’s womb and which we brought with us as we emerged from that womb.”⁴⁵

Hefner places the concept of co-creator within a nexus of the doctrines of creation, the image of God, sin, grace, and final consummation.⁴⁶ Observing that there are many ways to interpret the notion of the image of God, Hefner proposes an interpretation of his own: human beings are expressions of the purposes of God inside of the creation. Human beings express God’s creative purpose by serving as co-creators. Concerning LCTH, he sees the essential question as what constitutes “inviolable and or normative in human nature.” Hefner suggests that human nature is violated “when we obliterate or no longer acknowledge the sense that we are accountable to something larger than ourselves and larger than our times.” Co-creators should never forget they are themselves accountable to their Maker. Co-creators should proceed with the goal of expressing their Maker’s purpose, expressing in their co-creations their finitude, their sinfulness, and their dependence on the grace and mercy of God.⁴⁷

Biological Enhancement Not Mandated

Gerald P. McKenny observes a certain malleability and indeterminacy in the human biological nature that biotechnology may exploit to change human traits without becoming disrespectful of God, but he does not see any biblical mandate to alter human

⁴⁵ Philip Hefner, “The Animal that Aspires to be an Angel: The Challenge of Transhumanism,” *Dialog: A Journal of Theology* 48, no. 2 (2009): 159.

⁴⁶ Philip Hefner, “Biocultural Evolution and the Created Co-Creator,” in *Science and Theology: The New Consonance*, ed. Ted Peters (Boulder: Westview Press, 1998), 174–88.

⁴⁷ Hefner, “The Animal that Aspires to be an Angel: The Challenge of Transhumanism,” 165.

biological nature.⁴⁸ Agreeing with Oliver O'Donovan, he insists that God's creation must be respected as a coherent composition and cannot be treated as raw material totally up to human fashioning.⁴⁹ He agrees also with International Theological Commission's 2004 statement "Communion and Stewardship" that the human body should not be viewed merely as an instrument with a purpose completely up to a person's choosing.⁵⁰ However, he does not believe that all biological enhancements should therefore be prohibited. Some natural capabilities such as cognition, perception, emotion, strength, agility, and longevity can conceivably be improved quantitatively or qualitatively without involving any ungodly purpose.

Still, McKenny cautions against seeing malleability and indeterminacy as a divine vocation to engineer the eschatological perfection of human biology. He disagrees with Hefner and James C. Peterson in their theological justification for biological engineering of the eschatological perfection.⁵¹ McKenny insists that we do not know what the glorified body looks like. And even for those attributes such as immortality that are promised, we cannot know if they could be technologically producible. He also disagrees with Karl Rahner, who seems to reason that the malleability and indeterminacy of human nature justify its open-ended improvement as an exercise of human freedom.⁵²

⁴⁸ Gerald P. McKenny, "Human Nature and Biotechnological Enhancement: Some Theological Considerations," *Studies in Christian Ethics* 32, no. 2 (2019): 240.

⁴⁹ Oliver O'Donovan, *Resurrection and Moral Order: An Outline of Evangelical Ethics*, 2nd ed. (Grand Rapids: W. B. Eerdmans, 1994), 31, 35.

⁵⁰ International Theological Commission, "Communion and Stewardship: Human Persons Created in the Image of God," July 23, 2004, http://www.vatican.va/roman_curia/congregations/cfaith/cti_documents/rc_con_cfaith_doc_20040723_communion-stewardship_en.html.

⁵¹ McKenny, "Human Nature and Biotechnological Enhancement: Some Theological Considerations," 237.

⁵² Karl Rahner, "The Problem of Genetic Manipulation," *Theological Investigations* 9 (1972): 233.

Theosis Is Kenotic and Communal

Ronald Cole-Turner observes that the biblical and historical view of *theosis* is kenotic, communal, and cosmic. Therefore, *theosis* contrasts sharply with transhumanism, which is often characterized by self-aggrandizement, individualism, and anthropocentrism. In the Old Testament, *theosis* is grounded by the creation of humankind according to the image of God (Gen 1:26-27). But the original sin shows that it is possible to pursue *theosis* the wrong way (Gen 3:3-4).⁵³

Cole-Turner observes that both Psalm 8 and 82 describe humans as “gods” (Ps 82:6 cf. John 10:33-36). In the New Testament, Jesus spoke of believers as “children of God” (Matt 5:9) and commanded them to “be perfect, as your heavenly Father is perfect” (Matt 5:48). Similarly, Paul exhorted Christians to put away the “old self” and be renewed with a “new self,” which is “created according to the likeness of God in true righteousness and holiness” (Eph 4:22-24). Christians must be “renewed in knowledge according to the image of its creator” (Col 3:9) by having “the same attitude that Christ Jesus had,” which is to take on the image of a servant (Phil 2:5). Athanasius famously wrote, “the Son of God became man so that we might become God.”⁵⁴ As Michael J. Gorman explains, “Kenosis is theosis... To be like Christ crucified is to be both most godly and most human. Christification is divinization, and divinization is humanization.”⁵⁵

Cole-Turner believes that when the biblical and historical emphasis of *theosis* is restored theologically and spiritually, “technology will take care of itself.” Christians will know when to use enhancement technology because ultimately “it is not about their technology, but their Christianity.” All things are lawful if “you eat or drink, or whatever

⁵³ Ronald Cole-Turner, “Theosis and Human Enhancement,” *Theology and Science* 16, no. 3 (2018): 330–42.

⁵⁴ Athanasius, *On the Incarnation*, 54:3.

⁵⁵ Michael J. Gorman, *Inhabiting the Cruciform God: Kenosis, Justification, and Theosis in Paul's Narrative Soteriology* (Grand Rapids: W. B. Eerdmans, 2009), 37.

you do, do everything for the glory of God” (1 Cor 10:31).⁵⁶

Neither Back to Eden Nor to the Cross

Todd T. W. Daly sets up the perspectives of Athanasius and Karl Barth regarding the human body as two bookends of the Christian understanding. Daly finds the transhumanist view stands opposed to both ends. In Athanasius, Daly sees an emphasis on asceticism to restore the body and soul to be like Adam before he sinned. The disobedient eating of forbidden fruit was an illustration of gluttony. Hence, fasting is an obedient act that leads back to the tree of life. Athanasius was especially impressed by Saint Anthony who lived to 105 in the harsh condition of the desert.⁵⁷ In Barth, Daly sees an emphasis on the Cross as the point where God fully identifies with the human being. Paradoxically, death becomes an obedient act of Christ that leads back to life. In contrast to both, Daly sees in transhumanism a confusion between the tree of knowledge and the tree of life. Instead of seeking to reduce the bondage to the flesh, transhumanists instrumentalize the human body to play God.⁵⁸

***Theosis* Requires Human Limitations**

Eugenia Torrance observes that Maximus the Confessor sees *theosis* as transcending from the original human vocation given to Adam into a new and higher vocation of becoming Christ-like. The emphasis of “going out of oneself” to participate in the work of God as “bearing uncanny resemblance with transhumanist discourse.” But unlike the transhumanists who lament the human biological limitations, Maximus insists that *theosis* is achieved in this age by living under the human limitation that we each

⁵⁶ Cole-Turner, “Theosis and Human Enhancement,” 341.

⁵⁷ Daly, “Chasing Methuselah: Transhumanism and Christian Theosis in Critical Perspective,” 135–37.

⁵⁸ Daly, “Chasing Methuselah: Transhumanism and Christian Theosis in Critical Perspective,” 137–39.

share with Christ, with the material creation, and with each other as neighbors. In other words, even if *theosis* might require a transformed biological and functional image of God in the age to come, the same biological nature with all its limitations is required in this age.⁵⁹

***Theosis* Requires Humility**

Roshnee Ossewarde-Lowtoo suggests that the similarities drawn between transhumanism and the Christian concept of *theosis* seem to mostly rest on God's incommunicable attributes: God's power, sovereignty, and self-sufficiency.⁶⁰ As Celia E. Deane-Drummond has observed, transhumanists tend to emphasize the mental powers of willing, choosing, and understanding.⁶¹ Their dissimilarities become apparent when other attributes of God such as righteousness, love, and self-giving are in view. However, the imitation of Christ for such communicable attributes is the traditionally emphasized goal of *theosis*. The conflation of transhumanism and *theosis* could lead to a skewed view of God where God is seen exclusively in terms of capacity, and not as a humble servant. It also renders unintelligible the beatitudes where the kingdom of heaven is said to belong to the poor in spirit and the pure in heart.

Mangodhood Is Not Godmanhood

Brandon Gallaher, writing from an Eastern Orthodox perspective, decries transhumanism as a Satanic religion of "Mangodhood" (*chelovekobozhie*) characterized by human self-worship and self-deification. That was the original temptation retold in

⁵⁹ Eugenia Torrance, "Acquiring Incorruption: Maximian Theosis and Scientific Transhumanism," *Studies in Christian Ethics* 32, no. 2 (2019): 177–86.

⁶⁰ Roshnee Ossewarde-Lowtoo, "Theosis contra Transhumanism," (paper presented at the Transforming Religion Conference, Münster, Germany, 2014), 1–5.

⁶¹ Celia E. Deane-Drummond, "Taking Leave of the Animal? The Theological and Ethical Implications of Transhuman Projects," in *Transhumanism and Transcendence*, ed. Ronald Cole-Turner (Washington, DC: Georgetown University Press, 2011), 115–16.

Genesis 3, where humans were tempted to become godlike by themselves. *Theosis*, in contrast, is made possible by the “Godmanhood” (*bogochelovechestvo*) of Jesus Christ. It begins with gratitude for God’s gift of creation of divine presence and ends with gratitude for Jesus Christ, life in all its fulness (John 10:10).⁶² As Maximus explained, God brought creatures into being so that they might participate in God. Therefore, Gallaher insists that *theosis* does not make human gods by nature, as the uncreated and the created are forever different. *Theosis* is through participating in the life, death, and resurrection of the incarnated Jesus Christ.⁶³

What Role Does God Play in *Theosis*?

Christians believe that Jesus Christ alone holds the power to save sinners from eternal destruction. Because of the Fall, every descendant of Adam was naturally born a sinner. To be saved as a sinner entails being spiritually regenerated by God (Rom 9:16; Eph 2:1-5; Col 2:13). Whether we think of salvation as the pre-requisite or the first step of *theosis*, salvation is impossible apart from the active involvement of God. And God is actively involved in all stages of *theosis*.

While God works through human virtue, God is not limited by it. God can accomplish great things through the meek and the poor. God can empower people with no natural talents to work wonders and perform miracles. The sovereignty of God to exercise supernatural power implies that enhancing human virtue as imagined by Walker is not necessarily a top priority in God’s plan at every stage.

Maintenance of Covenantal Relationship

God participates in a covenantal relationship with humankind and the covenant

⁶² Brandon Gallaher, “Godmanhood vs Mangodhood: An Eastern Orthodox Response to Transhumanism,” *Studies in Christian Ethics* 32, no. 2 (2019): 200–215.

⁶³ Gallaher, “Godmanhood vs Mangodhood: An Eastern Orthodox Response to Transhumanism,” 208.

is the basis of salvation. Philip G. Zeigler sees human beings as existing in two dimensions of tension and hence, a sound understanding of *theosis* must take full account of such tensions in the background. The first tension is found in the dimension of universal-vs-particular. God established universal covenants with mediators, notably Adam and Christ, so that individual persons may participate by exercising their decisional capacity. The second tension is found in the dimension of the sinful-vs-reconciled. Human beings are sinful creatures and the unfaithful party in the old covenants. At the same time, human beings have the potential to be reconciled with God by participating in the new covenant.⁶⁴

The Revelation of the Truth

Through the covenantal relationship, God reveals the truth to humankind. Jonathan Jong disagrees with natural law theorists who see virtue and its cultivation as a reality that can be characterized naturalistically. He faults the natural law theorists for making virtue a scientific phenomenon and thereby delegating the responsibility of defining virtue to scientists. Jong insists that virtue is a normative notion that requires philosophical and theological definitions at a fundamental level. To define virtue, natural law theorists first need an account of what human nature is. But it is not clear that the question can be reduced to biological characterization, let alone genetic descriptions. Jong cites sex as comprising a complex biological phenomenon to illustrate the inherent difficulty of defining human nature, and hence virtuous living, purely in terms of biological phenomena and without the insights offered by philosophers and theologians.⁶⁵

⁶⁴ Philip G. Zeigler, “‘Those He Also Glorified’: Some Reformed Perspectives on Human Nature and Destiny,” *Studies in Christian Ethics* 32, no. 2 (2019): 165–76.

⁶⁵ Jonathan Jong, “On Biotechnology, Theology, and the Human Sciences,” *Theology and Science* 16, no. 3 (2018): 349–50.

Salvation by Grace through Faith

Christians believe that salvation is a gift (Acts 2:38; Rom 3:23-24; Rom 5:15-17; Rom 11:29; Eph 2:8-9). Just as a naturally born human being comes into the world out of the will of the human parents, a spiritually born-again person receives salvation out of the will of God (John 1:13). A spiritually born-again person is born “from the above” (John 3:3, 7).⁶⁶ Salvation is offered exclusively by Jesus Christ (Acts 4:12). Jesus Christ brings about salvation through his work on the Cross (Eph 1:7). A person is not saved because of good works (Rom 3:10-12). Rather, a person is born from the above into eternal life through believing in Jesus Christ (John 3:15, 16, 36).

Transhumanists seek to artificially engineer their immortality through radical life enhancement or non-biological existence. Instead of seeking salvation from God, transhumanists put their trust in human ingenuity. To be transhuman is to bootstrap oneself up “from below,” not through rebirth, but rejuvenation or reincarnation. A Christian transhumanist's attempt to seek *theosis* without God is to fail to acknowledge the necessary role of God in the process.

Fathering New Humanity from the Above

In contradistinction to transhumanists, Christians are “re-humanists.” The end of salvation is the restoration of people to become fully human, no more and no less. For transhumanists, to live forever requires one to become more than human, that is, to become a post-human. For Christians, to be born again into eternal life is the restoration of part of the original meaning of being human. Adam was given eternal life originally. He lost that life because he sinned against God by eating the forbidden fruit (Gen 2:17). He was sinless originally. He became a slave to sin as a result of eating the forbidden fruit. To be free from the bondage of sin is to restore that original sinlessness.

⁶⁶ Peter Toon, *Born Again: A Biblical and Theological Study of Regeneration* (Grand Rapids: Baker Book House, 1987), 13–15, 27–36.

The Fall stemmed from disbelief towards the word of God. Once Adam inflicted the humanly irreparable damage of death to himself, he also inflicts humanly irreparable damage to all his progenies. His disbelief and death are inherited by all.

Because death is humanly irreparable, salvation can only come from God through a new life. Only human beings are promised the opportunity to be born again into such a new eternal life. But as the damage came from disbelief, the restoration of life comes from faith. And only human beings can have such saving faith. A machine or a non-human animal could not be born again. A rock could not believe in Jesus Christ. A dog could never have eternal life like a human being. Transhumanists cannot bring about salvation by making a human into a non-human. What they seek may inflict further irreparable damage to humankind beyond the Fall.

Sustaining and Cultivating Virtue

God empowers humankind spiritually. Gayle E. Woloschak is skeptical that genetic engineering can help much in producing virtuous living or aiding *theosis*. She sees other factors affecting the cultivation of virtue that seem much more relevant. First, environmental factors may impact behavioral traits. Culture and education influence what people view as virtuous living. Second, the human capacity to make free moral choices includes the cultivation of virtue. It is not obvious that genetic modification will or could alter this freedom. Third, moral character is sustained by the grace of God. While it is conceivable that such divine grace can be endowed upon a person genetically, God could impart such grace more with the power of the Spirit.⁶⁷

An Alternative: Test Anthropodicy

Arvin M. Gouw recognizes both philosophical and theological difficulties in

⁶⁷ Gayle E. Woloschak, "Can We Genetically Engineer Virtue and Deification?" *Theology and Science* 16, no. 3 (2018): 300–307.

Walker's neo-Irenaean theodicy. Philosophically, Gouw sees an inherent incompatibility between free will and the gradient model of virtue postulated by Walker. Gouw contends that there should not be a ceiling of moral excellence achievable by a class of truly free beings. The existence of a moral ceiling is an indication that they are not completely free. Gouw characterizes Walker as attempting a neo-Pelagian theodicy rather than a neo-Irenaean theodicy.⁶⁸

The list of theological objections identified in the previous sections should make it clear that Irenaean or not, the theological assumptions underlying Walker's proposal diminished the work of salvation as performed by God. The philosophical problem concerning free will which Gouw recognizes in Walker's proposal is exactly the heart of the Pelagian heresy. If human free will is not impacted by sin, it would indeed be possible for human beings to live a completely virtuous life. The Cross would not be necessary.

Nevertheless, Walker shines a helpful spotlight on the limitation of the free will defense (FWD) and the soul-making defense (SMD) as theodicy. Why would God give freedom to angelic beings and people, knowing that they might misuse their freedom, which is not what God desires? FWD says there is an inherent greater good in free will. A common rebuttal against FWD is called the evidential argument. What if most people misuse their free will to do evil? Why isn't it possible that the accumulated evils due to misuse of freedom end up outweighing the greater good of free will? That seems to be the case in this world. SMD sidesteps the FWD difficulty by resting the hope in the long-term benefits. Although the world suffers now, the souls of people are made more mature in the process. But optimism is where SMD tends to run into a dogmatic problem with the concept of hell. Why shouldn't every soul be eventually made mature?

⁶⁸ Arvin M. Gouw, "Genetic Virtue Program: An Unfeasible Neo-Pelagian Theodicy?" *Theology and Science* 16, no. 3 (2018): 273–78.

Why would there be a need for hell? Why are many called but few chosen (Matt 22:14)? While both FWD and SMD have strengths as defense, both leave some evils unexplained when the full spectrum of biblical-theological doctrines is in view.

A Taxonomy of Anthropodicy

Henri Blocher has helpfully classified theodicy into three types: pessimistic, dualistic, and optimistic.⁶⁹ I prefer the word “ambiguous” over dualistic and I would suggest the word “ambiguous” is a better translation of what Blocher means.

Anthropodicy could also be similarly classified into pessimistic, ambiguous, and optimistic. We can group the different transhumanist approaches to anthropodicy into three types.

As an anthropodicy, transhumanism is most pessimistic in its libertarian egotistic strand because it reduces the purpose of life to transient pleasure. Nevertheless, there is an inherent contradiction. If all I care about is my pleasure, why would I care if a posthuman being existing a century from now would be happy? I would be long gone. The anthropodicy of libertarian transhumanism fails where existentialism has failed. Like existentialism, egotistic transhumanism leads to nihilism. Hughes suggests that the Hedonistic Imperative shares some similarities with the notion of the *bodhisattva* in Mahayana Buddhism. Happiness is subjective and is achievable by dissolving evil and suffering inside of the human mind. But his suggestion only highlights the annihilation of any objective meaning of life when the pursuit of subjective happiness is the only goal of life. Hughes insists that transhumanism need not be pessimistic and nihilistic because transhumanism need not be egotistic. For example, transhumanism could embrace the

⁶⁹ Henri Blocher, *Evil and the Cross*, trans. David G. Preston (Downers Grove, IL: InterVarsity Press, 1994), 12–18.

concept of karma to hold people morally responsible for their actions.⁷⁰ Alternatively, some transhumanists might embrace a Manichean theodicy that sees the universe as a battlefield between forces of good and evil.⁷¹ These dualist worldviews see personal happiness only as an intermediate objective. The bigger prize comes for the collective at the end.

As an anthropodicy, transhumanism is ambiguous in its social democratic strand as exemplified by the political advocacy of Hughes and Bostrom. Individual life has significance because it becomes a part of a greater purpose of the evolution of a living species towards transcendence. To foster an ideological alliance with the naturalists, Bostrom contends that transcendence is the best way to guarantee the survival of the species.⁷² Similarly, Brent P. Waters observes that social-democratic transhumanism finds long-lasting value in historicism.⁷³ History has significance if and only if people live to read about history. Bostrom belongs to a long tradition of humanism that sees life's purpose of individuals in terms of its historical significance.⁷⁴

As an anthropodicy, transhumanism is most optimistic in its cosmic strand as exemplified by Ray Kurzweil, Ted Chu, and the Russian cosmism. The cosmic transhumanists take seriously the idea that human is only a transient step in the progressive divinization of nature. Even the extinction of humanity could be constructive because it might be necessary for the universe in retrospect. In the grand story of

⁷⁰ James J. Hughes, "The Compatibility of Religious and Transhumanist Views of Metaphysics, Suffering, Virtue and Transcendence in an Enhanced Future," *IEET*, May 8, 2007, <https://ieet.org/index.php/IEET2/more/hughes20070401>.

⁷¹ Walker, "Genetic Engineering, Virtue-First Enhancement, and Deification in Neo-Irenaean Theodicy," 251-272.

⁷² Nick Bostrom, "Transhumanist Values," *Journal of Philosophical Research* 30, no. Supplement (2005): 9-12.

⁷³ Brent P. Waters, *From Human to Posthuman: Christian Theology and Technology in a Postmodern World* (Burlington, VT: Ashgate, 2006), 22-31.

⁷⁴ Nick Bostrom, *Anthropic Bias: Observation Selection Effects in Science and Philosophy* (New York: Routledge, 2002), 46-50.

universal transcendence and nature struggling to become divine, good could simply be what is. Cosmists are not stoic because they do not object to confronting evils. They just do not believe that one could ever be doing anything evil in the ultimate sense. If you want to fight evil, fight by all means! Win or lose, you can do no wrong.

Cosmic transhumanism presents a deflationary anthropodicy because it dismisses the value of anthropodicy in the grand scheme of things. All they need is a cosmodicy based on optimism. If humanity is gone, so be it. Cosmism holds an unfalsifiable belief that this world is the best of all possible worlds because being the only world, this world must be the best. In the final analysis, cosmic transhumanism is either pantheistic or panentheistic, neither of which is compatible with Christian theism. Ben Goertzel declares in the *Cosmist Manifesto*, “Whether or not transhuman minds now exist in the universe, or have existed in the universe in the past, current evidence suggests it will be possible to create them – in effect to build gods.”⁷⁵

Life Is a Trial

An alternative conception of the problem of evil takes as a presumption that humanity is being tested and life is a trial. As we have considered in chapter 3, the test hypothesis might be rejected out of hand by some as unverifiable. However, in a biblical worldview, we are not bounded by any reductionist “autonomous reason.” A hypothesis can be validated by biblical revelation alone.

A partial explanation for the existence of evils is inherent in the test hypothesis because adversity could be part of a test to make the test meaningful. A substantial test of endurance requires pains. A multiple-choice test is meaningful only if the wrong alternatives are given. The presumption itself yields only a partial answer to evils because different worldviews must still explain who put humanity on trial and why humanity is

⁷⁵ Ben Goertzel, *A Cosmist Manifesto: Practical Philosophy for the Posthuman Age* (Lexington, KY: Humanity+ Press, 2010), 29.

put on trial. For example, Christians would need to answer why God put humanity on trial. Christians would also need to answer why the perfect God would allow humanity to continue to exist given that humanity has been failing the test so badly.

A value of the presumption of human trial derives from its commensurability across ancient and modern worldviews. The metaphor that humanity is on trial does find occasional expressions in contemporary culture, even though mostly just as thought experiments. For example, a panel of 20 Nobel Laureates enacted in May 2011 a mock trial against humanity on behalf of the Planet Earth. They produced a Stockholm Memorandum suggesting ways for humanity to restore its proper sustainable relationship with the environment.⁷⁶ The idea that humanity needs to own up to its failures and justifies its continued existence is also a theme found in science fiction. In the series premiere of *Star Trek: The Next Generation*, the alien entity Q put Captain Picard and the Enterprise crew on trial, charging that humanity is a dangerous race and should be destroyed.⁷⁷ More recently, in the movie *Noah*, directed by Darren Aronofsky, God was interpreted as having decreed that the whole human race would be wiped out by the flood for they had ruined the planet. In his failure to execute God's instruction to terminate the human line, Noah passed a higher test and saved mankind by revealing the authentic human capacity to have mercy. As an atheist, Aronofsky could be interpreted as suggesting an anthropodicy: that in his *Felix culpa* against Nature, Man set himself free! These examples are contemporary attempts to make a case for humanity while acknowledging the evils that humanity has inflicted upon the world. These examples are signs of the time: people no longer even blame the gods because they live in a godless

⁷⁶ Geisler Stockholm Resilience Center, "The Stockholm Memorandum," May 31, 2011, <https://www.stockholmresilience.org/news--events/general-news/2011-05-31-the-stockholm-memorandum.html>.

⁷⁷ Corey Allen, dir. *Star Trek: The Next Generation – Encounter at Farpoint, Part 1*. Paramount Television, September 28, 1987.

world; they can only blame each other. Nevertheless, the idea that humanity is on trial is compatible with Christian theology, too. A search on “Humanity on Trial” as a sermon title would reveal numerous results.⁷⁸

Franklin Perkins draws a parallel with classical Chinese philosophy, portraying various ancient Chinese philosophies as explanations of human evils within a pantheistic and anthropocentric worldview.⁷⁹ Confucianism regards the trials in life as a gift from heaven, preparing men for great works. Most Chinese know the Confucian proverb, “The gem cannot be polished without friction, nor man perfected without trial.”⁸⁰ Mencius claims,

Thus, when Heaven is about to confer a great office on any man, it first exercises his mind with suffering and his sinews and bones with toil. It exposes his body to hunger and subjects him to extreme poverty. It confounds his undertakings. By all these methods it stimulates his mind, hardens his nature, and supplies his incompetencies.⁸¹

Hinduism views suffering (*dukkha*) as an integral and inescapable part of life, arisen from *samsara*, the cycle of births, aging, sickness, and deaths. Liberation is found in freedom (*Mukti*) when one learns to endure suffering from detachment and acceptance. Trials in life function as negative reinforcement, helping people reach the goal of *moksha*, letting go.⁸²

Although they differ in their ultimate assessment of reality, with the ancient East Asians sounding more optimistic while the South Asians more pessimistic, both

⁷⁸ John MacArthur, “Humanity on Trial,” (sermon manuscript), March 15, 2009, <http://www.gty.org/resources/sermons/80-343/humanity-on-trial>.

⁷⁹ Franklin Perkins, *Heaven and Earth Are Not Humane: The Problem of Evil in Classical Chinese Philosophy* (Bloomington: Indiana University Press, 2014), 35–44.

⁸⁰ Wing-tsit Chan, *A Source Book in Chinese Philosophy* (Princeton, NJ: Princeton University Press, 1969), 78.

⁸¹ Chan, *A Source Book in Chinese Philosophy*, 78.

⁸² Christopher Isherwood, *The Song of God, Bhagavad Gita* (Hollywood: Vedanta Press, 1987), 60.

peoples see the trials in life as providing the occasions for transformation.

While the ancient Greeks had a dualistic assessment of reality that was optimistic towards the eternal-spiritual and pessimistic towards the temporal-material, they too recognized the cathartic value of the afflictions in life. They even find sorrow and fear capable of partial dissemination through retelling tragic heroic legends. As Aristotle observes in *Poetics*,

Tragedy, then, is an imitation of an action that is serious, complete, and of a certain magnitude; in language embellished with each kind of artistic ornament, the several kinds being found in separate parts of the play; in the form of action, not of narrative; through pity and fear effecting the proper purgation [*catharsis*] of these emotions.⁸³

Similarly, the Roman Stoic Seneca saw trials in life as the means to test and grow virtues.⁸⁴

Jeremy Koons observes that a testing theodicy evidently “appears numerous times in the scriptures of all three Abrahamic faiths.” He observes that the idea of God testing people is commonly found in Judaism, Christianity, and Islam. But then he argues that such theodicy “fails to adequately account for the existence of natural evil.”⁸⁵ It seems that Koons overreaches in his conclusion because he reads modern theodicy into the ancient texts, a procedure Terrence W. Tilley has warned against.⁸⁶ Contrary to Koon’s eisegesis, the view of life as a test was not necessarily meant to be part of a defense of the justice of God in the ancient texts. But Koons is certainly correct to speak of a commensurable view of life as a test across ancient worldviews. While different ancient worldviews share this common idea of life as a test, they differ in defining the

⁸³ Aristotle, *Poetics*, Sec.1, Part VI.

⁸⁴ Seneca, *On Providence*, iv.4–6, x.4–xi.2.

⁸⁵ Jeremy Koons, “Natural Evil as a Test of Faith in the Abrahamic Traditions,” *Sophia* no. 49 (2010): 15–28.

⁸⁶ Terrence W. Tilley, *The Evils of Theodicy* (Washington, DC: Georgetown University Press, 1991), 2–3, 10–11, 126, 114, 142.

objective of the test. For example, the Hindu worldview sees the test of life as leading to a renunciation of life.⁸⁷ In contrast, Confucians see the test of life as a heavenly mandate to cultivate an optimistic outlook of human nature, despite the mystery of human evils.⁸⁸

As we have seen from the discussion on Webb and Bostrom, the test hypothesis can be coherent and yet unfalsifiable. That could also be the strength of fashioning an anthropodicy through a test hypothesis. If we grant the conceivability of the test hypothesis, the pertinent question for the subject of transhumanism would then be whether radically modifying human biological nature helps humanity pass the test or instead gets humanity a failing grade for cheating in the test. The answer would then depend on what the test is about. Different worldviews would give different answers.

Within the biblical worldview, the test hypothesis is a partial anthropodicy that works in conjunction with a Christian theology to justify FWD and SMD as providing different goods. For example, one might suggest that:

- (1) God sees it as good to reveal his love to those chosen as his children.
- (2) Tests of faith in this life are painful for God and his children.
- (3) God's children are shown to be loved by God when they overcome the tests of faith in this life with God's help.

Instead of locating the greater good in a capacity (e.g. free will) or a state of being (e.g. soul made), the Apostle Paul suggests a greater good in the revelation of a loving relationship. "For the creation waits with eager longing for the revealing of the sons of God" (Rom 8:19). That is the reason "the creation was subjected to futility, not willingly, but because of him who subjected it, in hope that the creation itself will be set free from its bondage to corruption and obtain the freedom of the glory of the children of

⁸⁷ David R. Kinsley, *Hinduism: A Cultural Perspective*, 2nd ed. (Englewood Cliffs, NJ: Prentice Hall, 1993), 104–5.

⁸⁸ Xinzhong Yao, *An Introduction to Confucianism* (New York: Cambridge University Press, 2000), 160–65.

God.” And Paul is confident that the sufferings of this present time cannot be compared to the glorious revelation in the end. Trials are therefore blessings in disguise (Rom 1:2-5). Christians are confident that all things work together for the good of those who love God (Rom 8:28).

If tests of faith are ways for God to show his love, will it necessarily be helpful to make the tests easier by engineering moral behavior? Probably not. Love is hard work in a fallen world. To make it easy might only serve to distort the nature of life if people are saved to do good works. When good works are only done by automated processes, people might no longer experience life for all its worth.

Christian Re-humanism

A Christian response to transhumanism must be grounded on the biblical revelation that humanity is made according to the image and likeness of God (Gen 1:26-27). Every human being is fearfully and wonderfully knit together by God in the mother’s womb (Ps 139:13-16). Even after the Fall, this distinction of human beings remains (Gen 9:6, Jas 3:9). While all lives have sanctity, such a unique distinction gives humankind incomparable dignity over other animals (Gen 9:1-7).

There have been different interpretations of the meaning of *imago Dei*. After reviewing the traditional interpretations of the image as substance, function, or relationship, Ryan S. Peterson contends that the notion of personal identity perhaps best captures the biblical meaning. While having an identity may imply certain substantive, functional, or relational attributes, personal identity as such is meant to set apart a group of persons. In the case of humanity, human beings are marked off as different from other kinds of animals, plants, and non-living things. Confusion of kinds with different identities is a severe moral offense.⁸⁹

⁸⁹ Ryan S. Peterson, *The Imago Dei as Human Identity: A Theological Interpretation* (Winona Lake, IN: Eisenbrauns, 2016), 53–86.

Human is different from other creatures and God. Two degrees of separation are implied with the statement that human is made according to the image of God. First, God and humans are different. God is not human because God is eternal, infinite, and immutable (Num 23:19; 1 Sam 15:29; Hos 11:9). Although the purpose of humanity is to become like God, humans cannot take on the identity of God. Second, Man is not identical to the image of God, for Christ alone is the true image of God (2 Cor 4:4; Heb 1:3). In that sense, every other human person is made according to Christ.

Due to sin, human beings are not the way they should be. Historically, many have used the metaphor of a distorted or lost image to describe the sinful condition of humankind. John F. Kilner observes that the pictures range from completely lost (e.g. Augustine of Hippo, Martin Luther, Karl Barth, and Dietrich Bonhoeffer), virtually lost (e.g. Anselm of Canterbury and John Calvin), to partially lost, darkened, or distorted (e.g. Gregory of Nyssa, Cyril of Alexandria, Aquinas, Emil Brunner, Reinhold Niebuhr, and Helmut Thielicke).⁹⁰ And the metaphor of distorted or lost image remains popular among evangelical thinkers today. However, Kilner contends that in the few biblical references of the image of God, the language of damage seems to be avoided. He reads that as implying a distinction that Christ's identity as the perfect Image of God is never compromised. Christ is always the perfect bearer of human nature. What got damaged is the made-according-to relationship between individual human beings and Christ.⁹¹

If an immutable human nature has always existed perfectly in Christ, the idea of enhancing that nature by technology would be quite audacious. It would not only an attempt to be Christ-like but to surpass Christ's perfection. However, Walker is

⁹⁰ Kilner, *Dignity and Destiny*, 159–72.

⁹¹ G. C. Berkouwer, *Man: The Image of God* (Grand Rapids: W. B. Eerdmans, 1978), 119. See also Anthony A. Hoekema, *Created in God's Image* (Grand Rapids: W. B. Eerdmans, 1988), 28. Wayne A. Grudem, *Systematic Theology: An Introduction to Biblical Doctrine* (Grand Rapids: Zondervan, 1994), 444. J. Richard Middleton, *The Liberating Image: The Imago Dei in Genesis 1* (Grand Rapids: Brazos, 2005), 207.

effectively making such a suggestion when he speculates that Adam-type beings have the potential to cultivate a greater virtue than Jesus-type beings. Walker suggests that it might be the reason God made Adam-type human beings rather than Jesus-type beings: to obtain the best of all possible worlds according to the Prime Imperative.

Biblical Christianity would find it difficult to accept the suggestion that created beings can ever surpass Christ in terms of moral virtue. A disciple is not above his teacher (Matt 10:24; Luke 6:40).

Moreover, in denying Arianism, the Nicene Creed maintains that the Son of God was “begotten, not created.” Walker might be comparing apple and orange color when he wonders why God would create Adam-type rather than Jesus-type persons.

Instead of being transformed into a posthuman kind, sinners need to be regenerated just as all things need to be renewed. The concept of the new birth is found in two Greek expressions, *palingenesia* (Matt 19:28; Titus 3:5, “renewal” or “regeneration”) and *gennēthēnai anōthen* (John 3:3, 7; “to be born again” or “to be born from above”). Both expressions bring the eschatological consequences into the consideration of present actions.⁹² In his conversation with Nicodemus, Jesus insists that having such renewal at the personal level is a necessary condition for a person to “see” the kingdom of God (John 3:3). A new perception of reality is possible only with such personal renewal.

Believers in Christ are being renewed after him as the image of God (Col 3:10). Such renewal cannot happen apart from faith in Christ (John 14:6; Acts 4:12). And the only way to obtain such faith is that a person is born of God (1 John 5:1). As John Piper explains,

What happens in the new birth is not getting new religion but getting new life, . . . not merely affirming the supernatural in Jesus but experiencing the supernatural in yourself. . . not the improvement of your old human nature but the creation of a new human nature—a nature that is really you, and is forgiven and cleansed; and a nature

⁹² *Dictionary of Jesus and the Gospels*, s.v. “New Birth,” (Downers Grove, IL: InterVarsity Press, 1992), 574.

that is really new, and is being formed by the indwelling Spirit of God. . . . The Holy Spirit causes people to be born again with a view to creating faith in the incarnate God-man, Jesus Christ (see 1 John 4:2–3). That’s the aim of the new birth. And so faith in Jesus Christ is the first evidence that the new birth has happened. “Everyone who believes that Jesus is the Christ has been born of God.” Faith is the sign that the new birth has happened.⁹³

The way for people to become like God again is therefore spiritual, not technological. And it requires divine action that cannot be accomplished by human initiatives only.

Summary

In chapter 4, we argue against Christian transhumanism through a critical examination of Walker’s proposal of engineering virtues genetically. Walker explains the motivation for his technological vision as helping human beings to achieve *theosis*, which is required by the purpose of creation that could be explained in terms of a neo-Irenaean theodicy.

While we accept the terms *theosis* or deification due to its well-established history in Christian theology, we maintain that the meaning of *theosis* is limited to becoming godlike, not becoming god substantively. Moreover, we maintain that the traditional understanding of *theosis* is tied to becoming Christ-like in his servant image. Therefore, *theosis* is about being restored into fully human, being remade according to *imago Dei*.

Using the conception of virtues as defined by Aquinas, different writers have argued that virtues cannot be engineered. More importantly, we contend that the enhancement of human biological nature is not necessary for *theosis*. What is necessary, however, is the active involvement of God.

We further examine the test hypothesis introduced in the last chapter in conjunction with the simulation hypothesis and the Zoo hypothesis. We see how the test

⁹³ John Piper, *Finally Alive: What Happens When We Are Born Again* (Ross-shire, Scotland: Christian Focus, 2008), 70.

hypothesis can serve both as an anthropodicy and as an answer to the traditional problem of evil. Moreover, there are biblical revelations to support that humanity is on trial. Life is a test. The love of God for his most beloved humanity is demonstrated with this test.

In the last section, we respond to Christian transhumanism by contending that a more biblically grounded theological anthropology should be called Christian Re-humanism.

Conclusion

In this study, I have sought to engage transhumanism through the approach of worldview apologetics. I present transhumanism as a worldview and transhumanists as worldview apologists. The chaptering of this study is organized as a Y-juncture engagement. The sectioning is organized around four key perspectives of a worldview, namely, moral, epistemological, metaphysical (the philosophy of mind), and eschatological. In chapter 1, we place transhumanism in the broader context of the humanist family and explore how posthumanism and transhumanism historically came to depart from traditional secular humanism. In chapter 2, we explore tenets of the transhumanist worldview from the four perspectives of moral philosophy, epistemology, the philosophy of mind, and eschatology. We see how transhumanists attempt to weave together a coherent worldview by leaning towards positions that arguably compatible with a naturalistic worldview. In chapter 3, I outline an “offensive” apologetic strategy that highlights conflicts between transhumanism and its other relatives in humanism. In chapter 4, I present a polemic against Christian transhumanism, which can be described as a “defensive” apologetic strategy that identifies key differences between the Christian and the transhumanist worldviews using commensurable concepts.

A substantial engagement with transhumanism from a Christian worldview requires technical and theological details that this study can only supply a rough sketch. Nevertheless, I hope that this study will serve as a springboard for further research in the

subject matter. Technological innovations in biotech and AI during the last decade underscore the relevance of this study. The COVID-19 pandemic has demonstrated to the world the systemic vulnerability of the globalized world. And yet, it might leave others emboldened in their estimation of the human capacity to overcome natural evils technologically in “warp speed.” The debate over transhumanism has only begun.

This work is pursued to serve implicitly as a demonstration of the usefulness of worldview apologetics and the continued relevance of Schaeffer. While the western cultural landscape has changed much since his passing nearly half a century ago, Schaeffer’s core apologetic contention has become more poignant. More people are brought up with worldviews that are in fundamental disagreement with the biblical Christian worldview. “Total cultural apologetics” has become more relevant than ever, not only in pre-evangelism but also in Christian education and discipleship.

BIBLIOGRAPHY

- Accelerating Anarchism. “What’s All This about Anarchism and Transhumanism?” An Anarcho-Transhumanist FAQ. Accessed November 2, 2018. <http://blueshifted.net/faq/#1>.
- Agar, Nicholas. *Humanity’s End: Why We Should Reject Radical Enhancement*. Cambridge, MA: MIT Press, 2010.
- . “Whereto Transhumanism? The Literature Reaches a Critical Mass.” *The Hastings Center Report* 37, no. 3 (2007): 12–17.
- AL-Salami, Nada M. A. “Evolutionary Algorithm Definition.” *American Journal of Engineering and Applied Sciences* 2, no. 4: 789–95.
- Alcor Life Extension Foundation. “Frequently Asked Questions.” Accessed November 2, 2018. <https://www.alcor.org/FAQs/faq01.html#cryonics>.
- Alcorta, Candace S., and Richard Sosis. “Ritual, Emotion, and Sacred Symbols: The Evolution of Religion as an Adaptive Complex.” *Human Nature* 16, no. 4 (2005): 323–59.
- Alfsvåg, Knut. “Transhumanism, Truth and Equality: Does the Transhumanist Vision Make Sense?” *Theofilos* 7, no. 3 (2015): 256–67.
- Alt, Franz L., and Morris Rubinoff, eds. *Advances in Computers*. Vol. 6. New York: Academic Press, 1966.
- Altwegg, Kathrin, Hans Balsiger, Akiva Bar-Nun, Jean-Jacques Berthelier, Andre Bieler, Peter Bochsler, Christelle Briois et al. “Prebiotic Chemicals — Amino Acid and Phosphorus — In the Coma of Comet 67P/Churyumov-Gerasimenko.” *Science Advances* 2, no. 5 (2016).
- American Academy of Religion. “Human Enhancement and Transhumanism Unit.” Accessed October 28, 2018. <https://papers.aarweb.org/pu/human-enhancement-and-transhumanism-unit>.
- American Humanist Association. “Humanism and Its Aspirations: Humanist Manifesto III, a Successor to the Humanist Manifesto of 1933.” Accessed October 24, 2018. <https://americanhumanist.org/what-is-humanism/manifesto3/>.
- . “Humanist Manifesto I.” Accessed October 24, 2018. <https://americanhumanist.org/what-is-humanism/manifesto1/>.
- . “Humanist Manifesto II.” Accessed October 24, 2018. <https://americanhumanist.org/what-is-humanism/manifesto2/>.

- American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders*. 5th ed. Washington, DC: American Psychiatric Publishing, 2013.
- Anderson, James. "Introduction to Libertarian Transhumanism." April 16, 2014. <https://transhumanism.liberty.me/introduction-to-libertarian-transhumanism/>.
- Anderson, Matthew Lee, and Andrew T. Walker. "Breaking Evangelicalism's Silence on IVF." Accessed August 25, 2019. <https://www.thegospelcoalition.org/article/evangelicalisms-silence-ivf/>.
- Andrews, Lori B. *Future Perfect: Confronting Decisions about Genetics*. New York: Columbia University Press, 2001.
- Annas, George J., Lori B. Andrews, and Rosario M. Isasi. "Protecting the Endangered Human: Toward an International Treaty Prohibiting Cloning and Inheritable Alterations." *American Journal of Law & Medicine* 28, no. 2-3 (2002): 151–78.
- Arbor, Sage. "Where and How in the mTOR Pathway Inhibitors Fight Aging: Rapamycin, Resveratrol, and Metformin." November 5, 2018. <https://www.intechopen.com/books/resveratrol-adding-life-to-years-not-adding-years-to-life/where-and-how-in-the-mtor-pathway-inhibitors-fight-aging-rapamycin-resveratrol-and-metformin>.
- Arendt, Hannah. *The Human Condition*. Chicago: University of Chicago Press, 1958.
- Aristotle. *Nicomachean Ethics*. Translated by W. D. Ross. Kitchener: Batoche Books, 1999.
- . *Poetics*. Translated by S. H. Butcher. Urbana, IL: Project Gutenberg, 1999. Accessed November 16, 2014. <http://www.gutenberg.org/ebooks/1974>.
- Ashcroft, Richard, Angus Dawson, Heather Draper, and John McMillan, eds. *Principles of Health Care Ethics*. Chichester, UK: Wiley, 2007.
- Askland, Andrew. "The Misnomer of Transhumanism as Directed Evolution." *International Journal of Emerging Technologies & Society* 9, no. 1 (2011): 71–78.
- Athanasius. *On the Incarnation*. Grand Rapids: Christian Classics Ethereal Library. Accessed November 2, 2018. <https://ccel.org/ccel/a/athanasius/incarnation/cache/incarnation.txt>.
- Auletta, G., I. Colagè, and P. D'Ambrosio. "Transhumanism Critically Assessed." In *Humanity on the Threshold: Religious Perspectives on Transhumanism*. Edited by John C. Haughey and Ilia Delio, 41–62. Washington, DC: Council for Research in Values and Philosophy, 2014.
- Aydede, Murat, ed. *Pain: New Essays on Its Nature and the Methodology of Its Study*. Cambridge, MA: MIT Press, 2005.
- Bacon, Francis. *The New Atlantis*. Urbana, IL: Project Gutenberg, December 1, 2000. Accessed May 28, 2020. <https://www.gutenberg.org/ebooks/2434>.
- . *The New Atlantis*. In *Francis Bacon*. Edited by Brian Vickers, 457–89. Oxford: Oxford University Press, 1996.

- Baggett, David, Gary R. Habermas, and Jerry L. Walls, eds. *C. S. Lewis as Philosopher: Truth, Goodness and Beauty*. Downers Grove, IL: InterVarsity Press, 2008.
- Bahnsen, Greg L. *Presuppositional Apologetics: Stated and Defended*. Edited by Joel McDurmon. Powder Springs, GA: American Vision, 2008.
- . *Van Til's Apologetic: Readings and Analysis*. Phillipsburg, NJ: P&R Publishing, 1998.
- Bailey, Ronald. "For Enhancing People." In *The Transhumanist Reader: Classical and Contemporary Essays on the Science, Technology, and Philosophy of the Human Future*. Edited by Max More and Natasha Vita-More, 327–44. Chichester, UK: Wiley-Blackwell, 2013.
- . "Transhumanism: The Most Dangerous Idea? Why Striving to be More Than Human Is Human." *Reason*, August 25, 2004.
<http://reason.com/archives/2004/08/25/transhumanism-the-most-dangero>.
- Bainbridge, William S. "Religion for a Galactic Civilization." In *Science Fiction and Space Futures: Past and Present*. Edited by Eugene Morlock Emme, 187–201. American Astronautical Society, 1982.
- . "Transavatars." In *The Transhumanist Reader: Classical and Contemporary Essays on the Science, Technology, and Philosophy of the Human Future*. Edited by Max More and Natasha Vita-More, 91–99. Chichester, UK: Wiley-Blackwell, 2013.
- . "The Transhuman Heresy." *Journal of Evolution & Technology* 14, no. 2 (2005): 91–100.
- Bains, William. "What Do We Think Life Is? A Simple Illustration and Its Consequences." *International Journal of Astrobiology* 13, no. 2 (2014): 101–111.
- Bains, William, and Dirk Schulze-Makuch. "The Cosmic Zoo: The (Near) Inevitability of the Evolution of Complex, Macroscopic Life." *Life* 6, no. 3 (2016): 25.
- Baker, Stephen. *Final Jeopardy: Man vs. Machine and the Quest to Know Everything*. Boston: Houghton Mifflin Harcourt, 2011.
- Ball, John A. "The Zoo Hypothesis." *Icarus* 19, no. 3 (1973): 347–49.
- Bamford, Sim. "A Framework for Approaches to Transfer of a Mind's Substrate." *International Journal of Machine Consciousness* 4, no. 1 (2012): 23–34.
- Barbuscia, Anna, and Melinda C. Mills. "Cognitive Development in Children Up To Age 11 Years Born after ART – A Longitudinal Cohort Study." *Human Reproduction* 32, no. 7 (2017): 1482–88.
- Bardziński, Filip. "Transhumanism and Evolution. Considerations on Darwin, Lamarck and Transhumanism." *Ethics in Progress* 5, no. 2 (2014): 103–15.
- Barja, Gustavo. "Endogenous Oxidative Stress: Relationship to Aging, Longevity and Caloric Restriction." *Ageing Research Reviews* 1, no. 3 (2002): 397–411.

- Barrangou, Rodolphe. "The Roles of CRISPR-Cas Systems in Adaptive Immunity and Beyond." *Current Opinion in Immunology* 32 (2015): 36–41.
- Barrett, J. L. "Exploring the Natural Foundations of Religion." *Trends in Cognitive Sciences* 4, no. 1 (2000): 29–34.
- Barrow, John D., and Frank J. Tipler. *The Anthropic Cosmological Principle*. New York: Oxford University Press, 1986.
- Barrs, Jerram. "Francis Schaeffer: His Apologetics." In *Francis Schaeffer: A Mind and Heart for God*. Edited by Bruce A. Little, 27–50. Phillipsburg, NJ: P&R Publishing, 2010.
- Bartley, William Warren, III. *The Retreat to Commitment*. 2nd ed. La Salle, IL: Open Court, 1984.
- Bastian, Brock, Jolanda Jetten, Matthew J. Hornsey, and Siri Leknes. "The Positive Consequences of Pain: A Biopsychosocial Approach." *Personality and Social Psychology Review* 18, no. 3 (2014): 256–79.
- Baumann, Fred. "Humanism and Transhumanism." *The New Atlantis: A Journal of Technology & Society* 29 (2010): 68–84.
- Baxter, Stephen. "The Planetarium Hypothesis – A Resolution of the Fermi Paradox." *Journal of the British Interplanetary Society* 54, no. 5 (2001): 210–16.
- Bazac, Ana. "Human Worth on the Threshold of Its Technological Transformation." In *Humanity on the Threshold: Religious Perspectives on Transhumanism*. Edited by John C. Haughey and Ilia Delio, 21–40. Washington, DC: Council for Research in Values and Philosophy, 2014.
- Beauvoir, Simone de. *The Second Sex*. Translated by Constance Borde and Sheila Malovany-Chevallier. New York: Alfred A. Knopf, 2010.
- Becker, Ernest. *The Denial of Death*. New York: Free Press, 1973.
- Begley, Sharon. "STAT-Harvard Poll: Americans Say No to 'Designer Babies'." February 11, 2016. <https://www.statnews.com/2016/02/11/stat-harvard-poll-gene-editing/>.
- Bellamy, Edward. *Looking Backward 2000-1887*. Rev. ed. New York: Dover, 1996.
- Belloche Arnaud, Robin T. Garrod, Holger S. P. Müller, and Karl M. Menten. "Detection of a Branched Alkyl Molecule in the Interstellar Medium: Iso-propyl Cyanide." *Science* 345, no. 6204 (2014): 1584–87.
- Benders, Alison. "Genetic Moral Enhancement? Yes. Holiness? No." *Theology and Science* 16, no. 3 (2018): 308–18.
- Benedikter, Roland, Katja Siepmann, and Annabella McIntosh. "Zoltan Istvan's 'Teleological Egocentric Functionalism': A Libertarian Philosophical Basis for 'Transhumanist' Politics." July 2, 2015. <https://transpolitica.org/2015/07/02/zoltan-istvans-teleological-egocentric-functionalism-a-libertarian-philosophical-basis-for-transhumanist-politics/>.

- Benek, Christopher. "Christian Transhumanism Offers an Ethical Transhumanist Alternative." *Christopher Benek* (blog). August 27, 2017. <http://www.christopherbenek.com/2017/08/christian-transhumanism-offers-an-ethical-transhumanist-alternative/>.
- . "Could We, as Creators in the Image of God, Change the World with Our Beliefs?" *Christopher Benek* (blog). June 18, 2014. <http://www.christopherbenek.com/2014/06/could-we-as-creators-in-the-image-of-god-change-the-world-with-our-beliefs/>.
- Benjamin, Ben Varkey, Peiran Gao, Emmett McQuinn, Swadesh Choudhary, Anand R. Chandrasekaran, Jean-Marie Bussat, Rodrigo Alvarez-Icaza, John V. Arthur, Paul A. Merolla, and Kwabena Boahen. "Neurogrid: A Mixed-Analog-Digital Multichip System for Large-Scale Neural Simulations." *Proceedings of the IEEE* 102, no. 5 (2014): 699–716.
- Bercovici, Jeff. "Peter Thiel Is Very, Very Interested in Young People's Blood: The Contrarian Venture Capitalist Believes Transfusions May Hold the Key to His Dream of Living Forever." *Inc.com*, August 1, 2016. <https://www.inc.com/jeff-bercovici/peter-thiel-young-blood.html>.
- Berger, Peter L. *The Sacred Canopy: Elements of a Sociological Theory of Religion*. Garden City, NY: Doubleday, 1967.
- Bergsma, Ad. "Transhumanism and the Wisdom of Old Genes: Is Neurotechnology a Source of Future Happiness?" *Journal of Happiness Studies* 1, no. 3 (2000): 401–17.
- Berkouwer, G. C. *Man: The Image of God*. Grand Rapids: W. B. Eerdmans, 1978.
- Bernal, J. D. *The World, the Flesh and the Devil: An Enquiry into the Future of the Three Enemies of the Rational Soul*. Bloomington: Indiana University Press, 1969.
- Bess, Michael. "Enhanced Humans Versus 'Normal People': Elusive Definitions." *Journal of Medicine and Philosophy* 35, no. 6 (2010): 641–55.
- Bevilacqua, Laura, and David Goldman. "Genetics of Impulsive Behaviour." *Philosophical Transactions of the Royal Society B: Biological Sciences* 368, no. 1615 (2013).
- Binnig, G., and H. Rohrer. "Scanning Tunneling Microscopy." *Surface Science* 126, no. 1-3 (1983): 236–44.
- Binnig, Gerd K. Atomic Force Microscope and Method for Imaging Surfaces with Atomic Resolution. US Patent 4,724,318, filed August 4, 1986, and issued February 9, 1988.
- Bishop, Jeffrey P. "Transhumanism, Metaphysics, and the Posthuman God." *Journal of Medicine and Philosophy* 35, no. 6 (2010): 700–720.
- Black, Edwin. *War Against the Weak: Eugenics and America's Campaign to Create a Master Race*. New York: Four Walls Eight Windows, 2003.

- Blocher, Henri. *Evil and the Cross*. Translated by David G. Preston. Downers Grove, IL: InterVarsity Press, 1994.
- Block, Ned. "Anti-reductionism Slaps Back." *Philosophical Perspectives* 11 (1997): 107–133.
- . *Consciousness, Function, and Representation*. Cambridge, MA: MIT Press, 2007.
- . "The Harder Problem of Consciousness." In *Consciousness, Function, and Representation*, 397–432. Cambridge, MA: MIT Press, 2007.
- . "Psychologism and Behaviorism." *Philosophical Review* 90, no. 1 (1981): 5–43.
- , ed. *Readings in Philosophy of Psychology*. Vol. 1. Cambridge, MA: Harvard University Press, 1980.
- . "Troubles with Functionalism." *Minnesota Studies in the Philosophy of Science* 9 (1978): 261–325.
- Boa, Kenneth D., and Robert M. Bowman Jr. *Faith Has Its Reasons: Integrative Approaches to Defending the Christian Faith*. Downers Grove, IL: InterVarsity Press, 2001.
- Boethius. *The Theological Tractates*. Translated by H. F. Stewart, E. K. Rand and S. J. Tester. Cambridge, MA: Harvard University Press, 1973.
- Bohan, Elise. "Transhumanist Zoltan Istvan Runs for Governor of California." *Big Think*, March 5, 2007. <https://bigthink.com/elise-bohan/could-this-transhumanist-be-the-next-governor-of-california>.
- Boorse, Christopher. "On the Distinction Between Disease and Illness." *Philosophy & Public Affairs* 5, no. 1 (1975): 49–68.
- Bornstein, Kate. *Gender Outlaw: On Men, Women, and the Rest of Us*. New York: Routledge, 1994.
- Bostrom, Nick. *Anthropic Bias: Observation Selection Effects in Science and Philosophy*. New York: Routledge, 2002.
- . "Are We Living in a Computer Simulation?" *Philosophical Quarterly* 53, no. 211 (2003): 243–55.
- . "Existential Risk Prevention as Global Priority." *Global Policy* 4, no. 1 (2013): 15–31.
- . "Existential Risks: Analyzing Human Extinction Scenarios and Related Hazards." *Journal of Evolution & Technology* 9, no. 1 (2002): 1–30.
- . "A History of Transhumanist Thought." *Journal of Evolution & Technology* 14, no. 1 (2005): 1–25.
- . "How Long Before Superintelligence?" *International Journal of Futures Studies* 2 (1998).

- . “In Defense of Posthuman Dignity.” *Bioethics* 19, no. 3 (2005): 202–14.
- . *The Transhumanist FAQ*. The World Transhumanist Association, 2003.
- . “Transhumanist Values.” *Journal of Philosophical Research* 30, no. Supplement (2005): 3–14.
- . “When Machines Outsmart Humans.” *Futures* 35 (2003): 759–64.
- Bostrom, Nick, and James J. Hughes. “Institute for Ethics and Emerging Technologies.” *IEET*. Accessed August 22, 2019. <https://ieet.org/>.
- Bostrom, Nick, and Toby Ord. “The Reversal Test: Eliminating Status Quo Bias in Applied Ethics.” *Ethics* 116, no. 4 (2006): 656–79.
- Bowman, Robert M., Jr. “The Mormon God Has Not Always Been God.” August 26, 2013. <http://mit.irr.org/mormon-god-has-not-always-been-god-part-1>.
- Bradshaw, Heather G. “Morphological Freedom.” *IEET*. November 20, 2009. <https://ieet.org/index.php/IEET2/more/bradshaw20091120>.
- Bradshaw, Heather G., and Ruud ter Meulen. “A Transhumanist Fault Line around Disability: Morphological Freedom and the Obligation to Enhance.” *Journal of Medicine and Philosophy* 35, no. 6 (2010): 670–84.
- Brin, David. “The ‘Great Silence’: The Controversy Concerning Extraterrestrial Intelligent Life.” *Quarterly Journal of the Royal Astronomical Society* 24, no. 3 (1983): 283–309.
- Brown-Borg, H., W. T. Johnson, S. Rakoczy, and M. Romanick. “Mitochondrial Oxidant Generation and Oxidative Damage in Ames Dwarf and GH Transgenic Mice.” *Journal of the American Aging Association* 24, no. 3 (2001): 85–96.
- Bryson, Steve, Michelle Kunimoto, Ravi K. Kopparapu, Jeffrey L. Coughlin, William J. Borucki, David Koch, Victor Silva Aguirre et al. “The Occurrence of Rocky Habitable Zone Planets around Solar-like Stars from Kepler Data.” *The Astronomical Journal* 161, no. 1 (2021): 36.
- Buchanan, Allen E., Dan W. Brock, Norman Daniels, and Daniel Wikler. *From Chance to Choice: Genetics and Justice*. Cambridge: Cambridge University Press, 2000.
- Bupp, Nathan, ed. *Meaning and Value in a Secular Age: Why Eupraxsophy Matters – The Writings of Paul Kurtz*. Amherst, NY: Prometheus Books, 2012.
- Burchell, Mark J. “W(h)ither the Drake Equation?” *International Journal of Astrobiology* 5, no. 3 (2006): 243–50.
- Burson, Scott R., and Jerry L. Walls. *C.S. Lewis & Francis Schaeffer: Lessons for a New Century from the Most Influential Apologists of Our Time*. Downers Grove, IL: InterVarsity Press, 1998.
- Butler, Judith. *Gender Trouble: Feminism and the Subversion of Identity*. New York: Routledge, 1990.

- Calico. "Calico Research and Development." Accessed November 2, 2018.
<http://calicolabs.com>.
- Cannon, Lincoln. "What Is Mormon Transhumanism?" *Theology and Science* 13, no. 2 (2015): 202–18.
- Čapek, Karel, and Claudia Novack. *R.U.R. (Rossum's Universal Robots)*. London: Penguin, 2004.
- Carmon, Ziv, and Dan Ariely. "Focusing on the Forgone: How Value Can Appear So Different to Buyers and Sellers." *Journal of Consumer Research* 27, no. 3 (2000): 360–70.
- Carpenter, Catherine L., Angela M. Wong, Zhaoping Li, Ernest P. Noble, and David Heber. "Association of Dopamine D2 Receptor and Leptin Receptor Genes with Clinically Severe Obesity." *Obesity* 21, no. 9 (2013): E467–73.
- Carrico, Dale. "The Politics of Morphological Freedom." *IEET*. August 3, 2006.
<https://ieet.org/index.php/IEET2/more/carrico20060803>.
- Carson, D. A. "Athens Revisited." In *Telling the Truth: Evangelizing Postmoderns*. Edited by D. A. Carson, 384–98. Grand Rapids: Zondervan, 2000.
- , ed. *Telling the Truth: Evangelizing Postmoderns*. Grand Rapids: Zondervan, 2000.
- Carter, Brandon. "Large Number Coincidences and the Anthropic Principle in Cosmology." In *Confrontation of Cosmological Theories with Observational Data*. Edited by Malcolm S. Longair, 291–98. Dordrecht, Holland: D. Reidel, 1974.
- Cassirer, Ernst, Paul Oskar Kristeller, and John H. Randall, eds. *The Renaissance Philosophy of Man*. Chicago: University of Chicago Press, 1948.
- Center for Genetics and Society. "An Open Letter & Report: Calling for Prohibitions on Human Germline Engineering." November 29, 2015.
<https://www.geneticsandsociety.org/press-statement/open-letter-report-calling-prohibitions-human-germline-engineering>.
- Chalmers, David J. "Facing Up to the Problem of Consciousness." *Journal of Consciousness Studies* 2, no. 3 (1995): 200–19.
- . "The Singularity: A Philosophical Analysis." *Journal of Consciousness Studies* 17, no. 9-10 (2010): 7–65.
- Chan, Wing-tsit. *A Source Book in Chinese Philosophy*. Princeton, NJ: Princeton University Press, 1969.
- Chapman, Audrey R. "Inconsistency of Human Rights Approaches to Human Dignity with Transhumanism." *The American Journal of Bioethics* 10, no. 7 (2010): 61–63.
- Chen, Miaoxin, Linda Wu, Junli Zhao, Fang Wu, Michael J. Davies, Gary A. Wittert, Robert J. Norman, Rebecca L. Robker, and Leonie K. Heilbronn. "Altered Glucose Metabolism in Mouse and Humans Conceived by IVF." *Diabetes* 63, no. 10 (2014): 3189–98.

- Christian Transhumanist Association. "Faith, Technology, and the Future." 2013. <https://www.christiantranshumanism.org/>.
- Chu, Ted. *Human Purpose and Transhuman Potential: A Cosmic Vision for Our Future Evolution*. San Rafael, CA: Origin Press, 2014.
- Chung, K. W., D. H. Kim, M. H. Park, Y. J. Choi, N. D. Kim, J. Lee, B. P. Yu, and H. Y. Chung. "Recent Advances in Calorie Restriction Research on Aging." *Experimental Gerontology* 48, no. 10 (2013): 1049–53.
- Churchland, Patricia S., and Terrence J. Sejnowski. *The Computational Brain*. Cambridge, MA: MIT Press, 1992.
- Clapper, James R. *Worldwide Threat Assessment of the US Intelligence Community*. Office of the Director of National Intelligence, 2016.
- Clark, Andy. *Natural-Born Cyborgs: Minds, Technologies, and the Future of Human Intelligence*. Oxford: Oxford University Press, 2003.
- Clark, Andy, and David Chalmers. "The Extended Mind." *Analysis* 58, no. 1 (1998): 7.
- Clarke, Arthur C. *Childhood's End*. New York: Ballantine Books, 1953.
- . *Imperial Earth*. London: Victor Gollancz, 1975.
- Cole-Turner, Ronald. "Going Beyond the Human: Christians and Other Transhumanists." *Dialog: A Journal of Theology* 54, no. 1 (2015): 20–26.
- . "Theosis and Human Enhancement." *Theology and Science* 16, no. 3 (2018): 330–42.
- , ed. *Transhumanism and Transcendence: Christian Hope in an Age of Technological Enhancement*. Washington, DC: Georgetown University Press, 2011.
- Colson, Charles W., and Timothy George. "Flaming Truth: With Laser-Like Precision, Francis Schaeffer Hit on the Fundamental Issue of Our Day." *Christianity Today* 56, no. 2 (2012): 45.
- Condorcet, Jean-Antoine-Nicolas de Caritat. *Sketch for a Historical Picture of the Progress of the Human Mind*. Translated by June Barraclough. London: Weidenfeld and Nicolson, 1955.
- Cook, V. J., and Malcolm Newson. *Chomsky's Universal Grammar: An Introduction*. 3rd ed. Oxford: Blackwell, 2007.
- Cooper, Sasha. "On Transhumanism." *Meanjin* 65, no. 4 (2006): 108–12.
- Council for Democratic and Secular Humanism. "A Secular Humanist Declaration." 1980. <https://secularhumanism.org/a-secular-humanist-declaration/>.
- Courcelle, Pierre. *Late Latin Writers and Their Greek Sources*. Translated by Harry E. Wedeck. Cambridge, MA: Harvard University Press, 1969.

- Craig, William Lane. *Reasonable Faith: Christian Truth and Apologetics*. 3rd ed. Wheaton, IL: Crossway, 2008.
- CRISPR Therapeutics. “CRISPR Therapeutics and Vertex Announce Progress in Clinical Development Programs for the Investigational CRISPR/Cas9 Gene-Editing Therapy CTX001,” (press release). February 25, 2019, <http://www.globenewswire.com/news-release/2019/02/25/1741524/0/en/CRISPR-Therapeutics-and-Vertex-Announce-Progress-in-Clinical-Development-Programs-for-the-Investigational-CRISPR-Cas9-Gene-Editing-Therapy-CTX001.html>.
- Cruz, Eduardo R. “The Evolution of Human Birth and Transhumanist Proposals of Enhancement.” *Zygon* 50, no. 4 (2015): 830–53.
- Cryonics Institute. “About Cryonics Institute.” Accessed November 2, 2018. <http://www.cryonics.org/ci-landing/>.
- Currah, Paisley, Richard M. Juang, and Shannon Minter, eds. *Transgender Rights*. Minneapolis: University of Minnesota Press, 2006.
- Cyranoski, David. “Gene-Edited ‘Micropigs’ to be Sold as Pets at Chinese Institute.” *Nature* 526, no. 7571 (2015): 18.
- Daly, Todd T. W. “Chasing Methuselah: Transhumanism and Christian Theosis in Critical Perspective.” In *Transhumanism and Transcendence: Christian Hope in an Age of Technological Enhancement*. Edited by Ronald Cole-Turner, 131–44. Washington, DC: Georgetown University Press, 2011.
- Danaylov, Nikola. “Top 10 Singularitarians of All Time.” January 23, 2010. <https://www.singularityweblog.com/top-10-singularitarians/>.
- Daniels, Norman. “Normal Functioning and the Treatment-Enhancement Distinction.” *Cambridge Quarterly of Healthcare Ethics* 9, no. 3 (2000): 309–22.
- Darwin, Charles. *On the Origin of the Species*. New York: D. Appleton and Company, 1861.
- Davies, Paul. *The Eerie Silence: Renewing Our Search for Alien Intelligence*. Boston: Houghton Mifflin Harcourt, 2010.
- Davis, Erik. *TechGnosis: Myth, Magic, and Mysticism in the Age of Information*. New York: Harmony Books, 1998.
- De Prycker, Valérie. “Critical Remarks on Shortcuts to Happiness: The Relevance of Effort and Pain.” *Philosophica* 79 (2007): 57–70.
- Deane-Drummond, Celia E. “Taking Leave of the Animal? The Theological and Ethical Implications of Transhuman Projects.” In *Transhumanism and Transcendence: Christian Hope in an Age of Technological Enhancement*. Edited by Ronald Cole-Turner, 115–30. Washington, DC: Georgetown University Press, 2011.
- Decety, Jean. “The Neuroevolution of Empathy.” *Annals of the New York Academy of Sciences* 1231, no. 1 (2011): 35–45.
- Dennett, Daniel C. *Consciousness Explained*. Boston: Little, Brown and Co., 1991.

- Dennis, Lane T. "Conversion in an Evangelical Context: A Study in the Micro-Sociology of Religion." PhD diss., Northwestern University, 1980.
- , ed. *Francis A. Schaeffer: Portraits of the Man and His Work*. Westchester, IL: Crossway, 1986.
- Depoe, John. *Rejuvenating Apologetics in the Twenty-First Century: Taking Hints from Søren Kierkegaard*. Waco, TX: Baylor University, 2002.
- Descartes, René. *Meditations on First Philosophy: In Which the Existence of God and the Distinction of the Soul from the Body Are Demonstrated*. Edited by Andrew Bailey. Translated by Ian Johnson. Peterborough, Ontario: Broadview Press, 2013.
- DeVoe, Robert. "Transhumanism and Crypto: Interview with Zoltan Istvan, Transhumanist." *Bitsonline*, July 15, 2018. <https://bitsonline.com/zoltan-istvan-transhumanism-crypto/>.
- Dickel, Sascha, and Andreas Frewer. "Life Extension." In *Post- and Transhumanism: An Introduction*. Edited by Robert Ranisch and Stefan Lorenz Sorgner, 119–31. Frankfurt am Main: Peter Lang, 2014.
- Diderot, Denis. *Rameau's Nephew and D'Alembert's Dream*. Translated by Leonard Tancock. London: Penguin, 1976.
- Doede, R. P. "Polanyi in the Face of Transhumanism." *Tradition and Discovery* 35, no. 1 (2008): 33–45.
- Doyle, Richard. *Wetwares: Experiments in Postvital Living*. Minneapolis: University of Minnesota Press, 2003.
- Drake, Nadia. "How My Dad's Equation Sparked the Search for Extraterrestrial Intelligence." *National Geographic*, June 30, 2014. <https://www.nationalgeographic.com/news/2014/6/140630-drake-equation-50-years-later-aliens-science/>.
- Drexler, K. Eric. *Engines of Creation: The Coming Era of Nanotechnology*. New York: Anchor Books, 1986.
- . *Nanosystems: Molecular Machinery, Manufacturing, and Computation*. New York: Wiley, 1992.
- . *Radical Abundance: How a Revolution in Nanotechnology Will Change Civilization*. New York: BBS PublicAffairs, 2013.
- Dreyfus, Hubert L. *What Computers Can't Do: A Critique of Artificial Reason*. Cambridge, MA: MIT Press, 1992.
- Dublin, Max. *Futurehype: The Tyranny of Prophecy*. Markham, ON: Viking, 1989.
- Dulles, Avery. *A History of Apologetics*. New York: Corpus, 1971.
- Duriez, Colin. *Francis Schaeffer: An Authentic Life*. Wheaton, IL: Crossway, 2008.

- Dvorak, John. "The Death of Moore's Law?" *ZDNet*, September 25, 2000. <https://www.zdnet.com/article/the-death-of-moores-law/>.
- Dvorsky, George. "Cognitive Liberty and Right to One's Mind." *IEET*. October 20, 2009. <https://ieet.org/index.php/IEET2/more/dvorsky20091020>.
- . "J. Hughes on Democratic Transhumanism, Personhood, and AI." March 28, 2012. <http://www.sentientdevelopments.com/2012/03/j-hughes-on-democratic-transhumanism.html>.
- . "Limits to the Biolibertarian Impulse." *Sentient Developments* (blog). October 14, 2009. <http://www.sentientdevelopments.com/2009/10/limits-to-biolibertarian-impulse.html>.
- Dvorsky, George, and James J. Hughes. "Postgenderism: Beyond the Gender Binary." *IEET*. March 20, 2008. <https://archive.ieet.org/articles/dvorsky20080320.html>.
- Dyson, Freeman J. *Infinite in All Directions*. New York: Harper & Row, 1988.
- Edgar, William. "Two Christian Warriors: Cornelius Van Til and Francis A. Schaeffer Compared." *Westminster Theological Journal* 57, no. 1 (1995): 57–80.
- Editas Medicine. "Allergan and Editas Medicine Initiate the Brilliance Phase 1/2 Clinical Trial of AGN-151587 (EDIT-101) for the Treatment of LCA10," (press release). July 25, 2019, <http://ir.editasmedicine.com/news-releases/news-release-details/allergan-and-editas-medicine-initiate-brilliance-phase-12>.
- Edwards, Chris. "Moore's Law: What Comes Next?" *Communications of the ACM* 64, no. 2 (2021): 12–14.
- Ellul, Jacques. *The Technological Society*. Translated by John Wilkinson. New York: Vintage Books, 1964.
- Emme, Eugene Morlock, ed. *Science Fiction and Space Futures: Past and Present*. American Astronautical Society, 1982.
- Esfandiary, F. M. *Optimism One: The Emerging Radicalism*. New York: Norton, 1970.
- Eth, Daniel, Juan-Carlos Foust, and Brandon Whale. "The Prospects of Whole Brain Emulation within the Next Half-Century." *Journal of Artificial General Intelligence* 4, no. 3 (2013): 130–52.
- Ettinger, Robert C. W. *The Prospect of Immortality*. Garden City, NY: Doubleday, 1964.
- European External Action Service. "What Is Transhumanism?" Accessed August 4, 2019. <https://whatistranshumanism.org/>.
- Evans, Woody. "If You See a Cyborg in the Road, Kill the Buddha: Against Transcendental Transhumanism." *Journal of Evolution & Technology* 24, no. 2 (2014): 92–97.
- Fan, Jingtao, Lu Fang, Jiamin Wu, Yuchen Guo, and Qionghai Dai. "From Brain Science to Artificial Intelligence." *Engineering* 6, no. 3: 248–52.

- Farihi, J., B. T. Gänsicke, and D. Koester. "Evidence for Water in the Rocky Debris of a Disrupted Extrasolar Minor Planet." *Science* 342, no. 6155 (2013): 218–20.
- Feinberg, John S. *Can You Believe It's True? Christian Apologetics in a Modern and Postmodern Era*. Wheaton, IL: Crossway, 2013.
- Feinberg, Leslie. *Transgender Warriors: Making History from Joan of Arc to RuPaul*. Boston: Beacon Press, 1996.
- Fenn, Richard K. *Key Thinkers in the Sociology of Religion*. London: Continuum, 2009.
- Fenton, Elizabeth. "Liberal Eugenics & Human Nature: Against Habermas." *The Hastings Center Report* 36, no. 6 (2006): 35–42.
- Ferrando, Francesca. "Posthumanism, Transhumanism, Antihumanism, Metahumanism, and New Materialisms: Differences and Relations." *Existenz* 8, no. 2 (2013): 26–32.
- Feynman, Richard P. "There's Plenty of Room at the Bottom: An Invitation to Enter a New Field of Physics." *Engineering and Science* 23 (1960): 22–36.
- Finlan, Stephen, and Vladimir Kharlamov. *Theōsis: Deification in Christian Theology*. Eugene, OR: Pickwick, 2006.
- Firestone, Shulamith. *The Dialectic of Sex: The Case for Feminist Revolution*. New York: Farrar, Straus and Giroux, 2003.
- Flanagan, Joseph. *Quest for Self-Knowledge: An Essay in Lonergan's Philosophy*. Toronto: University of Toronto Press, 1997.
- FM-2030. *Are You a Transhuman? Monitoring and Stimulating Your Personal Rate of Growth in a Rapidly Changing World*. New York: Warner Books, 1989.
- Fodor, Jerry A. *The Language of Thought*. New York: Crowell, 1975.
- . "Special Sciences (Or: The Disunity of Science as a Working Hypothesis)." *Synthese* 28, no. 2 (1974): 97–115.
- Foerst, Anne. "Cog, a Humanoid Robot, and the Question of the Image of God." *Zygon* 33, no. 1 (1998): 91–111.
- . *God in the Machine: What Robots Teach Us about Humanity and God*. New York: Dutton, 2004.
- . "Robot: Child of God." In *God for the 21st Century*. Edited by Russell Stannard, 137–40. Philadelphia: Templeton Press, 2000.
- Fogg, Martyn J. "Extraterrestrial Intelligence and the Interdict Hypothesis." *Analog* 108, no. 10 (1988): 62–72.
- . "Temporal Aspects of the Interaction of the First Galactic Civilizations: The Interdict Hypothesis." *Icarus* 69 (1987): 370–84.
- Follis, Bryan A. *Truth with Love: The Apologetics of Francis Schaeffer*. Wheaton, IL: Crossway, 2006.

- Ford, Adam. "What Is Technoprogessivism? with James Hughes." *h+ Magazine*, November 19, 2014. <http://hplusmagazine.com/2014/11/19/technoprogessivism-james-hughes/>.
- Forrest, Conner. "Moore's Law Dead in 2021: Here's What the Next Revolution Will Mean." *TechRepublic*, July 26, 2016. <https://www.techrepublic.com/article/moores-law-dead-in-2021-heres-what-the-next-revolution-will-mean/>.
- Foucault, Michel. *The Order of Things: An Archaeology of the Human Sciences*. New York: Vintage Books, 1970.
- Frame, John M. "Some Thoughts on Schaeffer's Apologetics." *John Frame and Vern Poythress* (blog). June 5, 2012. <http://www.frame-poythress.org/some-thoughts-on-schaeffers-apologetics/>.
- Frame, John M., and Cornelius Van Til. *Cornelius Van Til: An Analysis of His Thought*. Phillipsburg, NJ: P&R Publishing, 1995.
- Freitas, Robert A., Jr., and Ralph C. Merkle. *Kinematic Self-replicating Machines*. Georgetown, TX: Landes Bioscience, 2004.
- Friedman, Patri, and Peter Thiel. "The Seasteading Institute." Accessed August 25, 2019. <https://www.seasteading.org>.
- Frierson, Patrick R. *What Is the Human Being?* New York: Routledge, 2013.
- Fukuyama, Francis. *Our Posthuman Future: Consequences of the Biotechnology Revolution*. New York: Farrar, Straus and Giroux, 2002.
- . "Transhumanism." *Foreign Policy* no. 144 (2004): 42–43.
- Fullam, Lisa. "Genetically Engineered Traits Versus Virtuous Living." *Theology and Science* 16, no. 3 (2018): 319–29.
- Fuller, Michael, ed. *The Concept of the Soul: Scientific and Religious Perspectives*. New Castle upon Tyne, UK: Cambridge Scholars, 2014.
- Fuller, Steve. *Humanity 2.0: What It Means to be Human Past, Present and Future*. Houndmills, UK: Palgrave Macmillan, 2011.
- . "Morphological Freedom and the Question of Responsibility and Representation in Transhumanism." *Confero* 4, no. 2 (2016): 33–45.
- . *Thomas Kuhn: A Philosophical History for Our Times*. Chicago: University of Chicago Press, 2000.
- Fuller, Steve, and Veronika Lipinska. "Transhumanism for the Encyclopedia of Ethics, Science, Technology and Engineering." *h+ Magazine*, March 30, 2014. <https://hplusmagazine.com/2014/03/30/transhumanism-for-the-encyclopedia-of-ethics-science-technology-and-engineering/>.
- . "Transhumanism." *Social Epistemology Review and Reply Collective* 3, no. 11 (2014): 25–29.

- Gallaher, Brandon. "Godmanhood vs Mangodhood: An Eastern Orthodox Response to Transhumanism." *Studies in Christian Ethics* 32, no. 2 (2019): 200–215.
- Geisler, Norman L. *Christian Apologetics*. Grand Rapids: Baker Book House, 1988.
- Geraci, Robert M. "Apocalyptic AI: Religion and the Promise of Artificial Intelligence." *Journal of the American Academy of Religion* 76, no. 1 (2008): 138–66.
- . "Spiritual Robots: Religion and Our Scientific View of the Natural World." *Theology and Science* 4, no. 3 (2006): 229–46.
- . "Video Games and the Transhuman Inclination." *Zygon* 47, no. 4 (2012): 735–56.
- Giancola, Michael L. "Does Transhumanism Mesh with Humanist Values?" *Humanist* 64, no. 5 (2004): 35–43.
- Gillis, William. "What Is Anarcho-Transhumanism?" *Human Iterations* (blog). January 6, 2012. <http://humaniterations.net/2012/01/06/what-is-anarcho-transhumanism/>.
- Glannon, Walter. "Identity, Prudential Concern, and Extended Lives." *Bioethics* 16, no. 3 (2002): 266–83.
- Glover, Jonathan. *What Sort of People Should There Be?* Harmondsworth, England: Penguin, 1984.
- Godwin, William. *An Enquiry Concerning Political Justice, and Its Influence on General Virtue and Happiness*. Vol. 2. London: G.G.J. and J. Robinson, 1793.
- Goertzel, Ben. *A Cosmist Manifesto: Practical Philosophy for the Posthuman Age*. Lexington, KY: Humanity+ Press, 2010.
- Good, Irving John. "Speculations Concerning the First Ultra-intelligent Machine." In *Advances in Computers*. Edited by Franz L. Alt and Morris Rubinfeld, 6:31–88. New York: Academic Press, 1966.
- Gorman, Michael J. *Inhabiting the Cruciform God: Kenosis, Justification, and Theosis in Paul's Narrative Soteriology*. Grand Rapids: W. B. Eerdmans, 2009.
- Gott, J. Richard, III. "Implications of the Copernican Principle for Our Future Prospects." *Nature* 363, no. 6427 (1993): 315–19.
- Gould, Paul M. "Aquinas, Schaeffer, Nominalism & the Demise of the Western World." *Brilliant and Beautiful* (blog). March 19, 2014. <http://www.paul-gould.com/2014/03/19/aquinas-schaeffer-nominalism-the-demise-of-the-western-world/>.
- . *Cultural Apologetics: Renewing the Christian Voice, Conscience, and Imagination in a Disenchanted World*. Grand Rapids: Zondervan, 2019.
- . "What Is Cultural Apologetics? Effective Apologetics Today Requires a Genuine Missionary Encounter." *Christianity Today*. April 15, 2019. <https://www.christianitytoday.com/ct/2019/april-web-only/what-is-cultural-apologetics-paul-gould-excerpt.html>.

- Gouw, Arvin M. "Genetic Virtue Program: An Unfeasible Neo-Pelagian Theodicy?" *Theology and Science* 16, no. 3 (2018): 273–78.
- Graham, Elaine L. "'Nietzsche Gets a Modem': Transhumanism and the Technological Sublime." *Literature and Theology* 16, no. 1 (2002): 65–80.
- . *Representations of the Post/Human: Monsters, Aliens and Others in Popular Culture*. New Brunswick, NJ: Rutgers University Press, 2002.
- Green, Brian Patrick. "Transhumanism and Roman Catholicism: Imagined and Real Tensions." *Theology and Science* 13, no. 2 (2015): 187–201.
- Green, Ronald M. "Challenging Transhumanism's Values." *The Hastings Center Report* 43, no. 4 (2013): 45–47.
- Greenberg, Julia A. "The Roads Less Traveled: The Problem with Binary Sex Categories." In *Transgender Rights*. Edited by Paisley Currah, Richard M. Juang and Shannon Minter, 51–73. Minneapolis: University of Minnesota Press, 2006.
- Grey, Aubrey de. *The Mitochondrial Free Radical Theory of Aging*. Austin: R. G. Landes, 1999.
- Grey, Aubrey de, and Michael Rae. *Ending Aging: The Rejuvenation Breakthroughs That Could Reverse Human Aging in Our Lifetime*. New York: St. Martin's Press, 2007.
- Griffin, David Ray. *God, Power, and Evil: A Process Theodicy*. Philadelphia: Westminster Press, 1976.
- Groothuis, Douglas R. *Christian Apologetics: A Comprehensive Case for Biblical Faith*. Downers Grove, IL: InterVarsity Press, 2011.
- Grossman, Lev. "2045: The Year Man Becomes Immortal." *Time* 177, no. 7 (2011).
- Grudem, Wayne A. *Systematic Theology: An Introduction to Biblical Doctrine*. Grand Rapids: Zondervan, 1994.
- Grumett, David. *Teilhard de Chardin: Theology, Humanity and Cosmos*. Dudley, MA: Peeters, 2005.
- Guttenplan, Samuel D., ed. *A Companion to the Philosophy of Mind*. Oxford: Blackwell, 1994.
- Guyer, Paul. Review of *Kant's Moral Metaphysics: God, Freedom, and Immortality*, edited by Benjamin J. Bruxvoort Lipscomb and James Krueger. *Notre Dame Philosophical Review: An Electronic Journal*. April 25, 2012. <https://ndpr.nd.edu/news/kant-s-moral-metaphysics-god-freedom-and-immortality/>.
- Habermas, Jürgen. *The Future of Human Nature*. Cambridge: Polity Press, 2003.
- Habets, Myk. "Reforming Theōsis." In *Theōsis: Deification in Christian Theology*, 146–67. Eugene, OR: Pickwick, 2006.
- Haldane, J. B. S. *Daedalus, or Science and the Future: A Paper Read to the Heretics, Cambridge, on February 4th, 1923*. New York: E.P. Dutton & Company, 1924.

- Hanson, Robin. "The Great Filter – Are We Almost Past It?" *Robin Hanson* (blog). September 15, 1998. <http://mason.gmu.edu/~rhanson/greatfilter.html>.
- Haraway, Donna J. *Simians, Cyborgs, and Women: The Reinvention of Nature*. New York: Routledge, 1991.
- Harper, Kenneth C. "Francis A. Schaeffer: An Evaluation." *Bibliotheca Sacra* 133, no. 530 (1976): 130–42.
- Harrington, Alan. *The Immortalist*. Millbrae, CA: Celestial Arts, 1977.
- Harris, John. *Enhancing Evolution: The Ethical Case for Making Better People*. Princeton, NJ: Princeton University Press, 2007.
- . *Wonderwoman and Superman: The Ethics of Human Biotechnology*. Oxford: Oxford University Press, 1992.
- Harrison, Peter, and Joseph Wolyniak. "The History of 'Transhumanism'." *Notes & Queries* 62, no. 3 (2015): 465–67.
- Hart, Roger, and Robert J. Norman. "The Longer-Term Health Outcomes for Children Born as a Result of IVF Treatment. Part II – Mental Health and Development Outcomes." *Human Reproduction Update* 19, no. 3 (2013): 244–50.
- Haughey, John C. "Transhumanism and the Anticipatory Universe." In *Humanity on the Threshold: Religious Perspectives on Transhumanism*. Edited by John C. Haughey and Ilia Delio, 7–20. Washington, DC: Council for Research in Values and Philosophy, 2014.
- Haughey, John C., and Ilia Delio, eds. *Humanity on the Threshold: Religious Perspectives on Transhumanism*. Washington, DC: Council for Research in Values and Philosophy, 2014.
- Hauskeller, Michael. "Nietzsche, the Overhuman and the Posthuman: A Reply to Stefan Sorgner." *Journal of Evolution & Technology* 21, no. 1 (2010): 5–8.
- . "Utopia." In *Post- and Transhumanism: An Introduction*. Edited by Robert Ranisch and Stefan Lorenz Sorgner, 101–8. Frankfurt am Main: Peter Lang, 2014.
- Hayflick, Leonard. "Aging, Longevity Determination and Disease." In *Principles and Practice of Geriatric Surgery*. Edited by Ronnie Ann Rosenthal, Michael E. Zenilman and Mark R. Katlic, 3–7. New York: Springer-Verlag, 2011.
- . "Aging: The Reality: 'Anti-Aging' Is an Oxymoron." *The Journals of Gerontology: Series A* 59, no. 6 (2004): 573–78.
- . "Anti-Aging Medicine: Fallacies, Realities, Imperatives: Author's Response to Commentary." *The Journals of Gerontology: Series A* 60, no. 10 (2005): 1228–32.
- . "The Future of Ageing." *Nature* 408, no. 6809 (2000): 267–69.
- . "How and Why We Age." *Experimental Gerontology* 33, no. 7-8 (1998): 639–53.

- Hayles, Katherine. *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics*. Chicago: University of Chicago Press, 1999.
- Hayward, Jeremy W., and Francisco J. Varela. *Gentle Bridges: Conversations with the Dalai Lama on the Sciences of Mind*. Boston: Shambhala, 1992.
- Hefner, Philip. "The Animal that Aspires to be an Angel: The Challenge of Transhumanism." *Dialog: A Journal of Theology* 48, no. 2 (2009): 158–67.
- . "Biocultural Evolution and the Created Co-Creator." In *Science and Theology: The New Consonance*. Edited by Ted Peters, 174–88. Boulder: Westview Press, 1998.
- Hegel, G. W. F. *The Phenomenology of Spirit*. Translated and edited by Terry P. Pinkard. Cambridge: Cambridge University Press, 2018.
- Herculano-Houzel, Suzana. "The Human Brain in Numbers: A Linearly Scaled-Up Primate Brain." *Frontiers in Human Neuroscience* 3 (2009): 31.
- Hesselgrave, David J., and Earl J. Blomberg. *Planting Churches Cross-Culturally: A Guide for Home and Foreign Missions*. Grand Rapids: Baker Book House, 1980.
- Hester, David. "Intersexes and the End of Gender: Corporeal Ethics and Postgender Bodies." *Journal of Gender Studies* 13, no. 3 (2004): 215–25.
- Hick, John. *Evil and the God of Love*. New York: Harper & Row, 1966.
- Hickman, Louise. "The Nature of the Self and the Contemplation of Nature: Ecotheology and the History of the Soul." In *The Concept of the Soul: Scientific and Religious Perspectives*. Edited by Michael Fuller, 5–28. New Castle upon Tyne, UK: Cambridge Scholars, 2014.
- Hiebert, Paul G. "The Flaw of the Excluded Middle." *Missiology: An International Review* 10, no. 1 (1982): 35–47.
- . *Transforming Worldviews: An Anthropological Understanding of How People Change*. Grand Rapids: Baker Academic, 2008.
- Hindmarsh, D. Bruce. *The Evangelical Conversion Narrative: Spiritual Autobiography in Early Modern England*. New York: Oxford University Press, 2007.
- History.com. "Mk-ultra." August 21, 2018. <https://www.history.com/topics/us-government/history-of-mk-ultra>.
- Hoekema, Anthony A. *Created in God's Image*. Grand Rapids: W. B. Eerdmans, 1988.
- Holmes, Arthur F. *All Truth Is God's Truth*. Grand Rapids: W. B. Eerdmans, 1977.
- Horn, Thomas R. *Nephilim Stargates: The Year 2012 and the Return of the Watchers*. Crane, MO: Defender, 2007.
- , ed. *Pandemonium's Engine: How the End of the Church Age, the Rise of Transhumanism, and the Coming of the Übermensch (Overman) Herald Satan's Imminent and Final Assault on the Creation of God*. Crane, MO: Defender, 2011.

- Horn, Thomas R., and Nita F. Horn. *Forbidden Gates: How Genetics, Robotics, Artificial Intelligence, Synthetic Biology, Nanotechnology, and Human Enhancement Herald the Dawn Of Techno-Dimensional Spiritual Warfare*. Crane, MO: Defender, 2011.
- Houtz, Wyatt. "Karl Barth's Letter to Francis Schaeffer." *The PostBarthian* (blog). April 2, 2016. <https://postbarthian.com/2016/04/02/karl-barths-letter-to-francis-schaeffer/>.
- Hrdy, Sarah B. *Mother Nature: A History of Mothers, Infants, and Natural Selection*. New York: Random House, 2000.
- Hughes, James J. "Buddhist Bioethics." In *Principles of Health Care Ethics*. Edited by Richard Ashcroft, Angus Dawson, Heather Draper and John McMillan, 127–34. Chichester, UK: Wiley, 2007.
- . *Citizen Cyborg: Why Democratic Societies Must Respond to the Redesigned Human of the Future*. Cambridge, MA: Westview Press, 2004.
- . "The Compatibility of Religious and Transhumanist Views of Metaphysics, Suffering, Virtue and Transcendence in an Enhanced Future." *IEET*. May 8, 2007. <https://ieet.org/index.php/IEET2/more/hughes20070401>.
- . "Contradictions from the Enlightenment Roots of Transhumanism." *Journal of Medicine and Philosophy* 35, no. 6 (2010): 622–40.
- . "Democratic Transhumanism 2.0." *Changesurfer Consulting* (blog). Accessed October 23, 2018. <http://www.changesurfer.com/Acad/DemocraticTranshumanism.htm>.
- . "The Politics of Transhumanism." *Changesurfer Consulting* (blog). 2002-03. <http://www.changesurfer.com/Acad/TranshumPolitics.htm>.
- . "The Politics of Transhumanism and the Techno-Millennial Imagination, 1626-2030." *Zygon* 47, no. 4 (2012): 757–76.
- . "Problems of Transhumanism: Atheism vs. Naturalist Theologies." *IEET*. January 14, 2010. <https://ieet.org/index.php/IEET2/more/hughes20100114/>.
- . "Problems of Transhumanism: Introduction." *IEET*. January 14, 2010. <https://ieet.org/index.php/IEET2/more/hughes20100105/>.
- . "Report on the 2007 Interests and Beliefs Survey of the Members of the World Transhumanist Association." Accessed August 20, 2019. <https://ieet.org/images/uploads/WTASurvey2007.pdf>.
- . "Technologies of Self-Perfection: What Would the Buddha Do with Nanotechnology and Psychopharmaceuticals?" *IEET*. September 22, 2004. <https://ieet.org/index.php/IEET2/more/hughes20040922>.
- . "Transhumanism and Personal Identity." In *The Transhumanist Reader: Classical and Contemporary Essays on the Science, Technology, and Philosophy of the Human Future*. Edited by Max More and Natasha Vita-More, 227–33. Chichester, UK: Wiley-Blackwell, 2013.

- Hughes, James J., Michael LaTorra, and George Dvorsky. "Cyborg Buddha Project." *IEET*. Accessed October 24, 2018. <https://ieet.org/index.php/IEET2/cyborgbuddha>.
- Human Flourishing in a Technological World: A Christian Perspective. "Transhumanism and Human Flourishing: A Critical Engagement." April 28, 2020. <https://www.christianflourishing.com/blog/2020/4/28/transhumanism-and-human-flourishing-a-critical-engagement>.
- Humanity+. "U.S. Transhumanist Party Platform." Accessed August 21, 2019. <http://transhumanist-party.org/platform/>.
- Hume, David. *Enquiries Concerning the Human Understanding and Concerning the Principles of Morals*. 3rd ed. Edited by L. A. Selby-Bigge and P. H. Nidditch. Oxford: Clarendon Press, 1975.
- . *An Enquiry Concerning Human Understanding*. Edited by Peter Millican. New York: Oxford University Press, 2007.
- . *An Enquiry Concerning the Principles of Morals*. Edited by J. B. Schneewind. Indianapolis: Hackett, 1983.
- . *A Treatise of Human Nature*. 2nd ed. Edited by L. A. Selby-Bigge and P. H. Nidditch. New York: Oxford University Press, 1978.
- Huxley, Aldous. *Brave New World*. New York: Perennial Classics, 1998.
- . *Island*. New York: Harper & Row, 1962.
- Huxley, Julian. *Religion without Revelation*. Westport, CT: Greenwood Press, 1979.
- International Association for the Cognitive Science of Religion. "About the IACSR." Accessed November 2, 2018. <http://www.iacsr.com/>.
- International Humanist and Ethical Union. "The Amsterdam Declaration." 2002. <https://iheu.org/about/humanism/the-amsterdam-declaration/>.
- International Theological Commission. "Communion and Stewardship: Human Persons Created in the Image of God." July 23, 2004. http://www.vatican.va/roman_curia/congregations/cfaith/cti_documents/rc_con_cfaith_doc_20040723_communion-stewardship_en.html.
- Ipsos. "One in Seven (14%) Global Citizens Believe End of the World Is Coming in Their Lifetime." May 1, 2012. <https://www.ipsos.com/en-us/one-seven-14-global-citizens-believe-end-world-coming-their-lifetime>.
- Isherwood, Christopher. *The Song of God, Bhagavad Gita*. Hollywood: Vedanta Press, 1987.
- Istvan, Zoltan. "The Growing World of Libertarian Transhumanism." *The American Conservative*, August 8, 2017. <https://www.theamericanconservative.com/articles/the-growing-world-of-libertarian-transhumanism/>.
- . *The Transhumanist Wager*. Reno, NV: Futurity Imagine Media, 2013.

- Javi. "On Buddhist Transhumanism." February 20, 2017.
<https://dhammadawheel.com/viewtopic.php?t=28990>.
- Jensen, Steven J. "The Roots of Transhumanism." *Nova et Vetera (English Edition)* 12, no. 2 (2014): 515–41.
- Johnson, Phillip E. *Reason in the Balance: The Case Against Naturalism in Science, Law & Education*. Downers Grove, IL: InterVarsity Press, 1995.
- Jonas, Hans. "The Burden and Blessing of Mortality." *The Hastings Center Report* 22, no. 1 (1992): 34–40.
- . *Technik, Medizin Und Ethik: Zur Praxis des Prinzips Verantwortung*. Berlin: Suhrkamp, 1985.
- Jones, D. Gareth. "A Christian Perspective on Human Enhancement." *Science & Christian Belief* 22, no. 2 (2010): 114–16.
- Jong, Jonathan. "On Biotechnology, Theology, and the Human Sciences." *Theology and Science* 16, no. 3 (2018): 343–52.
- Jordan, Gregory E. "Apologia for Transhumanist Religion." *Journal of Evolution & Technology* 15, no. 1 (2006): 55–72.
- Jotterand, Fabrice. "Human Dignity and Transhumanism: Do Anthro-Technological Devices Have Moral Status?" *The American Journal of Bioethics* 10, no. 7 (2010): 45–52.
- Joy, Bill. "Why the Future Doesn't Need Us." *Wired*. April 1, 2000.
<https://www.wired.com/2000/04/joy-2/>.
- Kahneman, Daniel, and Amos Tversky. "Choices, Values, and Frames." *American Psychologist* 39, no. 4: 341–50.
- Kahneman, Daniel, Jack L. Knetsch, and Richard H. Thaler. "Anomalies: The Endowment Effect, Loss Aversion, and Status Quo Bias." *Journal of Economic Perspectives* 5, no. 1 (1991): 193–206.
- . "Experimental Tests of the Endowment Effect and the Coase Theorem." *Journal of Political Economy* 98, no. 6 (1990): 1325–48.
- Kaku, Michio. *The Future of the Mind: The Scientific Quest to Understand, Enhance, and Empower the Mind*. New York: Doubleday, 2014.
- . *Physics of the Future: How Science Will Shape Human Destiny and Our Daily Lives by the Year 2100*. New York: Doubleday, 2011.
- . *Physics of the Impossible: A Scientific Exploration into the World of Phasers, Force Fields, Teleportation, and Time Travel*. New York: Doubleday, 2008.
- Kant, Immanuel. *Critique of Pure Reason*. Translated by Norman Kemp Smith. London: Macmillan, 1929.

- Kass, Leon R. "Ageless Bodies, Happy Souls: Biotechnology and the Pursuit of Perfection." *The New Atlantis* no. 1 (2003): 9–28.
- . *Life, Liberty, and the Defense of Dignity: The Challenge for Bioethics*. San Francisco: Encounter Books, 2002.
- . "L'chaim and Its Limits: Why Not Immortality?" *First Things* no. 113 (2001): 17–24.
- . "Preventing a Brave New World." In *Ethics and Emerging Technologies*. Edited by Ronald L. Sandler, 76–89. New York: Palgrave Macmillan, 2014.
- . "The Wisdom of Repugnance: Why We Should Ban the Cloning of Humans." *The New Republic* 216, no. 22 (1997): 17–26.
- Kaufmann, Walter. *Existentialism from Dostoevsky to Sartre*. Rev. and exp. New York: Plume, 1975.
- Kearney, Michael. *World View*. Novato, CA: Chandler and Sharp, 1984.
- Keenan, James F. *Goodness and Rightness in Thomas Aquinas's Summa Theologiae*. Washington, DC: Georgetown University Press, 1992.
- Keller, Timothy. *Center Church: Doing Balanced, Gospel-Centered Ministry in Your City*. Grand Rapids: Zondervan, 2012.
- . "How the Gospel Changes Our Apologetics, Part 1." *Timothy Keller* (blog). July 10, 2012. <https://timothykeller.com/blog/2012/7/10/how-the-gospel-changes-our-apologetics-part-1>.
- Kempis, Thomas à. *The Imitation of Christ*. Translated by Aloysius Croft and Harold Bolton. Mineola, NY: Dover, 2004.
- Kenyon, C., J. Chang, E. Gensch, A. Rudner, and R. Tabtiang. "A C. Elegans Mutant That Lives Twice as Long as Wild Type." *Nature* 366, no. 6454 (1993): 461–64.
- Kilner, John F. *Dignity and Destiny: Humanity in the Image of God*. Grand Rapids: W. B. Eerdmans, 2015.
- , ed. *Why People Matter: A Christian Engagement with Rival Views of Human Significance*. Grand Rapids: Baker Academic, 2017.
- Kim, Kwanoh, Jianhe Guo, Z. X. Liang, F. Q. Zhu, and D. L. Fan. "Man-Made Rotary Nanomotors: A Review of Recent Development." *Nanoscale* 8, no. 20 (2016): 10471–90.
- Kinsley, David R. *Hinduism: A Cultural Perspective*. 2nd ed. Englewood Cliffs, NJ: Prentice Hall, 1993.
- Klass, Michael R. "Aging in the nematode *Caenorhabditis elegans*: Major Biological and Environmental Factors Influencing Life Span." *Mechanisms of Ageing and Development* 6 (1977): 413–29.

- Klassen, Chris, ed. *Feminist Spirituality: The Next Generation*. Lanham, MD: Lexington Books, 2009.
- Koch, Tom. "Enhancing Who? Enhancing What? Ethics, Bioethics, and Transhumanism." *Journal of Medicine and Philosophy* 35, no. 6 (2010): 685–99.
- Koene, Randal A. "Uploading to Substrate-Independent Minds." In *The Transhumanist Reader: Classical and Contemporary Essays on the Science, Technology, and Philosophy of the Human Future*. Edited by Max More and Natasha Vita-More, 146–56. Chichester, UK: Wiley-Blackwell, 2013.
- Konovalenko, Maria. "Neverending Sex." *Maria Konovalenko* (blog). July 27, 2015. <https://mariakonovalenko.wordpress.com/2015/07/27/neverending-sex/>.
- Koons, Jeremy. "Natural Evil as a Test of Faith in the Abrahamic Traditions." *Sophia* no. 49 (2010): 15–28.
- Koosed, Jennifer L., ed. *The Bible and Posthumanism*. Atlanta: Society of Biblical Literature, 2014.
- Kraft, Charles H. *Worldview for Christian Witness*. Pasadena, CA: William Carey Library, 2008.
- Kringelbach, Morten L., and Kent C. Berridge, eds. *Pleasures of the Brain*. Oxford: Oxford University Press, 2010.
- Kroto, H. W., J. R. Heath, S. C. O'Brien, R. F. Curl, and R. E. Smalley. "C60: Buckminsterfullerene." *Nature* 318, no. 6042 (1985): 162–63.
- Kuhn, Thomas S. *The Structure of Scientific Revolutions*. Chicago: University of Chicago Press, 1970.
- Kurzweil, Ray. "Achieving the Software of Human Intelligence: How to Reverse Engineer the Human Brain." In *The Singularity Is Near: When Humans Transcend Biology*, 144–204. New York: Viking, 2005.
- . *The Age of Spiritual Machines: When Computers Exceed Human Intelligence*. New York: Viking, 1999.
- . "The Coming Merging of Mind and Machine." *Scientific American*. March 23, 2009. <https://www.scientificamerican.com/article/merging-of-mind-and-machine/>.
- . *How to Create a Mind: The Secret of Human Thought Revealed*. New York: Viking, 2012.
- . "The Law of Accelerating Returns." *Accelerating Intelligence* (blog). March 7, 2001. <https://www.kurzweilai.net/the-law-of-accelerating-returns>.
- . *The Singularity Is Near: When Humans Transcend Biology*. New York: Viking, 2005.
- . "Will Artificial Intelligence Become Conscious?" *Accelerating Intelligence* (blog). December 22, 2017. <https://www.kurzweilai.net/will-artificial-intelligence-become-conscious>.

- Kurzweil, Ray, and Terry Grossman. *Fantastic Voyage: Live Long Enough to Live Forever*. Emmaus, PA: Rodale, 2004.
- La Mettrie, Julien Offray de. *Man a Machine*. La Salle, IL: Open Court, 1912.
- Labaree, Leonard Woods, and Whitfield J. Bell, eds. *Mr. Franklin: A Selection from His Personal Letters*. New Haven: Yale University Press, 1956.
- Lander, Eric S. "Brave New Genome." *New England Journal of Medicine* 373, no. 1 (2015): 5–8.
- Larrimore, Mark. "Evil and Wonder in Early Modern Philosophy: A Response to Susan Neiman." In *Teaching New Histories of Philosophy: Proceedings of a Conference*. Edited by J. B. Schneewind, 51–60. Princeton, NJ: University Center for Human Values, Princeton University, 2003.
- LaTorra, Michael. Review of *Post- and Transhumanism: An Introduction*, edited by Robert Ranisch and Stefan Lorenz Sorgner. *College Literature* 42, no. 3 (2015): 532–35.
- . "What Is Buddhist Transhumanism?" *Theology and Science* 13, no. 2 (2015): 219–29.
- Lee, Shin-Hae, and Kyung-Jin Min. "Caloric Restriction and Its Mimetics." *BMB Reports* 46, no. 4 (2013): 181–87.
- Leigh, David R. *Presupposing: How to Defend the Faith: The Methods of Francis Schaeffer and Cornelius Van Til*. Fox River Grove, IL: Leighist & Grateful Pressless Press, 2012.
- Lemmens, Pieter. Review of *Post- and Transhumanism: An Introduction*, edited by Robert Ranisch and Stefan Lorenz Sorgner. *Human Studies* 38, no. 3 (2015): 431–38.
- Levi-Strauss, Claude. "Pain and Pleasure: Masters of Mankind." In *Pleasures of the Brain*. Edited by Morten L. Kringelbach and Kent C. Berridge, 320–35. Oxford: Oxford University Press, 2010.
- . *Structural Anthropology*. Rev. ed. New York: Basic Books, 1974.
- Lewis, David. "Mad Pain and Martian Pain." In *Readings in Philosophy of Psychology*. Edited by Ned Block, 1:216–22. Cambridge, MA: Harvard University Press, 1980.
- Lewis, Gordon R. *Testing Christianity's Truth Claims: Approaches to Christian Apologetics*. Lanham, MD: University Press of America, 1990.
- Lewis, Jim. "Drexler Calms Fears of Runaway Replicators." June 9, 2004. https://foresight.org/drexler_calms_fears_of_runaway_replicators/.
- Lipscomb, Benjamin J. Bruxvoort, and James Krueger, eds. *Kant's Moral Metaphysics: God, Freedom, and Immortality*. Berlin: De Gruyter, 2010.
- Little, Bruce A., ed. *Francis Schaeffer: A Mind and Heart for God*. Phillipsburg, NJ: P&R Publishing, 2010.

- Locke, John. *The Works of John Locke in Nine Volumes*. 12th ed. Vol. 1. London: Rivington, 1824.
- Longair, Malcolm S., ed. *Confrontation of Cosmological Theories with Observational Data*. Dordrecht, Holland: D. Reidel, 1974.
- Lucas, J. R. "Minds, Machines and Gödel." *Philosophy* 36, no. 137 (1961): 112–27.
- Ludwig, David. "Beyond Physicalism and Dualism? Putnam's Pragmatic Pluralism and the Philosophy of Mind." *European Journal of Pragmatism and American Philosophy* III, no. 2 (2011): 245–57.
- Ma, Hong, Nuria Marti-Gutierrez, Sang-Wook Park, Jun Wu, Yeonmi Lee, Keiichiro Suzuki, Amy Koski et al. "Correction of a Pathogenic Gene Mutation in Human Embryos." *Nature* 548, no. 7668 (2017): 413–19.
- MacArthur, John. "Humanity on Trial." (sermon manuscript). March 15, 2009. <http://www.gty.org/resources/sermons/80-343/humanity-on-trial>.
- Macaskill, Grant. "Playing God or Participating in God? What Considerations Might the New Testament Bring to the Ethics of the Biotechnological Future?" *Studies in Christian Ethics* 32, no. 2 (2019): 152–64.
- Machen, J. Gresham. "Karl Barth and 'The Theology of Crisis'." *Westminster Theological Journal* 53, no. 2 (1991): 197–207.
- Manoj, V. R. "Spiritual Transcendence in Transhumanism." *Journal of Evolution & Technology* 17, no. 1 (2008): 36–44.
- Manzocco, Roberto. *Transhumanism – Engineering the Human Condition: History, Philosophy and Current Status*. Cham, Switzerland: Springer, 2019.
- Marantz, Andrew. "The Transhumanists' Nominee for President." *New Yorker*. November 6, 2016. <https://www.newyorker.com/magazine/2016/11/14/the-transhumanists-nominee-for-president>.
- Marx, Karl. "On the Jewish Question." In *The Marx-Engels Reader*. Edited by Robert C. Tucker, 26–46. New York: Norton, 1978.
- Masci, David. *To Count Our Days: The Scientific and Ethical Dimensions of Radical Life Extension*. Washington, DC: Pew Research Center, 2013.
- Maul, A. "An Evolutionary Interpretation of the Significance of Physical Pain Experienced by Human Females: Defloration and Childbirth Pains." *Medical Hypotheses* 69, no. 2 (2007): 403–9.
- McCormack, Bruce L. *The Epistle to the Romans*. Oxford: Oxford University Press, 1968.
- McCracken, Harry, and Lev Grossman. "Google vs. Death." *Time* 182, no. 14 (2013).
- McGrath, Alister E. *Darwinism and the Divine: Evolutionary Thought and Natural Theology*. Oxford: Wiley-Blackwell, 2011.

- McKenny, Gerald P. "Human Nature and Biotechnological Enhancement: Some Theological Considerations." *Studies in Christian Ethics* 32, no. 2 (2019): 229–40.
- McKibben, Bill. "Designer Genes." *Orion Magazine*. Accessed August 23, 2019. <https://orionmagazine.org/article/designer-genes/>.
- . *Enough: Staying Human in an Engineered Age*. New York: H. Holt, 2004.
- McKim, William. *Drugs and Behavior: An Introduction to Behavioral Pharmacology*. 6th ed. Upper Saddle River, NJ: Prentice Hall, 2007.
- McKinney, Laurence O. *Neurotheology: Virtual Religion in the 21st Century*. Cambridge, MA: American Institute for Mindfulness, 1994.
- McLean, George F. "Notes on a Seminar on Transhumanism with Jürgen Habermas." In *Humanity on the Threshold: Religious Perspectives on Transhumanism*. Edited by John C. Haughey and Ilia Delio, 155–58. Washington, DC: Council for Research in Values and Philosophy, 2014.
- McNamee, M. J., and S. D. Edwards. "Transhumanism, Medical Technology and Slippery Slopes." *Journal of Medical Ethics* 32, no. 9 (2006): 513–18.
- Mercedes, Anna, and Jennifer Thweatt-Bates. "Bound in the Spiral Dance: Spirituality and Technology in the Third Wave." In *Feminist Spirituality: The Next Generation*. Edited by Chris Klassen, 63–84. Lanham, MD: Lexington Books, 2009.
- Metzinger, Thomas. *The Ego Tunnel: The Science of the Mind and the Myth of the Self*. New York: Basic Books, 2009.
- Meulen, Ruud ter. "Dignity, Posthumanism, and the Community of Values." *The American Journal of Bioethics* 10, no. 7 (2010): 69–70.
- Micheva, Kristina D., Busse, Brad, Nicholas C. Weiler, Nancy O'Rourke, and Stephen J. Smith. "Single-Synapse Analysis of a Diverse Synapse Population: Proteomic Imaging Methods and Markers." *Neurotechnique* 68, no. 4 (2010): 639–53.
- Middleton, J. Richard. *The Liberating Image: The Imago Dei in Genesis 1*. Grand Rapids: Brazos, 2005.
- Midgley, Mary. *Science as Salvation: A Modern Myth and Its Meaning*. London: Routledge, 1992.
- Mill, John Stuart. "On Liberty." In *Utilitarianism and on Liberty*. Edited by Mary Warnock, 88–180. Malden, MA: Blackwell, 2003.
- . *Utilitarianism*. London: Parker and Bourn, 1863.
- Milne, James Maxwell. "Nietzsche, Transhumanism, and the Value of Suffering." *Journal of Theta Alpha Kappa* 34, no. 1 (2010): 47–55.
- Minsky, Marvin. "Why Freud Was the First Good AI Theorist." In *The Transhumanist Reader: Classical and Contemporary Essays on the Science, Technology, and Philosophy of the Human Future*. Edited by Max More and Natasha Vita-More, 167–76. Chichester, UK: Wiley-Blackwell, 2013.

- . “Will Robots Inherit the Earth?” *Scientific American* 271, no. 4 (1994): 108–13.
- Mitchell, C. Ben, and John F. Kilner. “Remaking Humans: The New Utopians Versus a Truly Human Future.” September 30, 2003. <https://cbhd.org/content/remaking-humans-new-utopians-versus-truly-human-future>.
- Mitchell, Stephen. *Gilgamesh: A New English Version*. New York: Free Press, 2004.
- Molhoek, Braden. “Raising the Virtuous Bar: The Underlying Issues of Genetic Moral Enhancement.” *Theology and Science* 16, no. 3 (2018): 279–87.
- Molnar, Thomas. “Marxism and the Utopian Theme.” *Marxist Perspectives* (1978): 153–154.
- Monod, Jacques. *Chance and Necessity: An Essay on the Natural Philosophy of Modern Biology*. Translated by Austryn Wainhouse. New York: Knopf, 1971.
- Moore, G. E. *Principia Ethica*. Mineola, NY: Dover, 2004.
- Moore, Geoffrey A. *Crossing the Chasm: Marketing and Selling Technology Project*. Harper Collins, 2009.
- Moravec, Hans. *Mind Children: The Future of Robot and Human Intelligence*. Cambridge, MA: Harvard University Press, 1988.
- . “Pigs in Cyberspace.” In *The Transhumanist Reader: Classical and Contemporary Essays on the Science, Technology, and Philosophy of the Human Future*. Edited by Max More and Natasha Vita-More, 177–81. Chichester, UK: Wiley-Blackwell, 2013.
- . *Robot: Mere Machine to Transcendent Mind*. New York: Oxford University Press, 1999.
- More, Max. “The Diachronic Self: Identity, Continuity, Transformation.” PhD diss., University of Southern California, 1995.
- . “The Extropian Principles.” *Extropy* no. 6 (1990): 17–18.
- . “The Extropist Manifesto.” 1998. <http://extropism.tumblr.com/post/393563122/the-extropist-manifesto>.
- . “H+: True Transhumanism.” *Metanexus*. February 5, 2009. <http://www.metanexus.net/essay/h-true-transhumanism>.
- . “A Letter to Mother Nature.” In *The Transhumanist Reader: Classical and Contemporary Essays on the Science, Technology, and Philosophy of the Human Future*. Edited by Max More and Natasha Vita-More, 449–50. Chichester, UK: Wiley-Blackwell, 2013.
- . “A Letter to Mother Nature: Amendments to the Human Constitution.” May 25, 2009. <http://strategicphilosophy.blogspot.com/2009/05/its-about-ten-years-since-i-wrote.html>.

- . “The Overhuman in the Transhuman.” *Journal of Evolution & Technology* 21, no. 1 (2010): 1–4.
- . “Pancritical Rationalism: An Extropic Metacontext for Memetic Progress.” Paper presented at the Extro-1 Conference, Sunnyvale, CA, April 30 - May 1, 1994.
- . “The Philosophy of Transhumanism.” In *The Transhumanist Reader: Classical and Contemporary Essays on the Science, Technology, and Philosophy of the Human Future*. Edited by Max More and Natasha Vita-More, 3–17. Chichester, UK: Wiley-Blackwell, 2013.
- . “The Principles of Extropy: Version 3.11.” October 15, 2013. <https://lifeboat.com/ex/the.principles.of.extropy>.
- . “The Proactionary Principle.” Accessed November 23, 2015. <http://www.extropy.org/proactionaryprinciple.htm>.
- . “The Proactionary Principle: Optimizing Technological Outcomes.” In *The Transhumanist Reader: Classical and Contemporary Essays on the Science, Technology, and Philosophy of the Human Future*. Edited by Max More and Natasha Vita-More, 258–67. Chichester, UK: Wiley-Blackwell, 2013.
- . “Singularity and Surge Scenarios.” *Max More’s Strategic Philosophy* (blog). June 21, 2009. <http://strategicphilosophy.blogspot.com/2009/06/how-fast-will-future-arrive-how-will.html>.
- More, Max, and Natasha Vita-More, eds. *The Transhumanist Reader: Classical and Contemporary Essays on the Science, Technology, and Philosophy of the Human Future*. Chichester, UK: Wiley-Blackwell, 2013.
- Moreau, A. Scott. “Paul G. Hiebert’s Legacy of Worldview.” *Trinity Journal* 30, no. 2 (2009): 223–33.
- Moreland, J. P. *Consciousness and the Existence of God: A Theistic Argument*. New York: Routledge, 2008.
- Morris, Thomas V. *Francis Schaeffer’s Apologetics: A Critique*. Grand Rapids: Baker Books, 1987.
- Mouchiroud, Laurent, Laurent Molin, Nicolas Dallièrè, and Florence Solari. “Life Span Extension by Resveratrol, Rapamycin, and Metformin: The Promise of Dietary Restriction Mimetics for an Healthy Aging.” *BioFactors* 36, no. 5 (2010): 377–82.
- Mulich, Kate, Nathan B., and William Gillis, eds. “Anarcho-Transhuman.” *Anarcho-Transhuman: a Journal of Radical Possibility & Striving*. Accessed November 2, 2018. <http://anarchotranshuman.org/>.
- Mundi, Amor. “The Politics of Morphological Freedom.” *Amor Mundi* (blog). August 2, 2006. <https://amormundi.blogspot.com/2006/08/politics-of-morphological-freedom.html>.
- Nagel, Thomas. “What Is It Like to Be a Bat?” *The Philosophical Review* 83, no. 4 (1974): 435–50.

- Nash, Ronald H. "The Life of the Mind and the Way of Life." In *Francis A. Schaeffer: Portraits of the Man and His Work*. Edited by Lane T. Dennis, 51–70. Westchester, IL: Crossway, 1986.
- National Research Council (US) Committee on Challenges for the Chemical Sciences in the 21st Century. *Beyond the Molecular Frontier: Challenges for Chemistry and Chemical Engineering*. Washington, DC: National Academies Press, 2003.
- Naugle, David K. *Worldview: The History of a Concept*. Grand Rapids: W. B. Eerdmans, 2002.
- Navarro, Alyssa. "Long-Term Side Effects of IVF Treatment in Children: Can Infertility Treatment Cause Health Risks and Development Delays?" *Tech Times*, January 5, 2016. <https://www.techtimes.com/articles/121458/20160105/long-term-side-effects-of-ivf-treatment-in-children-can-infertility-treatment-cause-health-risks-and-development-delays.htm>.
- Neiman, Susan. *Evil in Modern Thought: An Alternative History of Philosophy*. Princeton, NJ: Princeton University Press, 2002.
- Newberg, Andrew B., Eugene G. D'Aquili, and Vince Rause. *Why God Won't Go Away: Brain Science and the Biology of Belief*. New York: Ballantine Books, 2001.
- Newberg, Andrew B., and Mark Robert Waldman. *How God Changes Your Brain: Breakthrough Findings from a Leading Neuroscientist*. New York: Ballantine Books, 2009.
- Newman, William R. *Promethean Ambitions: Alchemy and the Quest to Perfect Nature*. Chicago: University of Chicago Press, 2005.
- Niebuhr, Reinhold. *The Nature and Destiny of Man: A Christian Interpretation*. New York: Charles Scribner's Sons, 1941.
- Nietzsche, Friedrich Wilhelm. *The Gay Science*. Translated by Thomas Common. Mineola, NY: Dover, 2012.
- . *The Genealogy of Morals*. Translated by Horace B. Samuel. New York: Boni and Liveright, 1887.
- . *Thus Spoke Zarathustra: A Book for Everyone and No One*. Translated by R. J. Hollingsworth. London: Penguin, 1961.
- Noble, David F. *The Religion of Technology: The Divinity of Man and the Spirit of Invention*. New York: Penguin, 1999.
- Norrie, Justin. "IVF Babies at Greater Risk of Heart Problems in Later Life." *The Conversation*. April 19, 2012, <https://theconversation.com/ivf-babies-at-greater-risk-of-heart-problems-in-later-life-6554>.
- Olson, Nikki, and Hank Pellissier. "Artificial Wombs Will Spawn New Freedoms." *IEET*. December 20, 2011. <http://ieet.org/index.php/IEET/more/olson20110526>.
- Ong, Walter J. "World as View and World as Event." *American Anthropologist* 71, no. 4 (1969): 634–47.

- Ortlund, Gavin. "Was Kierkegaard an Irrationalist?" *Soliloquium* (blog). January 18, 2008. <https://gavinortlund.com/2008/01/18/was-kierkegaard-an-irrationalist/>.
- Orwell, George. *1984: A Novel*. New York: New American Library, 1983.
- Ossewaarde-Lowtoo, Roshnee. "Theosis contra Transhumanism." Paper presented at the Transforming Religion Conference, Münster, Germany, 2014.
- O'Donovan, Oliver. *Entering Into Rest*. Grand Rapids: W. B. Eerdmans, 2017.
- . *Finding and Seeking*. Grand Rapids: W. B. Eerdmans, 2014.
- . *Resurrection and Moral Order: An Outline of Evangelical Ethics*. 2nd ed. Grand Rapids: W. B. Eerdmans, 1994.
- . *Self, World, and Time*. Grand Rapids: W. B. Eerdmans, 2013.
- O'Flaherty, Wendy Doniger. *Women, Androgynes, and Other Mythical Beasts*. Chicago: University of Chicago Press, 1990.
- Pallauf, Kathrin, Dawn Chin, Ilka Günther, Marc Birringer, Kai Lüersen, Gerald Schultheiß, Sarah Vieten et al. "Resveratrol, Lunularin and Dihydroresveratrol Do Not Act as Caloric Restriction Mimetics When Administered Intraperitoneally in Mice." *Scientific Reports* 9, no. 1 (2019): 4445.
- Panksepp, Jaak. "On the Neuro-Evolutionary Nature of Social Pain, Support, and Empathy." In *Pain: New Essays on Its Nature and the Methodology of Its Study*. Edited by Murat Aydede, 367–88. Cambridge, MA: MIT Press, 2005.
- Parfit, Derek. *Reasons and Persons*. Oxford: Clarendon Press, 1984.
- Parkhill, Chad. "Humanism after All? Daft Punk's Existentialist Critique of Transhumanism." *Parrhesia* no. 8 (2009): 76–88.
- Pearce, David. *The Hedonistic Imperative*. Self-pub., Amazon Digital Services, 2015. Kindle.
- Pearlman, Alex. "The Opposing Leaders of the Transhumanist Movement Got Salty in a Debate." *Vice*, April 25, 2016. https://www.vice.com/en_us/article/jpg577/transhumanist-debate.
- Peirce, Charles S. *Collected Papers of Charles S. Peirce*. Edited by Charles Hartshorne, Paul Weiss and Arthur Burks. Vol. 5. Cambridge, MA: Harvard University Press, 1934.
- . *Collected Papers of Charles S. Peirce*. Edited by Charles Hartshorne, Paul Weiss and Arthur Burks. Vol. 7. Cambridge, MA: Harvard University Press, 1958.
- . "The Nature of Science." In *Classical American Philosophy: Essential Readings and Interpretive Essays*. Edited by John J. Stuhr, 46–47. New York: Oxford University Press, 1987.
- . *Writings of Charles S. Peirce: A Chronological Edition*. Edited by Christian J. W. Kloesel. Vol. 3. Bloomington: Indiana University Press, 1986.

- Pellissier, Hank. "Do All Transhumanists Want Immortality? No? Why Not?" *The Futurist* 46, no. 6 (2012): 65.
- . "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>.
- Penrose, Roger. "Consciousness Involves Noncomputable Ingredients." May 7, 1996.
https://www.edge.org/conversation/roger_penrose-chapter-14-consciousness-involves-noncomputable-ingredients.
- . *The Emperor's New Mind: Concerning Computers, Minds, and the Laws of Physics*. Oxford: Oxford University Press, 1989.
- . *Shadows of the Mind: A Search for the Missing Science of Consciousness*. Oxford: Oxford University Press, 1994.
- Pepperell, Robert. *The Posthuman Condition: Consciousness Beyond the Brain*. Bristol, UK: Intellect Books, 2003.
- Perkins, Franklin. *Heaven and Earth Are Not Humane: The Problem of Evil in Classical Chinese Philosophy*. Bloomington: Indiana University Press, 2014.
- Persson, Ingmar, and Julian Savulescu. "Moral Transhumanism." *Journal of Medicine and Philosophy* 35, no. 6 (2010): 656–69.
- Peters, Ted. "H-: Transhumanism and the Posthuman Future: Will Technological Progress Get Us There?" *Metanexus*. September 1, 2011.
<https://www.metanexus.net/h-transhumanism-and-posthuman-future-will-technological-progress-get-us-there/>.
- . "Imago Dei, DNA, and the Transhuman Way." *Theology and Science* 16, no. 3 (2018): 353–62.
- . "'Playing God' and Germline Intervention." *The Journal of Medicine and Philosophy* 20 (1995): 365–86.
- . "Progress and Provolution: Will Transhumanism Leave Sin Behind?" In *Transhumanism and Transcendence: Christian Hope in an Age of Technological Enhancement*. Edited by Ronald Cole-Turner, 63–86. Washington, DC: Georgetown University Press, 2011.
- , ed. *Science and Theology: The New Consonance*. Boulder: Westview Press, 1998.
- . "The Soul of Trans-Humanism." *Dialog: A Journal of Theology* 44, no. 4 (2005): 381–95.
- . "Theologians Testing Transhumanism." *Theology and Science* 13, no. 2 (2015): 130–49.
- Peterson, Ryan S. *The Imago Dei as Human Identity: A Theological Interpretation*. Winona Lake, IN: Eisenbrauns, 2016.

- Pew Research Center. *Life in 2050: Amazing Science, Familiar Threats: Public Sees a Future Full of Promise and Peril*. Washington, DC: Pew Research Center, June 22, 2010.
- . *Living to 120 and Beyond: Americans' Views on Aging, Medical Advances and Radical Life Extension*. Washington, DC: Pew Research Center, August 6, 2013.
- . *Religious Leaders' Views on Radical Life Extension*. Washington, DC: Pew Research Center, August 6, 2013.
- Piccinini, Gualtiero. "The Mind as Neural Software? Understanding Functionalism, Computationalism, and Computational Functionalism." *Philosophy and Phenomenological Research* 81, no. 2 (2010): 269–311.
- Pico della Mirandola, Giovanni. *Oration on the Dignity of Man*. Translated by A. Robert Caponigri. Chicago: Regnery Gateway, 1956.
- Pinker, Steven. *The Blank Slate: The Modern Denial of Human Nature*. New York: Viking, 2002.
- Pinker, Susan. *The Village Effect: Why Face-to-Face Contact Matters*. London: Atlantic Books, 2014.
- Pinsent, Andrew, and Sean Biggins. "Catholic Perspectives on Human Biotechnological Enhancement." *Studies in Christian Ethics* 32, no. 2 (2019): 187–99.
- Piper, John. *Finally Alive: What Happens When We Are Born Again*. Ross-shire, Scotland: Christian Focus, 2008.
- Plantinga, Alvin. *God, Freedom, and Evil*. Grand Rapids: W. B. Eerdmans, 1977.
- . *Where the Conflict Really Lies: Science, Religion, and Naturalism*. New York: Oxford University Press, 2011.
- Pontin, Jason. "Is Defeating Aging Only a Dream?" *MIT Technology Review*. July 11, 2006. <http://www2.technologyreview.com/sens/>.
- . "The SENS Challenge." *MIT Technology Review*. July 28, 2005. <http://www.technologyreview.com/view/404453/the-sens-challenge/>.
- Pope Benedict XVI. "Easter Virgil Homily at Saint Peter's Basilica." April 3, 2010. http://www.vatican.va/content/benedict-xvi/en/homilies/2010/documents/hf_ben-xvi_hom_20100403_veglia-pasquale.html.
- Popper, Karl R. "Intellectual Autobiography." In *The Philosophy of Karl Popper*. Edited by Paul Arthur Schilpp, 3–184. La Salle, IL: Open Court, 1974.
- . *Objective Knowledge: An Evolutionary Approach*. Rev. ed. New York: Clarendon Press, 1979.
- . *The Open Society and Its Enemies*. 5th ed. Princeton, NJ: Princeton University Press.

- Putnam, Hilary. "Naturalism, Realism, and Normativity." *Journal of the American Philosophical Association* 1, no. 2 (2015): 312–328.
- . "Putnam, Hilary." In *A Companion to the Philosophy of Mind*. Edited by Samuel D. Guttenplan, 507–11. Oxford: Blackwell, 1994.
- . "Reductionism and the Nature of Psychology." *Cognition* 2, no. 1 (1973): 131–146.
- . "Reflexive Reflections." *Erkenntnis* 22, no. 1-3 (1985): 143–53.
- . *Representation and Reality*. Cambridge, MA: MIT Press, 2001.
- . *The Threefold Cord: Mind, Body, and World*. New York: Columbia University Press, 1999.
- Quayle, Stephen. *Genetic Armageddon: Today's Technology Tomorrow's Monsters*. Bozeman, MO: End Time Thunder Publishers, 2003.
- Rae, Gavin. "Heidegger's Influence on Posthumanism: The Destruction of Metaphysics, Technology and the Overcoming of Anthropocentrism." *History of the Human Sciences* 27, no. 1 (2014): 51–69.
- Rae, Michael J. "Anti-Aging Medicine: Fallacies, Realities, Imperatives: Commentary." *The Journals of Gerontology: Series A* 60, no. 10 (2005): 1223–27.
- Rahner, Karl. "The Problem of Genetic Manipulation." *Theological Investigations* 9 (1972): 225–57.
- Ramm, Bernard L. *Varieties of Christian Apologetics*. Grand Rapids: Baker Book House, 1962.
- Rand, Ayn. *Introduction to Objectivist Epistemology*. Edited by Leonard Peikoff and Harry Binswanger. New York: New American Library, 1990.
- Ranisch, Robert. "Morality." In *Post- and Transhumanism: An Introduction*. Edited by Robert Ranisch and Stefan Lorenz Sorgner, 149–72. Frankfurt am Main: Peter Lang, 2014.
- Ranisch, Robert, and Stefan Lorenz Sorgner, eds. *Post- and Transhumanism: An Introduction*. Frankfurt am Main: Peter Lang, 2014.
- Ravitsky, Vardit, Autumn Fiester, and Arthur L. Caplan, eds. *The Penn Center Guide to Bioethics*. New York: Springer, 2009.
- Read, Rupert, and Tim O'Riordan. "The Precautionary Principle Under Fire." *Environment: Science and Policy for Sustainable Development* 59, no. 5 (2017): 4–15.
- Redding, Micah. "Can Transhumanism Lead Us Back to Orthodoxy?" *Christ and Pop Culture*, July 18, 2016. <https://christandpopculture.com/can-transhumanism-lead-us-back-to-orthodoxy/>.

- Rees, Martin J. *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.
- Regalado, Antonio. "CRISPR Gene Editing to be Tested on People by 2017, Says Editas." *MIT Technology Review*, November 5, 2015. <https://www.technologyreview.com/s/543181/crispr-gene-editing-to-be-tested-on-people-by-2017-says-editas/>.
- . "The DIY Designer Baby Project Funded with Bitcoin." *MIT Technology Review*, February 1, 2019. <https://www.technologyreview.com/s/612838/the-transhumanist-diy-designer-baby-funded-with-bitcoin/>.
- . "Dupont Predicts CRISPR Plants on Dinner Plates in Five Years." *MIT Technology Review*, October 8, 2015. <https://www.technologyreview.com/s/542311/dupont-predicts-crispr-plants-on-dinner-plates-in-five-years/>.
- . "First Gene-Edited Dogs Reported in China." *MIT Technology Review*, October 19, 2015. <https://www.technologyreview.com/s/542616/first-gene-edited-dogs-reported-in-china/>.
- . "A Potato Made with Gene Editing." *MIT Technology Review*, April 20, 2015. <https://www.technologyreview.com/s/536756/a-potato-made-with-gene-editing/>.
- . "U.S. Panel Endorses Designer Babies to Avoid Serious Disease." *MIT Technology Review*, February 14, 2017. <https://www.technologyreview.com/s/603633/us-panel-endorses-designer-babies-to-avoid-serious-disease/>.
- Regis, Ed. "Meet the Extropians." *Wired*. October 1, 1994. <https://www.wired.com/1994/10/extropians/>.
- Regis, Edward. *Great Mambo Chicken and the Transhuman Condition: Science Slightly Over the Edge*. Reading, MA: Addison-Wesley, 1990.
- Rifkin, Jeremy. *Algeny*. New York: Viking, 1983.
- Rincon, Paul. "Nanotech Guru Turns Back on 'Goo'." BBC News. June 9, 2004. <http://news.bbc.co.uk/2/hi/science/nature/3788673.stm>.
- Robertson, J. M., ed. *The Philosophical Works of Francis Bacon*. London: Routledge, 1905.
- Roco, Mihail C., and William S. Bainbridge, eds. "Converging Technologies for Improving Human Performance: Nanotechnology, Biotechnology, Information Technology and Cognitive Science." *NSF/DOC-Sponsored report* (2003).
- Roden, David. "Deconstruction and Excision in Philosophical Posthumanism." *Journal of Evolution & Technology* 21, no. 1 (2010): 27–36.

- Rolston, H., III. "Human Uniqueness and Human Dignity: Persons in Nature and the Nature of Persons." In *Human Dignity and Bioethics: Essays Commissioned by the President's Council on Bioethics*, 129–54. Washington, DC: The President's Council on Bioethics, 2008.
- Rose, Michael R. "Immortalist Fictions and Strategies." In *The Transhumanist Reader: Classical and Contemporary Essays on the Science, Technology, and Philosophy of the Human Future*. Edited by Max More and Natasha Vita-More, 196–204. Chichester, UK: Wiley-Blackwell, 2013.
- Rosenthal, Ronnie Ann, Michael E. Zenilman, and Mark R. Katlic, eds. *Principles and Practice of Geriatric Surgery*. 2nd ed. New York: Springer-Verlag, 2011.
- Rossano, Matt J. "Ritual Behavior and the Origins of Modern Cognition." *Cambridge Archaeological Journal* 19, no. 2 (2009): 243–56.
- Rothbard, Murray N. *An Austrian Perspective on the History of Economic Thought*. Vol. 2. Auburn, AL: Ludwig von Mises Institute, 2006.
- Rotila, Viorel. "Two Issues of Transhumanism: Insufficient Evidence and Epistemic Arrogance." In *New Approaches in Social and Humanistic Sciences*, 1:463–68. Bologna, Italy: Medimond, 2016.
- Rotman, David. "Why We Will Need Genetically Modified Foods." *MIT Technology Review*, December 17, 2013. <https://www.technologyreview.com/s/522596/why-we-will-need-genetically-modified-foods/>.
- Rubin, Charles T. *Eclipse of Man: Human Extinction and the Meaning of Progress*. New York: Encounter Books, 2014.
- Ruegsegger, Ronald W. "Francis Schaeffer on Philosophy." In *Reflections on Francis Schaeffer*. Edited by Ronald W. Ruegsegger, 107–30. Grand Rapids: Zondervan, 1986.
- , ed. *Reflections on Francis Schaeffer*. Grand Rapids: Zondervan, 1986.
- Russell, Bertrand. *Icarus, Or, the Future of Science*. New York: E.P. Dutton & Company, 1924.
- Ryle, Gilbert. *The Concept of Mind*. London: Routledge, 2009.
- Sandars, N. K. *The Epic of Gilgamesh: An English Version with an Introduction*. London: Penguin, 1972.
- Sandberg, Anders. "Morphological Freedom – Why We Not Just Want It, but Need It." In *The Transhumanist Reader: Classical and Contemporary Essays on the Science, Technology, and Philosophy of the Human Future*. Edited by Max More and Natasha Vita-More, 56–64. Chichester, UK: Wiley-Blackwell, 2013.
- . "An Overview of Models of Technological Singularity." In *The Transhumanist Reader: Classical and Contemporary Essays on the Science, Technology, and Philosophy of the Human Future*. Edited by Max More and Natasha Vita-More, 376–94. Chichester, UK: Wiley-Blackwell, 2013.

- Sandberg, Anders, Eric Drexler, and Toby Ord. "Dissolving the Fermi Paradox." *arxiv.org*. June 6, 2018. <http://arxiv.org/abs/1806.02404>.
- Sandberg, Anders, and Nick Bostrom. *Whole Brain Emulation: A Roadmap*. Future of Humanity Institute, Oxford University, 2008.
- Sandel, Michael J. *The Case against Perfection: Ethics in the Age of Genetic Engineering*. Cambridge, MA: Harvard University Press, 2007.
- . "The Case against Perfection: What's Wrong with Designer Children, Bionic Athletes, and Genetic Engineering." *The Atlantic*, April 1, 2004. <https://www.theatlantic.com/magazine/archive/2004/04/the-case-against-perfection/302927/>.
- Sandler, Ronald L., ed. *Ethics and Emerging Technologies*. New York: Palgrave Macmillan, 2014.
- Sartre, Jean-Paul. *Being and Nothingness: A Phenomenological Essay on Ontology*. Translated by Hazel Estella Barnes. New York: Washington Square Press, 1984.
- . *Existentialism and Humanism*. Translated by Philip Mairet. London: Methuen, 1948.
- Savulescu, J. "Procreative Beneficence: Why We Should Select the Best Children." *Bioethics* 15, no. 5-6 (2001): 413–26.
- SBJT Forum. "Dimensions of Schaeffer's Life and Thought." *The Southern Baptist Journal of Theology* 6, no. 2 (2002): 68–78.
- Schaeffer, Edith. *L'abri*. New exp. ed. Wheaton, IL: Crossway, 1992.
- . *The Tapestry: The Life and Times of Francis and Edith Schaeffer*. Waco, TX: Word Books, 1981.
- Schaeffer, Francis A. *Back to Freedom and Dignity*. In *The Complete Works of Francis A. Schaeffer: A Christian Worldview*, 1:355–86. Westchester, IL: Crossway, 1985.
- . *A Christian Manifesto*. In *The Complete Works of Francis A. Schaeffer: A Christian Worldview*, 5:417–502. Westchester, IL: Crossway, 1985.
- . *The Church Before the Watching World*. In *The Complete Works of Francis A. Schaeffer: A Christian Worldview*, 4:115–80. Westchester, IL: Crossway, 1985.
- . *Escape from Reason*. In *The Complete Works of Francis A. Schaeffer: A Christian Worldview*, 1:207–354. Westchester, IL: Crossway, 1985.
- . *The God Who Is There*. In *The Complete Works of Francis A. Schaeffer: A Christian Worldview*, 1:5–206. Westchester, IL: Crossway, 1985.
- . *He Is There and He Is Not Silent*. In *The Complete Works of Francis A. Schaeffer: A Christian Worldview*, 1:275–354. Westchester, IL: Crossway, 1985.
- . *How Should We Then Live?* In *The Complete Works of Francis A. Schaeffer: A Christian Worldview*, 5:83–280. Westchester, IL: Crossway, 1985.

- . *The Mark of the Christian*. In *The Complete Works of Francis A. Schaeffer: A Christian Worldview*, 4:181–208. Westchester, IL: Crossway, 1985.
- . *No Final Conflict*. In *The Complete Works of Francis A. Schaeffer: A Christian Worldview*, 2:119–52. Westchester, IL: Crossway, 1985.
- . *Pollution and the Death of Man*. In *The Complete Works of Francis A. Schaeffer: A Christian Worldview*, 5:30011. Westchester, IL: Crossway, 1985.
- . “A Review of a Review.” *The Bible Today* 43, no. 1 (October, 1948): 7–9.
- . *True Spirituality*. In *The Complete Works of Francis A. Schaeffer: A Christian Worldview*, 3:195–380. Westchester, IL: Crossway, 1985.
- . *Whatever Happened to the Human Race?* In *The Complete Works of Francis A. Schaeffer: A Christian Worldview*, 5:281–404. Westchester, IL: Crossway, 1985.
- Scherrer, Urs, Stefano F. Rimoldi, Emrush Rexhaj, Thomas Stuber, Hervé Duplain, Sophie Garcin, Stefano F. de Marchi et al. “Systemic and Pulmonary Vascular Dysfunction in Children Conceived by Assisted Reproductive Technologies.” *Circulation* 125, no. 15 (2012): 1890–96.
- Schilpp, Paul Arthur, ed. *The Philosophy of Karl Popper*. La Salle, IL: Open Court, 1974.
- Schneider, Susan. “Future Minds: Transhumanism, Cognitive Enhancement, and the Nature of Persons.” In *The Penn Center Guide to Bioethics*. Edited by Vardit Ravitsky, Autumn Fiester and Arthur L. Caplan, 95–110. New York: Springer, 2009.
- Searle, John R. *Mind: A Brief Introduction*. Oxford: Oxford University Press, 2004.
- . “Minds, Brains, and Programs.” *Behavioral and Brain Sciences* 3, no. 3 (1980): 417–57.
- . *The Rediscovery of the Mind*. Cambridge, MA: MIT Press, 1992.
- Seneca. *On Providence*. Translated by John W. Basore. Cambridge, MA: Harvard University Press, 1928.
- Sentientia, Wrye. “Freedom by Design: Transhumanist Values and Cognitive Liberty.” In *The Transhumanist Reader: Classical and Contemporary Essays on the Science, Technology, and Philosophy of the Human Future*. Edited by Max More and Natasha Vita-More, 355–60. Chichester, UK: Wiley-Blackwell, 2013.
- . “Neuroethical Considerations: Cognitive Liberty and Converging Technologies for Improving Human Cognition.” *Annals of the New York Academy of Sciences* 1013, no. 1 (2004): 221–28.
- Shi, Y., J. R. van Rhijn, M. Bormann, M. Mossink, M. Frega, M. Hakobjan, S. Kittel-Schneider et al. “Brunner Syndrome Associated MAOA Dysfunction in Human Induced Dopaminergic Neurons Results in Dysregulated NMDAR Expression and Increased Network Activity.” August 21, 2019. <https://www.biorxiv.org/content/10.1101/741108v1>.

- Shuster, Evelyn. "Fifty Years Later: The Significance of the Nuremberg Code." *New England Journal of Medicine* 337, no. 20 (1997): 1436–40.
- Sifferlin, Alexandra. "IVF Linked to More Birth Defects." *Time* 180, no. 22 (2012).
- Silva, Jason. "Immortalism: Ernest Becker and Alan Harrington on Overcoming Biological Limitations." *h+ Magazine*, September 4, 2009.
<https://hplusmagazine.com/2009/09/04/immortalism-ernest-becker-and-alan-harrington-overcoming-biological-limitatio/>.
- Silver, Lee M. *Remaking Eden: Cloning and Beyond in a Brave New World*. New York: Harper Perennial, 1998.
- Sims, Bryan Billard. "Evangelical Worldview Analysis: A Critical Assessment and Proposal." PhD diss., The Southern Baptist Theological Seminary, 2006.
- Singer, Peter. "Shopping at the Genetic Supermarket." In *Asian Bioethics in the 21st Century*. Edited by Sang-yong Song, Young-Mo Koo and Darryl R. J. Macer, 143–56. Christchurch, New Zealand: Eubios Ethics Institute, 2003.
- Singularity Symposium. "The Best Definition of Singularity." Accessed October 23, 2018. <http://www.singularitysymposium.com/definition-of-singularity.html>.
- . "Who was John von Neumann?" Accessed November 2, 2018.
<http://www.singularitysymposium.com/john-von-neumann.html>.
- Slavo, Mac. "Doomsday Preppers Survey." *SHTFplan*, March 13, 2012.
<https://www.shtfplan.com/headline-news/doomsday-survey-51-of-americans-believe-a-financial-collapse-is-imminent-85-say-country-is-overwhelmingly-under-prepared>.
- Small, Meredith F. *Our Babies, Ourselves: How Biology and Culture Shape the Way We Parent*. Garden City, NY: Anchor Books, 1999.
- Smart, Ninian. *Worldviews: Crosscultural Explorations of Human Beliefs*. 3rd ed. Upper Saddle River, NJ: Prentice Hall, 2000.
- Smith, James K. A. *Desiring the Kingdom: Worship, Worldview, and Cultural Formation*. Grand Rapids: Baker Academic, 2009.
- Smith, Michael, David Lewis, and Mark Johnston. "Dispositional Theories of Value." *Proceedings of the Aristotelian Society, Supplementary Volumes* 63 (1989): 89–174.
- Song, Robert. *Human Genetics: Fabricating the Future*. London: Darton, Longman & Todd, 2002.
- Song, Sang-yong, Young-Mo Koo, and Darryl R. J. Macer, eds. *Asian Bioethics in the 21st Century*. Christchurch, New Zealand: Eubios Ethics Institute, 2003.
- Sontag, Frederick. "Anthropodicy or Theodicy? A Discussion with Becker's 'The Structure of Evil'." *Journal of the American Academy of Religion* XLIX, no. 2 (1981): 267–74.

- Sorgner, Stefan Lorenz. "Beyond Humanism: Reflections on Trans- and Posthumanism." *Journal of Evolution & Technology* 21, no. 2 (2010): 1–19.
- . "Nietzsche, the Overhuman, and Transhumanism." *Journal of Evolution & Technology* 20, no. 1 (2009): 29–42.
- Sotak, Max Harrison. "Apologetic Evangelism and Personal Rectitude: The Existential Perspective in Francis Schaeffer's Trilogy." PhD diss., North-West University, 2012.
- Sotala, Kaj, and Harri Valpola. "Coalescing Minds: Brain Uploading-Related Group Mind Scenarios." *International Journal of Machine Consciousness* 4, no. 1 (2012): 293–312.
- Southern Baptist Convention. "On Human Species-Altering Technologies." June 1, 2006. <http://www.sbc.net/resolutions/1158/on-human-speciesaltering-technologies>.
- Sproul, R. C. "The Christian and Science (Part 2)." May 14, 2014. <http://www.ligonier.org/learn/articles/christian-and-science-part-2/>.
- Sproul, R. C., John H. Gerstner, and Arthur Lindsley. *Classical Apologetics: A Rational Defense of the Christian Faith and a Critique of Presuppositional Apologetics*. Grand Rapids: Zondervan, 1984.
- Stambler, Iliia. "A History of Life-Extensionism in the Twentieth Century." PhD diss., Bar-Ilan University, Israel, 2014.
- . "Life Extension – a Conservative Enterprise? Some Fin-de-siècle and Early Twentieth-Century Precursors of Transhumanism." *Journal of Evolution & Technology* 21, no. 1 (2010): 13–26.
- Stannard, Russell, ed. *God for the 21st Century*. Philadelphia: Templeton Press, 2000.
- Stapledon, W. Olaf. *Last and First Men*. London: Methuen, 1930.
- Steinhart, Eric. "Teilhard de Chardin and Transhumanism." *Journal of Evolution & Technology* 20, no. 1 (2008): 1–22.
- Steinhoff, James. "Transhumanism and Marxism: Philosophical Connections." *Journal of Evolution & Technology* 24, no. 2 (2014): 1–16.
- Stock, Gregory. "The Battle for the Future." In *The Transhumanist Reader: Classical and Contemporary Essays on the Science, Technology, and Philosophy of the Human Future*. Edited by Max More and Natasha Vita-More, 302–16. Chichester, UK: Wiley-Blackwell, 2013.
- . *Redesigning Humans: Our Inevitable Genetic Future*. Boston: Houghton Mifflin, 2002.
- Stockholm Resilience Center. "The Stockholm Memorandum." May 31, 2011. <https://www.stockholmresilience.org/news--events/general-news/2011-05-31-the-stockholm-memorandum.html>.
- Strehler, Bernard L. *Time, Cells, and Aging*. 2nd ed. New York: Academic Press, 1977.

- Stuhr, John J., ed. *Classical American Philosophy: Essential Readings and Interpretive Essays*. New York: Oxford University Press, 1987.
- Szalavitz, Maia. "The Link Between Infertility Treatments and Birth Defects." *Time* 179, no. 18 (2012).
- Taleb, Nassim Nicholas. *The Black Swan: The Impact of the Highly Improbable*. New York: Random House, 2007.
- Tatchell, Jessica. "Making Human Rights Fit for the 21st Century: The Challenge of Morphological Freedom." August 8, 2015. <https://social-epistemology.com/2015/08/08/making-human-rights-fit-for-the-21st-century-the-challenge-of-morphological-freedom-jessica-tatchell/>.
- Tavares, Frank. "About Half of Sun-like Stars Could Host Rocky, Potentially Habitable Planets." October 29, 2020. <https://www.nasa.gov/feature/ames/kepler-occurrence-rate>.
- Taylor, Charles. *The Ethics of Authenticity*. Cambridge, MA: Harvard University Press, 1992.
- Teilhard de Chardin, Pierre. *The Future of Man*. Translated by Norman Denny. New York: Image Books, 2004.
- Teilhard de Chardin, Pierre, and Ursula King. *Pierre Teilhard de Chardin: Writings*. Maryknoll, NY: Orbis Books, 1999.
- The Future Society. "TFS Hosts Zoltan Istvan and James Hughes (Debate on the Politics of Post-humanism)." Accessed August 24, 2019. <https://www.youtube.com/watch?v=DTbU4SN9yQ0>.
- The President's Council on Bioethics (U.S.). *Human Dignity and Bioethics: Essays Commissioned by the President's Council on Bioethics*. Washington, DC: The President's Council on Bioethics, 2008.
- Thiselton, Anthony C. *The Two Horizons: New Testament Hermeneutics and Philosophical Description with Special Reference to Heidegger, Bultmann, Gadamer, and Wittgenstein*. Grand Rapids: W. B. Eerdmans, 1980.
- Thornbury, Gregory Alan. "Why We Still Need Kierkegaard." *Christianity Today*. March 18, 2016. <https://www.christianitytoday.com/ct/2016/april/why-we-still-need-kierkegaard.html>.
- Thweatt-Bates, Jeanine. *Cyborg Selves: A Theological Anthropology of the Posthuman*. Burlington, VT: Ashgate, 2012.
- Thweatt-Bates, Jennifer J. "Artificial Wombs and Cyborg Births: Postgenderism and Theology." In *Transhumanism and Transcendence: Christian Hope in an Age of Technological Enhancement*. Edited by Ronald Cole-Turner, 101–14. Washington, DC: Georgetown University Press, 2011.
- Tilak, Pradeep. "A Christian Worldview Apologetic Engagement with Advaita Vedanta Hinduism." PhD diss., The Southern Baptist Theological Seminary, 2013.

- Tilley, Terrence W. *The Evils of Theodicy*. Washington, DC: Georgetown University Press, 1991.
- Tipler, Frank J. *The Physics of Immortality: Modern Cosmology, God, and the Resurrection of the Dead*. New York: Anchor Books, 1994.
- Tirosh-Samuelson, Hava. "Engaging Transhumanism: The Meaning of Being Human." *Metanexus*. June 5, 2008. <https://www.metanexus.net/engaging-transhumanism-meaning-being-human/>.
- . "Religion." In *Post- and Transhumanism: An Introduction*. Edited by Robert Ranisch and Stefan Lorenz Sorgner, 49–72. Frankfurt am Main: Peter Lang, 2014.
- . "Transhumanism as a Secularist Faith." *Zygon* 47, no. 4 (2012): 710–34.
- Todorov, Tzvetan. *Imperfect Garden: The Legacy of Humanism*. Princeton, NJ: Princeton University Press, 2014.
- Toffler, Alvin. *Future Shock*. New York: Bantam Books, 1970.
- Tomkins, Justin. "Developing Theological Tools for a Strategic Engagement with Human Enhancement." *New Bioethics* 20, no. 2 (2014): 141–52.
- Toon, Peter. *Born Again: A Biblical and Theological Study of Regeneration*. Grand Rapids: Baker Book House, 1987.
- Torrance, Eugenia. "Acquiring Incorruption: Maximian Theosis and Scientific Transhumanism." *Studies in Christian Ethics* 32, no. 2 (2019): 177–86.
- Tracy, David. *The Analogical Imagination: Christian Theology and the Culture of Pluralism*. New York: Crossroad, 1981.
- Transhumanism Wiki. "Order of Cosmic Engineers." Accessed November 2, 2018. http://transhumanism.wikia.com/wiki/Order_of_Cosmic_Engineers.
- Trevathan, Wenda. *Ancient Bodies, Modern Lives: How Evolution Has Shaped Women's Health*. New York: Oxford University Press, 2010.
- Tucker, Robert C., ed. *The Marx-Engels Reader*. New York: Norton, 1978.
- Turing, A. M. "Computing Machinery and Intelligence." *Mind* 59, no. 236 (1950): 433–60.
- Tvedtnes, John. "The King Follett Discourse in the Light of Ancient and Medieval Jewish and Christian Beliefs." Paper presented at the FairMormon Conference, Orem, UT, 2004.
- Tversky, Amos, and Daniel Kahneman. "Advances in Prospect Theory: Cumulative Representation of Uncertainty." *Journal of Risk and Uncertainty* 5, no. 4 (1992): 297–323.
- Ulam, Stanislaw. "John von Neumann 1903-1957." *Bulletin of the American Mathematical Society* 64, no. 3 (1958): 1–49.

- United Nations Educational, Scientific and Cultural Organization. *Records of the 29th Session of the General Conference: Resolutions*. 1997.
- United States Catholic Conference. *Catechism of the Catholic Church*. 2nd ed. New York: Doubleday, 1995.
- US Census Bureau. “2017 National Population Projections Tables.” Accessed August 25, 2019. <https://www.census.gov/data/tables/2017/demo/popproj/2017-summary-tables.html>.
- USDA Animal and Plant Health Inspection Service. “Secretary Perdue Issues USDA Statement on Plant Breeding Innovation.” March 28, 2018. <https://content.govdelivery.com/accounts/USDAAPHIS/bulletins/1e599ff>.
- Van Til, Cornelius. “The Apologetic Methodology of Francis A. Schaeffer.” A collection of reflections on various Schaeffer texts in Westminster Theological Seminary (unpublished). 1974.
- . “Apologetics.” Westminster Theological Seminary (unpublished class notes), 1963.
- . *The Defense of the Faith*. 3rd ed. Philadelphia: Presbyterian and Reformed, 1967.
- Vanommeslaeghe, Kenno, Olgun Guvench, and Alexander D. MacKerell Jr. “Molecular Mechanics.” *Current Pharmaceutical Design* 20, no. 20 (2014): 3281–92.
- Vikhar, P. A. “Evolutionary Algorithms: A Critical Review and Its Future Prospects.” Paper presented at the International Conference on Global Trends in Signal Processing, Information Computing and Communication, Jalgaon, India, 2016.
- Vinge, Vernor. “The Coming Technological Singularity: How to Survive in the Post-Human Era.” Paper presented at the VISION-21 Symposium, Cleveland, OH, March 30-31, 1993.
- . “Technological Singularity.” In *The Transhumanist Reader: Classical and Contemporary Essays on the Science, Technology, and Philosophy of the Human Future*. Edited by Max More and Natasha Vita-More, 365–75. Chichester, UK: Wiley-Blackwell, 2013.
- Vint, Sherryl. “Animals and Animality from the Island of Moreau to the Uplift Universe.” *The Yearbook of English Studies* 37, no. 2 (2007): 85–102.
- Vita-More, Natasha. “Aesthetics: Bringing the Arts & Design into the Discussion of Transhumanism.” In *The Transhumanist Reader: Classical and Contemporary Essays on the Science, Technology, and Philosophy of the Human Future*. Edited by Max More and Natasha Vita-More, 18–27. Chichester, UK: Wiley-Blackwell, 2013.
- . “Life Expansion Media.” In *The Transhumanist Reader: Classical and Contemporary Essays on the Science, Technology, and Philosophy of the Human Future*. Edited by Max More and Natasha Vita-More, 73–82. Chichester, UK: Wiley-Blackwell, 2013.

- Von Neumann, John, and Arthur W. Burks. *Theory of Self-Reproducing Automata*. Urbana: University of Illinois Press, 1966.
- Walker, Mark. "Genetic Engineering, Virtue-First Enhancement, and Deification in Neo-Irenaeus Theodicy." *Theology and Science* 16, no. 3 (2018): 251–72.
- Wang, Xueshen, Qunqing Li, Jing Xie, Zhong Jin, Jinyong Wang, Yan Li, Kaili Jiang, and Shoushan Fan. "Fabrication of Ultralong and Electrically Uniform Single-Walled Carbon Nanotubes on Clean Substrates." *Nano Letters* 9, no. 9 (2009): 3137–41.
- Warnock, Mary, ed. *Utilitarianism and on Liberty*. 2nd ed. Malden, MA: Blackwell, 2003.
- Waters, Brent P. *Christian Moral Theology in the Emerging Technoculture: From Posthuman Back to Human*. Farnham, England: Ashgate, 2014.
- . *From Human to Posthuman: Christian Theology and Technology in a Postmodern World*. Burlington, VT: Ashgate, 2006.
- . "Whose Salvation? Which Eschatology? Transhumanism and Christianity as Contending Salvific Religions." In *Transhumanism and Transcendence: Christian Hope in an Age of Technological Enhancement*. Edited by Ronald Cole-Turner, 163–75. Washington, DC: Georgetown University Press, 2011.
- Weaver, Richard M. *Ideas Have Consequences*. Chicago: University of Chicago Press, 1984.
- Webb, Stephen. *If the Universe Is Teeming with Aliens ... Where Is Everybody? Seventy-five Solutions to the Fermi Paradox and the Problem of Extraterrestrial Life*. 2nd ed. Cham, Switzerland: Springer, 2015.
- Weissenbacher, Alan. "Defending Cognitive Liberty in an Age of Moral Engineering." *Theology and Science* 16, no. 3 (2018): 288–99.
- Weizenbaum, Joseph. *Computer Power and Human Reason: From Judgment to Calculation*. New York: W. H. Freeman, 1976.
- Weston, Paul. "Lesslie Newbigin: A Postmodern Missiologist?" *Mission Studies* 21, no. 2 (2004): 229–48.
- White, James Emery. *What Is Truth? A Comparative Study of the Positions of Cornelius Van Til, Francis Schaeffer, Carl F. H. Henry, Donald Bloesch, Millard Erickson*. Nashville: Broadman & Holman, 1994.
- Whitehead, Alfred North. *Process and Reality*. 2nd ed. New York: Free Press, 1979.
- Wiley, Keith. *A Taxonomy and Metaphysics of Mind-Uploading*. Seattle: Alautun Press, 2014.
- Wilson, Aaron B., and Daniel J. Brunson. "The Transhumanist Philosophy of Charles Sanders Peirce." *Journal of Evolution & Technology* 27, no. 2 (2017): 12–29.
- Wittig, Monique. "The Category of Sex." *Feminist Issues* 2, no. 2 (1982): 63–68.

- Woiak, Joanne. "Designing a Brave New World: Eugenics, Politics, and Fiction." *The Public Historian* 29, no. 3 (2007): 105–129.
- Wolfe, Cary. *What Is Posthumanism?* Minneapolis: University of Minnesota Press, 2009.
- Woloschak, Gayle E. "Can We Genetically Engineer Virtue and Deification?" *Theology and Science* 16, no. 3 (2018): 300–307.
- World Medical Association. "Declaration of Helsinki: Ethical Principles for Medical Research Involving Human Subjects." *Bulletin of the World Health Organization* (2001): 373–74.
- Wright, David McCord. *Democracy and Progress*. New York: Macmillan, 1948.
- Wright, N. T. *Surprised by Hope: Rethinking Heaven, the Resurrection, and the Mission of the Church*. New York: HarperOne, 2008.
- Yao, Xinzhong. *An Introduction to Confucianism*. New York: Cambridge University Press, 2000.
- Young, George M. *The Russian Cosmists: The Esoteric Futurism of Nikolai Fedorov and His Followers*. Oxford: Oxford University Press, 2012.
- Young, Simon. *Designer Evolution: A Transhumanist Manifesto*. Amherst, NY: Prometheus Books, 2006.
- Yudkowsky, Eliezer S. *Coherent Extrapolated Volition*. San Francisco: Machine Intelligence Research Institute, 2004.
- Zhang, Fei, Jeanette Nangreave, Yan Liu, and Hao Yan. "Structural DNA Nanotechnology: State of the Art and Future Perspective." *Journal of the American Chemical Society* 136, no. 32 (2014): 11198–211.
- Zhang, Feng, Yan Wen, and Xiong Guo. "CRISPR/Cas9 for Genome Editing: Progress, Implications and Challenges." *Human Molecular Genetics* 23, no. R1 (2014): R40–R46.
- Ziegler, Philip G. "'Those He Also Glorified': Some Reformed Perspectives on Human Nature and Destiny." *Studies in Christian Ethics* 32, no. 2 (2019): 165–76.
- Zimmerman, Michael. "The Singularity: A Crucial Phase in Divine Self-Actualization?" *Cosmos and History: The Journal of Natural and Social Philosophy* 4, no. 1-2 (2008): 347–70.
- Zubrin, Robert. *The Case for Mars: The Plan to Settle the Red Planet and Why We Must*. New York: Simon & Schuster, 2011.

ABSTRACT

BORN HUMAN AGAIN: A CHRISTIAN RESPONSE TO TRANSHUMANISM BASED ON THE APOLOGETIC APPROACH OF FRANCIS SCHAEFFER

Gideon Ip Kei Lee, PhD
The Southern Baptist Theological Seminary, 2021
Chair: Dr. James Parker III

Transhumanism, as explained by its proponents, is a philosophical and cultural movement that affirms the possibility and desirability of improving the human condition by modifying what it means to be human using science and technology. The transhumanist technological agenda is multifaceted and ambitious, ranging anywhere from enhancing the capacity of the human mind and body to slowing down aging, assisting reproduction, and simulating intelligence artificially.

The methodology adopted in this study is inspired by the apologetic approach of Francis Schaeffer. The approach in this dissertation may be viewed as a contemporary adaptation of the way Schaeffer argued against existentialism. Implicitly, this work illustrates the apologetic approach of Schaeffer and demonstrates his continual relevance.

This study explains the emergence of transhumanism as an attempted solution to what may be called the problem of human evil. Highlighting the dilemma of human existence, Schaeffer turned the table around and reformulated the classical problem of evil into a problem for the secular humanists. The phenomenon of evil not only poses a problem for the theists who believe in the goodness and greatness of God, but it also produces much skepticism against the modern humanists who assert the goodness, rationality, and self-sufficiency of humankind. Transhumanists tacitly acknowledge the failure of secular humanism in establishing a defense of humankind, or an anthropodicy,

but hold out hope that many evils will be eliminated as human nature is made perfect by natural or artificial evolution.

Picturing the apologetic approach of Schaeffer as a Y juncture engagement, this study responds to transhumanism in several steps. After a survey of transhumanism and an outline of the worldview apologetic approach exemplified by Schaeffer in chapter 1, chapter 2 probes where transhumanism originated from by examining its presuppositions in moral philosophy, epistemology, the philosophy of mind, and eschatology. Chapter 3 shows that transhumanism is deeply incompatible with widely-held intuitions about human equality, the universe, the mind, and the meaning of life. Chapter 4 points transhumanists to a better solution by translating the Christian gospel into a “re-humanist” metanarrative. Evil exists because life is a test of human dignity. Christians agree with humanists that evil is meant to be dealt with, not reasoned away. But transhumanism had been tried before by Adam and Eve. Precisely because of their failed attempt to become super-human, people are born post-human already. People will not overcome evil by becoming super-human. Instead, people must be born fully human again from above.

VITA

Gideon Ip Kei Lee

EDUCATION

SB, Massachusetts Institute of Technology, 1993
MDiv, Gordon-Conwell Theological Seminary, 2000

ORGANIZATIONS

Association of Christians in the Mathematical Sciences
American Academy of Religion
Evangelical Philosophical Society
Evangelical Theological Society
International Society of Christian Apologetics
Society of Biblical Literature

EMPLOYMENT

Minister of Evangelism, Chinese International Baptist Church, Boston,
Massachusetts, 2000-2005
President, NumberSciences, Cambridge, Massachusetts, 2006-2014
Chapter Director of MIT, Ratio Christi, Cambridge, Massachusetts, 2014-2019
English Ministry Pastor, Chinese Bible Church of Greater Lowell, Chelmsford,
Massachusetts, 2016-2019
Family Pastor and Milpitas Campus Pastor, Crosspoint Church of Silicon
Valley, Milpitas, California, 2019-
Adjunct Instructor, Midwestern Baptist Theological Seminary, Kansas City,
Missouri, 2019-