

LESSONS FOR THE FUTURE?
PROPHECY AND POLICY IN SPECULATIVE BIOETHICS

By

Ari Schick

A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

Philosophy – Doctor of Philosophy

2014

ABSTRACT

LESSONS FOR THE FUTURE? PROPHECY AND POLICY IN SPECULATIVE BIOETHICS

By

Ari Schick

For more than a decade, the field of bioethics has increasingly turned its attention to wide-ranging discussions of possible future biotechnologies, such as those that might be used to determine the genetic endowments of future offspring or to enhance existing people. Yet while the literature on human biomedical enhancement has become a focal point of bioethical debate, few of the technologies that stimulate this discourse have reached the point where they actually generate the ethical questions that the literature addresses. This study offers a comprehensive analysis and critique of speculative bioethics that builds on existing conceptualizations of two parallel modes of bioethical discourse (prophetic and regulatory), and draws from literature outside of bioethics that examines the social function of expectations regarding future technologies.

I begin by tracing various developments in bioethics that have given rise to the enhancement discourse in its present form and survey some of the existing criticism that it has drawn. I demonstrate the ways in which speculative bioethics goes wrong when exploring potential future technologies and scenarios, and evaluate the utility of anticipatory bioethics research that attempts to get ahead of expected future technological developments. In the course of developing a robust theory of the nature and function of the prophetic and regulatory aspects of bioethics, I establish that speculative explorations belong within the domain of the prophetic, not regulatory, mode of bioethics.

I expand the critique by examining the roles that technological expectations play in driving both biomedical research as well as public engagement with ethical issues in biomedicine. I argue that many existing ethical explorations of possible future technological scenarios mistakenly identify the object of ethical analysis as the actual possible future. Instead, it is the expectations that drive public discussion and research agendas that are the proper object of scrutiny and analysis. After probing the nature of this shortcoming and its consequences, I enlist alternative approaches that are capable of critically assessing the moral implications of technological expectations themselves.

Finally, I develop an integrated approach for exploring the possible future technological scenarios found in speculative bioethics. Drawing on work in narrative ethics and the interface between literature and bioethics, I offer a multifaceted model of ‘narrative competence,’ appropriate for analyzing the existing literature on human enhancement, as well as for pursuing alternatives that could better advance useful modes of bioethical discourse and public deliberation.

Copyright by
ARI SCHICK
2014

Dedicated to the memory of Adrienne Asch, who enriched many lives and the world of bioethics.

ACKNOWLEDGEMENTS

I am indebted to many teachers, mentors, and fellow students—too numerous to mention individually—for all that I have gained from them. However, those whose contributions to my work in bioethics have been particularly vital, and without whose help and support I would not have completed this dissertation, deserve special recognition.

My involvement in bioethics began nearly a decade ago when Erik Parens graciously took me on as a part-time intern at the Hastings Center. Working with him was an invaluable experience that helped to set the course of my research. I have benefited from the erudition of all the members of my doctoral committee, Len Fleck, Fred Gifford, Jim Nelson, and Dan Steel, and have learned much from each of them. I am especially grateful to Jim, who, aside from chairing my committee and directing this dissertation, was instrumental in securing the support that facilitated my studies. As this dissertation neared its completion, I received much insightful feedback from David Wasserman, a source of creative ideas and philosophical inspiration who has always been a pleasure to work with.

Two institutions deserve mention as well: first, the Department of Philosophy and the College of Arts and Letters at Michigan State University. My thanks to the deans, administrators, and support staff who, in various capacities, helped my graduate studies to progress as smoothly as possible. Second, for the past two years, I have been writing at the library of the Van Leer Jerusalem Institute in an atmosphere that has been exceptionally conducive to my work. I am grateful to the administration and staff of Van Leer for the use of the library and for obliging a number of special requests.

I cannot imagine completing this work without the support of my family. My parents have

been extremely supportive through the years, in ways large and small, ensuring that I could pursue graduate studies without many of the pressures that are a frequent hazard of academic life. My in-laws have likewise been gracious and helped to ease difficult transitions between New York, Michigan, and Israel. My children, Saadyah, Noa, and Aviyah have changed my life in ways both expected and unexpected, and have multiplied the good in my life many-fold.

Above all, this dissertation is the culmination of many years of love and support from my wife, Shana. Without her patient encouragement, reassurance, and assistance I could not have commenced or completed this work. Words cannot express how deeply I appreciate the many ways she accommodates me while pursuing her own work. She has set the bar high as a dedicated scholar and devoted parent. I hope someday to live up to her example.

Finally, I write these acknowledgments pained by the recent loss of my friend and mentor, Adrienne Asch, to whom this dissertation is dedicated. I learned more from working with Adrienne than in any classroom or from any book, and she supported and encouraged me in innumerable ways over the past eight years. This dissertation feels complete only because I was able to celebrate its completion with her.

TABLE OF CONTENTS

| | |
|--|-----------|
| LIST OF TABLES | XII |
| LIST OF FIGURES..... | XIII |
| CHAPTER ONE – INTRODUCTION | 1 |
| I. Human Enhancement and Speculative Bioethics | 1 |
| II. Should We Be Suspicious of Speculative Bioethics?..... | 2 |
| III. Critiquing Speculative Bioethics | 5 |
| a. Methodological Critique..... | 6 |
| b. Public Interest Critique | 7 |
| c. A Note on Purpose and Method | 9 |
| IV. Alternative Approaches to Speculative Bioethics | 11 |
| a. Regulatory and Prophetic Bioethics | 11 |
| b. Speculative Bioethics as a Reflective Discourse | 14 |
| 1. The goals of speculative bioethics | 14 |
| 2. Methods for speculative bioethics | 17 |
| V. Description of the Chapters | 18 |
| CHAPTER TWO – BIOETHICS UNBOUND: HUMAN ENHANCEMENT AND THE EVOLUTION OF A DISCOURSE | 20 |
| I. From Positive Genetic Engineering to Human Enhancement..... | 21 |
| a. Successes and Failures of the Human Genome Project..... | 24 |
| b. Transhumanism Enters the Mainstream..... | 26 |
| c. The Legacy of the Cloning Controversy..... | 34 |
| II. From Thought Experiments to Likely Futures..... | 35 |
| a. 1984: <i>What Sort of People Should There Be?</i> | 36 |
| b. 1996: <i>The Lives to Come</i> | 39 |
| c. 2000: <i>From Chance to Choice</i> | 41 |
| d. 2011 and beyond: <i>Beyond Humanity</i> (and an Embarrassment of Riches) | 44 |
| III. From Reflective to Regulatory Modes of Thinking..... | 47 |
| a. Callahan: The Secularization of Bioethics | 47 |
| b. Evans: The Rise of Formal Rationality..... | 50 |
| c. Formal Rationality and the Rhetoric of Inevitability..... | 55 |
| d. Consensus Obviates Justification | 57 |
| IV. Closing Thoughts..... | 59 |
| CHAPTER THREE – TRESPASSING INTO THE FUTURE? A SURVEY OF THE CRITICAL LITERATURE | 61 |
| I. Internal and External Critiques of Speculative Bioethics | 61 |
| a. What Sort of People Should Be Talking about the Future? | 62 |

| | |
|---|------------|
| b. Bioethics' Unseemly Technological Fixation..... | 65 |
| c. Speculation Distorts Bioethical Deliberation..... | 67 |
| 1. Slouching toward policy | 67 |
| 2. Wallowing in enhancement fantasies | 70 |
| 3. Genetic enhancement is a myth..... | 73 |
| II. Nanoethics and the STS Critique of Speculative Ethics | 75 |
| a. A Brief History of Nanoethics | 75 |
| b. Foundational Differences between Bio- and Nano-Ethics | 79 |
| c. Bioethical Skepticism toward Nanoethics | 83 |
| d. Nordmann's "If-and-Then" Critique..... | 87 |
| III. Closing Thoughts..... | 91 |
| CHAPTER FOUR – PROPHETIC AND REGULATORY BIOETHICS IN THE IMAGINED FUTURE | 92 |
| I. Speculation across the Generations – 1974 to 2004..... | 92 |
| a. 'Neomorts' and the 'Bioemporium' | 93 |
| 1. Predictive failure | 93 |
| 2. Reflective success? | 95 |
| b. The Just Distribution of Genes | 98 |
| 1. Justice after the genetic revolution..... | 98 |
| 2. The encroaching demands of a more just future..... | 103 |
| 3. Reflective equilibrium in the reified future | 106 |
| II. Alternatives to Regulatory Forays into the Future | 110 |
| a. Reflective Exploration..... | 110 |
| b. Thought Experiments | 111 |
| c. Intermezzo: An Unproductive Dialogue | 114 |
| III. The Prophetic Voice in Bioethics..... | 121 |
| a. Far-sighted and Reflective | 121 |
| b. Activist and Critical | 124 |
| c. Historical Memory, Shared Values, and Reflexivity..... | 125 |
| d. Utopian and Dystopian Visions | 127 |
| IV. Prophecy as Practice..... | 130 |
| a. The Idea of Prophetic Bioethics | 130 |
| b. Prophecy and Policy: Complementary or Incompatible? | 132 |
| c. Prophecy to Policy: From the Future to the Present and Back Again | 133 |
| d. Prophecy, Activism, and Moral Development..... | 136 |
| IV. Closing Thoughts: The Varieties of Prophetic Speculation | 142 |
| CHAPTER FIVE – THE FUTURE IS WHAT WE MAKE OF IT: ANTICIPATORY ETHICS AND PUBLIC POLICY | 145 |
| I. Introduction: Carts and Horses | 145 |
| a. The Human Genome Project and the ELSI Program..... | 146 |
| b. Was the ELSI Program Successful? | 148 |
| c. Direct-to-Consumer Genotyping: A Test Case..... | 151 |
| II. Plausible Goals and Putative Benefits | 154 |

| | |
|---|-----|
| a. Controlling the Future..... | 154 |
| b. Preparing for the Future | 160 |
| c. The Unverifiable Putative Benefit | 167 |
| III. The Nature and Scope of Regulatory Bioethics..... | 169 |
| a. Strategic Planning <i>vs.</i> Muddling Through..... | 170 |
| 1. Why ELSI was misconceived..... | 170 |
| 2. Regulatory bioethics: the art and science of muddling through..... | 171 |
| 3. Conflating strategic science policy with regulatory bioethics..... | 177 |
| 4. Strategic planning, plus consensus bioethics, equals regulatory approaches to speculative futures..... | 179 |
| 5. The illusion of consensus and the obfuscation of justification | 180 |
| b. Indeterminacy and the Limits of Regulatory Processes | 182 |
| 1. Prediction, speculation, and risk..... | 182 |
| 2. Uncertainty and indeterminacy | 186 |
| 3. The limited purview of regulatory bioethics | 188 |
| 4. Indeterminate futures in prophetic discourses..... | 189 |
| c. Keeping Regulatory and Prophetic Questions Apart..... | 191 |
| 1. The benefits of separation: IVF as a test case | 191 |
| 2. Regulatory commissions and reflective discourse: separation may be more equal | 196 |
| 3. Speculation without prediction..... | 198 |
| IV: Closing Thoughts..... | 200 |

| | |
|--|------------|
| CHAPTER SIX – THE FUTURE IS WHAT IT MAKES OF US: EXPECTATION, REIFICATION, AND MORAL FUTURISM IN SPECULATIVE BIOETHICS..... | 202 |
| I. Problematizing Speculative Bioethics..... | 204 |
| a. A Restatement of the Problem..... | 204 |
| b. The Purpose of Bioethics and the Mythic View of Biomedicine | 207 |
| II. Expectations in Science, Technology, and Bioethics | 213 |
| a. Technological Expectations | 213 |
| 1. Expectations and speech acts..... | 213 |
| 2. The function of technological expectations..... | 216 |
| 3. STS: constructive critique and an alternative model..... | 218 |
| b. The Nature and Function of Bioethical Expectations..... | 220 |
| 1. Coordination within bioethics..... | 220 |
| 2. Coordination with biomedical research | 222 |
| 3. Establishing bioethics’ relevance to biomedicine | 225 |
| 4. Mediating between researchers and the public..... | 228 |
| 5. Accountability for expectations..... | 230 |
| c. <i>Babies by Design</i> : Managing Expectations in the Realm of Mythic Science..... | 234 |
| III: Toward a De-reified Speculative Bioethics..... | 239 |
| a. Technological Inevitability and the Dream of Anticipatory Agency..... | 239 |
| 1. The future disconnected from the present | 239 |
| 2. The future imposed on the present | 245 |
| b. An Ethics of Wishing..... | 249 |
| c. Technology as Discourse | 253 |

| | |
|--|------------|
| IV: Closing Thoughts..... | 260 |
| CHAPTER SEVEN – NARRATIVE COMPETENCE IN SPECULATIVE BIOETHICS..... | 262 |
| I. Bioethics and the Uses of Socio-technical Scenarios..... | 262 |
| a. Beyond Moral Futurism..... | 262 |
| a. Bioethics and Narrative..... | 265 |
| c. Prophetic and Narrative Bioethics..... | 267 |
| II. Socio-technical Scenarios as Thought Experiments..... | 269 |
| a. Thought Experiments in Philosophy..... | 269 |
| b. The Trouble with Thought Experiments in Speculative Bioethics..... | 271 |
| c. Present Judgments, Technological Futures, and Reflective Equilibrium..... | 277 |
| III. Narrative Ethics and Future Technologies..... | 284 |
| a. Narrative, Identity, and Ethics..... | 284 |
| b. Narrative Subjectivity and Technological Futures..... | 285 |
| c. Narrative in the Public Sphere..... | 288 |
| d. Narrative and Democratic Deliberation..... | 293 |
| e. Lay Ethics, Dramatic Resources, and Master Narratives..... | 296 |
| IV. Reading and Retelling Technological Narratives..... | 306 |
| a. Filling-in the Gaps: Archetypes, History, and Scripts..... | 307 |
| b. Framing and Temporal Shaping..... | 310 |
| c. Deus Ex Machina..... | 314 |
| d. Language, Perspective, and Redescription..... | 315 |
| e. Revolutionary and Perplexing, Yet Familiar..... | 320 |
| V. Speculative Fiction: Valuable Resource or Force to Resist?..... | 321 |
| a. Why Read Science Fiction?..... | 321 |
| b. Predicting Technology and Shaping the Future in SF and Bioethics..... | 328 |
| c. The Science-Fictional Origins of the Human Enhancement Discourse..... | 331 |
| d. Science-Fictional Habits of Mind..... | 335 |
| e. Dreams of Reason Revisited..... | 339 |
| VI: Closing Thoughts: The End of the Line for Anticipatory and Visionary Bioethics?..... | 340 |
| BIBLIOGRAPHY..... | 345 |

LIST OF TABLES

| | |
|---|-----|
| Table 1: Incidence of Terms | 23 |
| Table 2: Methods of Policy Analysis | 173 |

LIST OF FIGURES

| | |
|--|-----|
| Figure 1: Relative Frequency of Terms | 28 |
| Figure 2: Causal Structure of Technological Discourses | 254 |

CHAPTER ONE – INTRODUCTION

The more deeply I studied the problems I am going to talk about, the more deeply I became convinced that the opinions of the learned are often much less interesting than the reasoning which professes to uphold them; and in the outcome I decided that these lectures were to be about the process of foretelling rather than about what is actually foretold.

– P.D. Medawar, *The Future of Man* (1959)

I. Human Enhancement and Speculative Bioethics

Over the past decade the field of bioethics has devoted an increasing amount of attention to a set of questions surrounding the enhancement of human beings using various technologies such as genetic engineering, pharmaceuticals, human-machine interfaces, and nanotechnology. ‘Human enhancement’ has emerged as one of the focal points of bioethical discourse and has coalesced into a recognizable research program with its own set of key theoretical positions, recognized protagonists, and even dedicated funding initiatives. As it stands, the preponderance of the enhancement discourse is not primarily concerned with present-day ethical issues falling under the rubric of human enhancement. Contemporary topics such as the use of drugs to increase academic or athletic performance, administering growth hormones to achieve above-average stature, and other ways that people attempt to make themselves ‘better than well’ are amply dealt with, but the

bulk of bioethicists' interest appears to be devoted to the future.¹ Authors typically delve into a series of possible future scenarios fashioned from the expected trajectory of achievements in biotechnology. This future-oriented segment of scholarship on human enhancement comprises much of what can be termed 'speculative bioethics.' Although the term covers any issue within bioethics where the technological capability framing its domain of inquiry has not sufficiently developed to actually pose ethical challenges today, the human enhancement discourse is distinguished by the degree to which it explores the very likely existence, vast capability, and widespread social ramifications of particular future technologies. These technologies are frequently portrayed as potentially disruptive; they may significantly affect human behavior, personal relationships, and larger social structures, thereby reshaping the contours of the social world. The discourse on human enhancement constitutes the locus of ferment within speculative bioethics and is therefore the primary focus of this dissertation.

II. Should We Be Suspicious of Speculative Bioethics?

It is usually taken as a matter of course that effort is justifiably invested in speculative bioethics—surely want to have a moral discourse that precedes and influences the effects of future

¹ We can divide contributions to the enhancement discourse into three categories based on temporal focus: current enhancement technologies, current and future enhancement technologies, and only future technologies. I contend that not only are the latter two categories future-oriented, but the rubric of 'enhancement' emerged from discussions of human genetic engineering (a claim I support in the next chapter) and, as a result, the enhancement discourse overall is future-oriented. Absent the prospect of human genetic enhancement or a similarly powerful and controversial future enhancement technology the discourse would look very different

biotechnologies on our lives—but this assumption, along with many others that drive speculative bioethics, has not received sufficient scrutiny. The primary purpose of this dissertation is not to investigate questions within the human enhancement debate—though along the way some substantive issues will be addressed—but to explore and critique the grounds of the discourse itself.

My wariness toward speculative bioethics will become clearer as I develop a sustained critique. Initially some may find it puzzling that it warrants such scrutiny to begin with. Should we not value speculative bioethics for its attempts to be proactive instead of reactive? Are we to let technology progress without the benefit of ethical foresight? To see why the enhancement debate invites suspicion, it is instructive to contrast it with environmental ethics, an ongoing future-oriented multidisciplinary research project pursued within applied ethics.²

Speculative scenarios play a key role in environmental ethics when it seeks to evaluate the implications of possible future environmental changes, most prominently those brought about by human-driven global climate change. Consider, for instance, whether today's citizens of developed countries are obligated to reduce the standard of living to which they are accustomed in order to mitigate against damaging effects on future generations. How might our moral deliberations give weight to future scenarios which are deemed unlikely to occur, but project outcomes that are catastrophic? At first glance speculative bioethics appears to do much the same: it asks whether we ought to pursue or regulate certain biotechnologies to benefit future generations, or avoid

² Arguably there is no reason to distinguish between bioethics and environmental ethics, and that is not my intent. Several noted ethicists have explicitly described environmental ethics as a segment of bioethics, such as Onora O'Neill, *Autonomy and Trust in Bioethics* (Cambridge; New York: Cambridge University Press, 2002).

pursuing them altogether to prevent potential unwanted consequences. The crucial difference between environmental ethics and speculative bioethics is the way in which they construct the space of possible futures. The future scenarios discussed within environmental ethics are built using models developed independent of the ethical discourse, using accepted scientific techniques that are themselves the subject of ongoing scientific scrutiny. Whatever the limitations of predictive environmental modeling and the complications of attempting to predict how climate change would reverberate through various societies, these are acknowledged epistemic constraints factored into both the models themselves and all ensuing ethical discussions.³ Additionally, because these forecasts center on the relationship between human causes and environmental effect, they orient the discussion toward courses of action which could be adopted now to make these future scenarios less or more likely. Environmental ethics attends to the way in which present-day decisions impact potential future scenarios that are assigned probabilities by the prevailing scientific consensus, as arrived at within a discrete scientific discipline.

However, in the enhancement debate, the content of future scenarios—both in terms of the future technologies undergirding them and the social consequences they may produce—is projected via little if any rigorous methodology. The differences between what is anticipated, what is desired, and what is probable are often elided, and the rather dismal record of predicting accurately either the advent of a ‘disruptive’ technology or its myriad social effects is ignored. Yet, with little or no justification aside from a few *pro-forma* caveats about not knowing what the future actually holds,

³ Dale Jamieson, “Ethics, Public Policy, and Global Warming,” *Science, Technology, & Human Values* 17, no. 2 (1992): 139–153.

speculative scenarios are implicitly assigned a high degree of probability—as if we do in fact have the ability to predict the shape of technological change. Beyond this core deficiency, the enhancement discourse suffers from a lack of well-defined goals. There is little agreement as to what implications if any these future scenarios hold vis-à-vis the decisions which confront us today, and often no clear understanding of what the discourse as a whole is meant to accomplish. Can these futures be avoided or are they inevitable? Do we actively regulate which technologies are developed or do we wait until they are developed and then regulate their application? In sum, we have a significant area of bioethical research with questionable foundations and uncertain goals.

III. Critiquing Speculative Bioethics

Throughout this dissertation I pursue two primary lines of critique—at times independently, and at times in an interlaced fashion. The first is broadly methodological: is the current discourse coherent on its own terms? Is it driven by realistic goals? Does it have a clear understanding of the nature of the questions it attempts to answer? The second line of critique is motivated by the ideal that views bioethics as a discourse in service of the public interest: does the speculative discourse benefit society and promote the public good? Unifying these two lines of critique is the idea that bioethics understands itself at its core to be a practical field addressing real-world questions of genuine consequence in a responsible manner. Its practitioners must consider not only their contributions within the field, but how they contribute to broader public discussion and deliberation surrounding medicine, science, and technology. That is not to say that bioethicists

ought to avoid research that is highly theoretical, only that they ought to do so in a way that does not undermine these core objectives.⁴

a. Methodological Critique

I argue that much of speculative bioethics is methodologically unsound. It proceeds under a set of faulty assumptions, both implicit and explicit, beginning with the idea that we can predict to a useful degree both the course of progress in biotechnology and its possible social ramifications. It further assumes that applying a standard set of considerations common within bioethics to the analysis of future scenarios aids in positively directing the course of how future technologies are adopted and in forestalling unwanted consequences.

Undermining these core assumptions are: (1) our inability to predict the course of future technological development accurately;⁵ (2) our inability to predict social changes that occur in

⁴ The genesis of this dissertation owes a large debt to a short online article by R.L. Guyer and J.D. Moreno which sparked my initial interest in the problem of speculative bioethics. The questions raised in the article in a concise and insightful manner remained with for quite a while until I decided, several years later, to make speculative bioethics the subject of an extended study (Ruth Levy Guyer and Jonathan D. Moreno, "Slouching Toward Policy: Lazy Bioethics and the Perils of Science Fiction," *The American Journal of Bioethics* 4, no. 4 (2004): W14-17).

⁵ The following excerpt from a transcript of remarks by Steven Pinker to the President's Council on Bioethics offers a brief explanation of why technological predictions are so often wrong:

First, there's a habit of assuming that technological progress can be linearly extrapolated. If there's a little bit of progress now, there will be proportional progress as we multiply the number of years out. Engineers sometimes refer to this as the fallacy of thinking that we can get to the moon by climbing trees. A little bit of progress now can be extended indefinitely.

Secondly, there's a tendency to underestimate the number of things that have to go exactly right for a given scenario to take place. Most technological changes don't depend on a single discovery, but rather on an enormous number of
(continues)

parallel with technological development; (3) our inability to foresee and control social consequences of new technologies prior to the adoption of such technologies; and (4) the fact that technologies that effect significant social changes will likely affect future people's preferences, to the point where they may diverge significantly from our own, thereby rendering our judgments as to their best interests irrelevant. In sum, the actual future, so far as the questions pursued under the heading of human enhancement are concerned, is largely indeterminate; we cannot justify a sustained discourse on speculative futures by appealing to the usual formal and informal regulatory functions carried out within bioethics.

b. Public Interest Critique

As a largely ineffective research program it would be worth rethinking speculative bioethics—particularly to the extent that it diverts resources and public attention from a range of more

factors, scores or even hundreds, all of which have to fall into place exactly right. Both technological developments, psychological developments, namely, whether individual humans will opt for the technology both in developing it and in adopting it, and sociological factors, namely, whether there will be a multiplication of those choices society-wide that will lead to the economies of scale and the social pressures that would lead to some technological development becoming ubiquitous.

Third, there's a widespread failure of futurologists to consider the costs of new technologies, as well as the benefits, whereas in reality the actual users faced with a particular technology consider both the benefits and the costs.

Finally, there is an incentive structure to futurology. Someone who predicts a future that's radically different from our own, either to hype it or to raise an alarm against it will get the attention of the press and the public. The chances are *The New York Times* won't call you up if you say either that the future is going to be pretty similar to the present or we haven't a clue as to what the future will be.

President's Council on Bioethics, "Transcript: Session 3," March 6, 2003.

pressing bioethical issues. However, because bioethics plays a unique role in the public discourse on biotechnology and in shaping public policy, the effects of speculative bioethics on the public understanding of, and expectations for, science and technology deserve special scrutiny. I argue that the unwarranted predictive confidence projected in bioethical discussions of future technologies goes hand-in-hand with a failure to adopt a critical stance toward the expectations that form them. Speculative bioethics reinforces and legitimizes the expectations that certain technologies and scenarios are inevitable or desirable. The inevitable future then imposes itself on the present, prejudicing where we ought to invest resources and how we ought to address a range of contemporary issues. Speculative bioethics, along with all discourses on the future of biotechnology, may have some influence on the future, but it is the unexamined expectations—not the content of moral argumentation—that will yield the most significant impact on the future of biotechnology. Without an understanding of how visions of the future are constructed and reinforced by uncritical ethical engagement (among other factors), bioethics will not be a competent form of moral discourse.

The human enhancement discourse continues the course that were set during the salad days of the Human Genome Project's (HGP) Ethical Legal and Social Issues (ELSI) research initiative, when the scientific and medical advances that were expected to arrive soon after the mapping of the human genome fed on and into the public's fascination with all things genetic. While some scholars worked to dispel many of the myths surrounding the coming 'genetic revolution' and carefully differentiated between rapid advances in scientific knowledge and successful applications that might never materialize, others took for granted that the predictive and therapeutic uses of genetic technologies would arrive as promised. Their work tended to exacerbate

the public's misunderstanding of the near-term potential for genetics and reinforced expectations of what science and technology would inevitably accomplish. But, as is often the case in biomedical science, there is a long lag between discoveries and reliable clinical applications. In the case of genomics in particular, the era ushered in by the HGP was one in which scientists learned that our knowledge is even less complete than had been previously thought and that beliefs about the path from a genetic sequence to an expressed trait needed to be revised.⁶ Nonetheless, there are only scattered indications that bioethicist writing on speculative enhancement technologies have adopted a less believing attitude toward the technological futures envisioned in the human enhancement debate.

c. A Note on Purpose and Method

I pursue a critique of aspects of contemporary bioethics instead of putting forth arguments bearing on the usual range of questions typically arising *within* bioethics. The purpose of this dissertation will surely be recognizable to those familiar with the field, which, in addition to addressing questions that arise at the intersection of ethics, medicine, and biotechnology, has been perennially interested in reflecting on its own history, its methods, and its place within society. Understanding the themes, assumptions, and methods operative within speculative bioethics requires a historically and socially contextualized approach which complements the multidisciplinary nature of bioethics itself. Aside from philosophy, I draw from the many fields that contribute to bioethics, including history and sociology, and I have benefited greatly from

⁶ James P. Evans et al., "Deflating the Genomic Bubble," *Science* 331, no. 6019 (February 18, 2011): 861–862.

work in science and technology studies (STS)—itself a multidisciplinary endeavor.

Although I draw from the writings of many authors who study and analyze bioethics from outside the field as observers and critics, I stress from the outset that this study is situated within bioethics. I therefore allow myself to proceed under several assumptions. First, I will not take up the question of what bioethics is, except insofar as it is necessary at particular junctures. I will speak often of ‘bioethics’ and ‘bioethicists’ without investigating the meaning of the terms. Second, I allow myself the naïve belief that bioethics, overall, contributes to the public good—I will not take up the question of whether bioethics was a bad idea to begin with, has outlived its usefulness, has become corrupted or is merely another form of technocratic control. I confine my suspicion of bioethics to the specific topic of my study. Third, I allow myself to partake liberally of bioethics’ eclecticism with the understanding that doing bioethics well does not require (or perhaps functions best without) comprehensive theories. Whatever theories I offer emerge from within the process of formulating a critique and exploring alternatives. Fourth, I have consciously made use of terms and concepts found within bioethics. The central conceptual distinction I employ to advance an approach to future technologies emerges from an existing self-critical stream within bioethics, and I have endeavored to expand and build upon it to the greatest possible extent, rather than invent something new or import concepts from outside of the field. This was done in attempt to preserve discursive continuity within the field and with an appreciation of bioethics’ extraordinary capacity for assimilating diverse approaches and sources of knowledge.⁷

⁷ John Arras has described Beauchamp and Childress’s *Principles of Biomedical Ethics* as the “Borg of Bioethics” for its ability in successive iterations to assimilate every critique ever directed towards principlism. I believe that the same is essentially true of bioethics writ large.

Finally, I proceed with the maxim that bioethics must first seek to answer questions of the type “what do we do now?”⁸ As a result, bioethics not only prioritizes the practical over the theoretical, it is also constrained by the contingencies of the present. I make no apologies for some immediate wariness when I encounter strains of the visionary, the utopian, or the apocalyptic within contemporary bioethics. If by some misfortune bioethicists worldwide were instantly struck by an inability to contemplate technologies that will not be available within the next five years, there would still be much useful work that could be accomplished.

The totality of my critique suggests that at present much of speculative bioethics constitutes an unsound and unwise enterprise. Rather than suggesting that we abandon it altogether, I instead offer alternative models for pursuing speculative bioethics that avoid the pitfalls found in the current literature. There is place for a speculative discourse within bioethics, but its purpose, limitations, and methods need to be properly understood.

IV. Alternative Approaches to Speculative Bioethics

a. Regulatory and Prophetic Bioethics

Daniel Callahan has described bioethics as divided between ‘regulatory’ and ‘prophetic’ modes—a distinction that speaks to differences in modes of moral inquiry, the role of the bioethicist as close

⁸ Daniel Callahan, “Bioethics as a Discipline,” *The Hastings Center Studies (Report)* 1, no. 1 (1973): 66–73. Callahan’s numerous articles reflecting on the history, methodology, and future of bioethics have been a vital source of information, analysis, and creative inspiration.

collaborator or dissenter, and in some cases its temporal focus.⁹ In the regulatory mode, bioethics focuses on the ethical governance of current or near-term practices, programs, and technologies in clinical medicine, biomedical research, and health policy. Bioethics operates as a form of oversight in both formal and informal capacities of current practices as they arise within medicine and biotechnology. Ethicists may formulate guidelines, point out problems, and suggest reforms, but their purpose is generally not to rethink these practices from the ground-up or to question the wisdom of the whole enterprise. In the regulatory mode, a good deal of the discourse centers on regulatory concepts; that is, those which have widespread currency within liberal societies because they devolve from protecting individuals from harm and promoting their rights. Harms and benefits, autonomy and consent, justice and individual responsibility and the myriad ways these contend with each other in varying circumstances form the core of regulatory bioethics. Both as a practical matter and as a source of justification, regulatory bioethics works toward finding consensus among stakeholders in the course of deliberative processes.

In the prophetic mode, the discourse can focus on many of the same topics when current practices provoke weighty questions about society and its scale of values. Here, bioethics is open to approaches which tend to be reflective and potentially much more critical. Broadly, it asks whether developments within biomedicine, and the practices they engender, promote or distort various

⁹ Daniel Callahan, "Why America Accepted Bioethics," *The Hastings Center Report* 23, no. 6 (1993): S8-S9. This is likely not the first use of the prophetic/regulatory distinction by Callahan, though it may be the first example in print. It is cited in his name, if not always by reference to his writing. The history of the use of the term 'prophetic' to describe a mode of bioethics goes back at least several years earlier, to James M. Gustafson, "Moral Discourse about Medicine: A Variety of Forms," *Journal of Medicine and Philosophy* 15, no. 2 (1990): 125-142.

conceptions of human flourishing and the social good. Prophetic bioethics can also look with a critical eye towards future horizons where anticipated but not-yet-realized technologies are thought to have the potential to bring about significant social changes, raising larger and often profound questions or offering new perspectives on existing social problems.¹⁰ The prophetic aspect of bioethics traces its history to the nascent years of professional bioethics and the first intimations of the contemporary discourse on human enhancement. I argue that it offers a mode of bioethics in which it is possible to coherently and responsibly address speculative futures. Just as we can ask where biotechnology has brought us and what kind of understandings of self, family, and society it fosters, so may we ask by exploring the speculative visions that emerge from the expectations and promises that drive research in biotechnology. However, prophetic bioethics, as its name implies, can easily turn into dire predictions or alluring visions of the technological future. Keeping discussions of future technologies centered in the here and now requires that we understand images of the future as aspects of the present, remembering that these are wishes and dreams, not future realities.

I qualify the prophetic/regulatory division from the outset in several ways: first, these are

¹⁰ This description of prophetic bioethics is not identical to Callahan's in the cited article. There, he stresses the idea of the 'prophet' as outsider and critic versus the regulator who is an insider and part of a larger system of biomedical research and healthcare. Elsewhere, Callahan divides bioethics into five practices: clinical, foundational, regulatory, cultural, and health policy. My use of 'prophetic' here conforms mostly with his use of 'cultural' and his lament that aspects of cultural bioethics, once enlivened by fundamental questions of meaning, have taken second place to regulatory approaches. Daniel Callahan, "The Social Sciences and the Task of Bioethics," *Daedalus* 128, no. 4 (1999): 275–294. I look at various senses of "prophetic" toward the end of Chapter Four.

ideal types. Although one can readily find pure examples of each approach, in many cases they are intermingled or the overall orientation is not clarified, and the prophetic and regulatory aspects need to be teased apart. Second, these modes do not exhaust the varieties of practices and approaches found within bioethics or the various ways to categorize them. For the most part they inhabit what some call the public functions of bioethics, where ethicists are involved in discussing issues that arise within political discourse and processes in the broadest sense. However, though the present discussion is concerned primarily with public bioethics, I believe that much of the institutional wisdom found within bioethics has emerged from the many other activities that bioethicists engage in, such as clinical consultation, formal and informal teaching, academic research, and a wide variety of community-based projects. I try to draw on these as much as possible. A final qualification is necessary: I make use of the term ‘prophetic’ due to its significant genealogical roots within bioethics, recognizing that it might imply more than I am trying to convey. I would ask the reader to adjust their understanding to the definition I stipulate—one that is both narrower and better accommodates many of the reflective and reflexive practices within contemporary bioethics.

b. Speculative Bioethics as a Reflective Discourse

1. The goals of speculative bioethics

The regulatory/prophetic distinction provides a framework for understanding why speculative bioethics is often approached from the wrong angle. A persistent flaw in much of speculative bioethics lies in the application of bioethics’ regulatory mode to imagined future scenarios. This is problematic on several counts. As was mentioned earlier, at a practical level we do not know

enough about which technologies will exist, how they will be implemented, and their probable social repercussion, in order to control from the present them via proactive regulation. Even when we do have a reasonable idea of what technologies are in store in the near term, effective regulation nonetheless generally proceeds stepwise as technologies are implemented, social consequences are realized and evaluated, and regulatory responses are studied and adjusted. Consequently, if the goal of speculative bioethics was proactive regulation, it would appear to be an exercise in futility.

At the discursive level, regulatory bioethics is not capable of questioning the assumptions and values driving technological expectations. The result is not so much that regulatory bioethics is ineffective in such situations; it is, in fact, incredibly effective at reinforcing these expectations. This produces a number of undesirable effects, such as undermining trust in the integrity of bioethics when expectations are not met.¹¹ More problematic is the manner in which regulatory discussions sidestep questions of the substantive conceptions of the human good that are embedded in visions of technological futures by treating potential future ethical questions as questions that urgently need to be answered now, leading to a reification of the possible future.¹² When the imagined future is perceived as real and inevitable—posing urgent questions—the range

¹¹ For discussions of the nature and importance of integrity and public trust in bioethics see the engaging collection of essays in Lisa A. Eckenwiler and Felicia G. Cohn, eds., *The Ethics of Bioethics: Mapping the Moral Landscape* (Baltimore: Johns Hopkins University Press, 2007); and O'Neill, *Autonomy and Trust in Bioethics*, chap. 6–8.

¹² As I was working on an initial treatment of this topic I found that the idea of the 'reified future' in speculative ethics was put forth by Alfred Nordmann several years earlier. Nordmann's work has been essential to the formation of this dissertation; Alfred Nordmann, "If and Then: A Critique of Speculative NanoEthics," *NanoEthics* 1, no. 1 (2007): 31–46.

of current possibilities open to agency, deliberation, and democratic input narrows; other options, prioritizations, and decisional junctures are obscured and forgotten. Much in the way that rapid global climate change, abstracted from its human causes, looks like a force of nature that humanity must manage and adapt to, biotechnologies projected into the future as an inevitable reality begin to look like forces outside of our control that can only be managed and adapted to.

The commonly invoked cliché urging for pragmatic regulatory responses to revolutionary technological futures—even those which are largely speculative—is that we cannot put the genie back in the bottle; the future is coming whether we like it or not. That may be true, but the cliché’s corollary is that we can still think very carefully about what we wish for. The value of speculative explorations lies in bioethics’ prophetic aspects: asking what it is that we want and expect from various future technologies as a means of clarifying and interrogating current attitudes and values; examining how they relate to our ongoing pursuit of various biotechnologies; and reflecting on how these aspirations and expectations change current understandings and affect political and regulatory decisions. In short, the proper function of speculative bioethics is to critically assess visions of the future as they bear on the present—not to allow imagined futures to impose themselves on present concerns.

The prophetic mode of reflective inquiry is present to varying degrees in the enhancement literature, but the misapplication of regulatory thinking to speculative scenarios is common. Authors defend, take for granted, or completely ignore what ought to be reflective questions with appeals to regulatory concepts or the norms of regulatory bioethics. There is also a persistent misconstruing of critical reflection on *present* discourses surrounding future technological possibilities as concerns over *predicted future effects* of technologies. In many cases the fault lies as

much with authors who employ the language of prediction in voicing prophetic concerns as it does with their critics who are anxious to translate every form of moral reservation into a forecast. The tendency to portray the future as inevitable thus distorts both prophetic and regulatory bioethics. Even in a prophetic mode authors can fail to adopt a critical stance towards technological expectations, and allow ethical exploration to reify the possible future in such a way that unwanted projected scenarios have a strong claim on the present. In either case, there is pervasive crosstalk between bioethicists writing in the prophetic mode and those applying regulatory approaches to the future.

2. Methods for speculative bioethics

Once speculative bioethics is understood to be best approached within a prophetic mode of moral inquiry, there is still the question of the methods—or more accurately, resources—appropriate for analyzing speculative scenarios. (This is distinct from the question of what philosophical approaches are appropriate for reflective bioethics generally, in answer to which I endorse a wide pluralism.) I offer two overall frameworks for ensuring that discussions of speculative technologies and possible futures do not become reified. The first, which I call the ‘ethics of wishing,’ adapts an approach from STS that emphasizes that we cannot foresee the actual future. All representations of future technologies should therefore be understood as ahistorical.¹³ An ethics of wishing is the aspect of moral discourse that examines technological expectations as they are formed and make claims on our attention and resources today, and as they are ‘fulfilled’—not necessarily by achieving

¹³ Alfred Nordmann, “A Forensics of Wishing: Technology Assessment in the Age of Technoscience,” *Poiesis & Praxis* 7, no. 1–2 (2010): 5–15.

particular goals, but by unfolding in and adapting themselves to the present. The second framework, ‘technology as discourse’—adapted from the philosophy of technology—is similar but pays more attention to the effects of technological expectation, visions, fictional stories, and more on the human condition—our understanding of self and the world—even before technological visions are manifested concretely in techniques or artifacts.

After laying this groundwork, I then turn back to bioethics and the various theories and uses of narrative ethics that have been incorporated into the field. The enhancement discourse is saturated with stories of the future of one kind or another, and I argue that narrative approaches are the most competent resource for bioethics to draw upon to engage critically with speculative futures. I first examine whether treating speculative scenarios as thought experiments is a productive rubric for the enhancement discourse—concluding that it usually is not. I therefore move on to more robust narrative approaches that pursue an understanding of human agency, identity, and moral valuation via narrative; turning to narrative as shared ‘dramatic resources’; and reading speculative bioethics using the tools of literary analysis. Finally, I ask whether speculative bioethics benefits from engaging seriously with science fiction literature where many themes, promises, expectations, and fears that underlie discussions of future technologies can be explored in richly drawn future worlds. After provisionally concluding that it can, I argue that we can also gain substantial insight into the enhancement discourse today by looking at the literary history of science fiction where the issue of human biotechnological enhancement first emerged.

V. Description of the Chapters

Chapter Two traces developments in bioethics that have given rise to the enhancement debate in

its current form. **Chapter Three** examines existing critiques of speculative bioethics—which have been raised within bioethics itself only rarely. **Chapter Four** takes up examples of bioethics in the speculative mode and uses the reflective/regulatory distinction to show the promise and pitfalls of speculation. I then offer a more robust account of the nature and function of prophetic bioethics. **Chapter Five** challenges the presumptive utility of getting ethical questions sorted out before future technologies arrive. I do so by examining research within bioethics that is future-oriented though not particularly speculative. Concluding that such research programs are of dubious value as regulatory projects, I then go on to delineate the limits of regulatory bioethics. In **Chapter Six**, I critique speculative bioethics’ tendency to reify the future, built on an examination of the necessary and problematic roles that expectations for future technologies play in propelling and coordinating biomedical research and bioethics. I then describe the two frameworks that avoid the problem of reification by engaging critically with expectations themselves. In **Chapter Seven**, I put forth several models of ‘narrative competence’ necessary for pursuing speculative bioethics and understanding the nature of the enhancement discourse.

CHAPTER TWO – BIOETHICS UNBOUND:

HUMAN ENHANCEMENT AND THE EVOLUTION OF A DISCOURSE

New questions appear with each new technical innovation. It is a pity to walk away from these fascinating bioethical debates, but they occurred during the years beyond the bounds of this history and belong to the future of bioethics.

– Albert Jonsen, *The Birth of Bioethics* (1998)

Speculation is not foreign to bioethics, nor is the human enhancement debate a completely new form of speculative bioethics. Yet there has been a noticeable change in the scope and terminology of the debate. In the mid-1990s, as the Human Genome Project (HGP) was generating a good deal of public excitement, the focus of speculative bioethics began to shift to the broad category of human enhancement. During this period, what were once acknowledged as highly speculative scenarios bordering on theoretical thought experiments came to be discussed as likely futures; human enhancement was now viewed as one of the likely determinants of the basic structure of future human societies.

Although I focus on bioethics, the changes in the nature and scope of the discussions were not a local phenomenon. They reflected—and may have contributed to—a larger trend in discussions of science and technology. An STS scholar notes that:

Since the 1990s, at the latest, we have witnessed a shift of focus in the overall ethico-political discourse on S&T. This shift from actual technoscientific innovations and short-term visions to far-reaching visions (with strong claims about the future of Western societies) had been on the horizon of various twentieth century debates on innovations in S&T, which were also often influenced by

“posthumanist” and other variants of technofuturism.¹⁴

I am concerned more about where the discourse stands now than on how it arrived at such a point. However, it will be beneficial to trace certain lines of change and influence within bioethics. My reconstruction of how and why the discourse evolved is certainly incomplete; nonetheless, it will help to illuminate the current shape of speculative bioethics in order to reveal some of its shortcomings.¹⁵

Instead of presenting one overarching account of the evolution of the enhancement discourse, I offer several overlapping pictures of the changes that occurred. The first looks at three key developments that contributed to a marked shift in the scope and terminology of the discourse, beginning with the period during which the HGP captured the public’s attention and provided a large source of funding for bioethics research. The second compares the approaches to speculative futures involving enhancement technologies found in four books written from the mid-1980s to the present. The third ties the changing discussion of human enhancement to a larger shift in professional bioethics toward regulatory approaches.

I. From Positive Genetic Engineering to Human Enhancement

We ought to first reflect on the use of the term ‘enhancement’ itself. The word is meant to

¹⁴ Christopher Coenen, “Deliberating Visions: The Case of Human Enhancement in the Discourse on Nanotechnology and Convergence,” in *Governing Future Technologies*, ed. Mario Kaiser et al., *Sociology of the Sciences Yearbook* 27 (Dordrecht: Springer, 2010), 74.

¹⁵ This chapter begins at the point where contemporary professional bioethics emerged. In Chapter Seven, I argue that the enhancement discourse is quite a bit older and discuss its literary origins.

contrast with ‘therapy,’ which generally is taken to mean an intervention whose purpose is to achieve or restore normal function (or prevent its loss). This turns on our understanding of the interdependent definitions of normalcy, health, and disease which is itself a knotty problem.¹⁶ Moreover, the distinction between therapy and enhancement has been questioned both on the grounds of the problematic definitions of normalcy and disease and its usefulness in providing guidance in borderline cases.¹⁷ Yet, in the current literature the term ‘enhancement’ (along with ‘enhancing,’ ‘enhance,’ etc.) has gained currency. This contrasts with the first twenty-five or so years of professional bioethics literature (about 1970-1995) where one encounters a frequently invoked distinction between genetic interventions intended to cure diseases or prevent impairments (often termed ‘negative’ genetic engineering) and those aimed at going beyond those goals (‘positive’ genetic engineering). In the mid-1990s, though, the terms began to shift to the distinction between ‘therapy’ and ‘enhancement,’ with enhancement becoming the dominant term referring to the use of all manner of biotechnology to better, in some sense, human traits.¹⁸

As a representative sampling of bioethics literature, I used the Georgetown University

¹⁶ Eric T. Juengst, “What Does Enhancement Mean?,” in *Enhancing Human Traits*, ed. Erik Parens (Washington, DC: Georgetown University Press, 2000), 29–47.

¹⁷ Robert Wachbroit, “Human Enhancement Uses of Biotechnology: Overview,” in *Encyclopedia of Ethical, Legal, and Policy Issues in Biotechnology*, ed. Thomas H. Murray and Maxwell J. Mehlman (New York: John Wiley & Sons, 2000), 549–552.

¹⁸ The precise meaning of enhancement varies somewhat from author to author; see Stephen Wilkinson, *Choosing Tomorrow’s Children: The Ethics of Selective Reproduction* (New York; Oxford: Oxford University Press, 2010), 186–191. For present purposes the exact meaning is not so important, but I do think it incorrect to refer to the selection of unaltered gametes or embryos as a form of enhancement, as the resulting person could not properly be called ‘enhanced.’ For something to be described as an enhancement it must produce an enhanced subject—either in relation to the subject’s original constitution or functioning, or in relation to those of the species.

Bioethics Research Library EthxWeb database to quantify the incidence of ‘enhancement’ as keyword and title versus ‘genetic engineering.’¹⁹

| | ‘Enhancement’ | | ‘Genetic Engineering’ | |
|-----------|---------------|-------|-----------------------|-------|
| Decade | Keyword | Title | Keyword | Title |
| 1980-1989 | 0 | 0 | 240 | 241 |
| 1990-1999 | 54 | 45 | 253 | 215 |
| 2000-2009 | 616 | 237 | 524 | 206 |

Table 1: Incidence of Terms

There are several convergent factors that lead to a shift in terminology of this magnitude, and one should not discount the contribution of the somewhat mundane possibility that many bioethicists seized upon the change to recycle material on genetic engineering in the *au courant* and more general terms of biomedical therapy or enhancement. However, more fundamentally, this pronounced change parallels the emergence of the HGP as a source of ethical concern, and its Ethical Legal and Social Implications (ELSI) research programs as a major source of funding for bioethics. Directly and indirectly, the HGP led to a burgeoning discussion of the potential uses and consequences of new genetic information.²⁰

¹⁹ Search conducted at <http://bioethics.georgetown.edu/databases/ethxweb/ethx/index.html>, January 21, 2013. As this is a curated collection the shift also likely reflects the changing awareness of the terms by the curators.

²⁰ A number of authors have discussed the influence of the ELSI funding initiative which accompanied the HGP. For an early and rather discerning view see George J. Annas, “The Human Genome Project as Social Policy: Implications for Clinical Medicine,” *Bulletin of the New York Academy of Medicine* 68, no. 1 (1992): 126–134.

a. Successes and Failures of the Human Genome Project

By the mid-1990s, the HGP was well underway (actually, ahead of schedule) and one of its primary purposes—at least in the mind of the general public—was to provide the information that would make genetic therapies a reality.²¹ Once the momentum of the HGP picked up and its initial goal was within reach, the discourse on whether we ought to be pursuing human genetic engineering at all became moot; of course we would. Applying the new genetic knowledge to develop genetic therapies was the primary expectation used to justify the multibillion dollar project to the public, and as therapeutic uses of the technology began to appear imminent and desirable, the potential for enhancement uses began to look much less speculative. Erik Parens describes the shift toward discussions of enhancement over the span of only four years:

I remember a colleague raising the prospect of enhancing human capacities at a Hastings Center meeting in 1993. He was roundly criticized by at least a couple of well-respected senior scholars for raising such a speculative, if not silly, issue. In the fall of 1997, the first NIH Gene Therapy Policy Conference was devoted to that very topic.²²

Once the discourse turned primarily to the ethics of enhancements the fundamental debate over therapeutic uses of genetic engineering was largely dropped. A 1994 article already signals this change by shifting the focus of the discussion from therapy to enhancement:

Somatic gene therapy is now a clinical and scientific reality: human gene therapy experiments have been carried out by the National Institute of Health, which has

²¹ Leroy Hood, “The Human Genome Project—Launch Pad for Human Genetic Engineering,” in *Engineering the Human Germline*, ed. Gregory Stock and John H. Campbell (New York: Oxford University Press, 2000), 17–24.

²² Erik Parens, “Is Better Always Good?: The Enhancement Project,” *Hastings Center Report* 28, no. 1 (1998): S2.

begun clinical trials to treat patients with severe genetic diseases, such as ADA deficiency. These experiments have been approved by the United States' Subcommittee on Human Gene Therapy and they have been defended by many writers. The next possible step from somatic gene therapy is germ-line gene therapy. Although germ-line gene therapy was a taboo topic in biomedical ethics for many years, we have now reached a time when more people are willing to critically discuss HGLGT.²³

Resnik indicates that the discourse had moved to discussions of germline therapies, but the implication of his article is that talking about therapeutic applications of genetic technologies is already passé. Instead of arguing for the acceptability of germline therapies themselves, Resnik contends that there is nothing categorically wrong with germline *enhancements*, and *a fortiori* therapeutic uses are unproblematic. Resnik may have been a bit ahead of his time (especially since twenty years later useful genetic therapies are rare), but the move away from questioning the legitimacy of germline therapies to almost exclusively investigating the uses of genetic engineering for enhancement purposes eventually spread throughout bioethics.

The enhancement/therapy distinction implicitly endorses a view that therapeutic uses of genetic interventions are noncontroversial;²⁴ it also serves to broaden the scope of the discussion to include other kinds of enhancements that do not rely on genetic technologies. The usefulness of having a broader rubric under which to discuss enhancements more generally can also be

²³ David Resnik, "Debunking the Slippery Slope Argument against Human Germ-Line Gene Therapy," *Journal of Medicine and Philosophy* 19, no. 1 (1994): 24.

²⁴ For a critical discussion of the function of 'enhancement' in the discourse see Jackie Leach Scully and Christoph Rehmann-Sutter, "When Norms Normalize: The Case of Genetic 'Enhancement,'" *Human Gene Therapy* 12, no. 1 (2001): 87-95; Michael Morrison, "Beyond the Perils and Promise of Human Enhancement: The Social Shaping of Enhancement Technologies," *eSharp* 12 (Winter 2008): 1-24.

attributed to the eventual failure of the biomedical community to fulfill the expectation that information gained from completing the HGP would be rapidly translated into effective clinical uses.²⁵ Once the widespread safe and effective application of genetic engineering began to appear remote, the term ‘genetic engineering’ began to lose some of its luster. The turn to ‘enhancement’ within bioethics was therefore originally a product of the successes of the HGP in transforming the public perception of genetic therapy from a mere possibility into a tangible near-term goal that was already being pursued on a large scale. Later, however, the disappointment when these expectations were not met made the generic term ‘enhancement’ more appealing for authors to adopt. Nonetheless, genetic technologies have remained at the center of the enhancement debate due to their potential for altering the genetic endowments of children and changing the makeup of future generations. Moreover, the concept of the gene and genetic technologies retains an unrelenting hold on the public imagination.²⁶

b. Transhumanism Enters the Mainstream

By the early 2000s discussions of human enhancement were increasingly common within bioethics, but, with the exception of genetic engineering, the discourse was mostly confined to discussions of existing technologies or those very much like them, such as mood-altering pharmaceuticals. The prospect of genetic enhancement itself was treated rather tentatively. Parens, for instance, referencing a then-recent book on genetic engineering, uses the term ‘thought

²⁵ Evans et al., “Deflating the Genomic Bubble.”

²⁶ Dorothy Nelkin and M. Susan Lindee, *The DNA Mystique: The Gene as a Cultural Icon*, 2nd ed. (University of Michigan Press, 2004).

experiment' to describe the possibility of using genetic technologies to produce people who are kinder and gentler.²⁷ All this began to change when bioethics became involved in the discourse on transhumanism and the posthuman—the extremely enthusiastic and often deterministic belief in the advancement of the species by technology, even to the point of constituting a new species. The graph below shows the frequency of the terms 'transhumanism', 'posthuman', and 'human enhancement' in the Google Books database from 1980 to 2008.²⁸ However, because the term 'posthuman' is far more common—for reasons that will be explained shortly—it is reduced by a factor of 10 so that the trend-lines can be compared more easily.

²⁷ Parens, "Is Better Always Good?," S1. I discuss this thought experiment in Chapter Seven (section II).

²⁸ The graph was last generated 6/02/2013 using the Google n-gram viewer: http://books.google.com/ngrams/graph?content=transhumanism%2Cposthuman*.1%2Chuman+enhancement&year_start=1980&year_end=2008&corpus=15&smoothing=3&share=. Raw data was then extracted and imported to Excel and a new graph was generated for clarity.

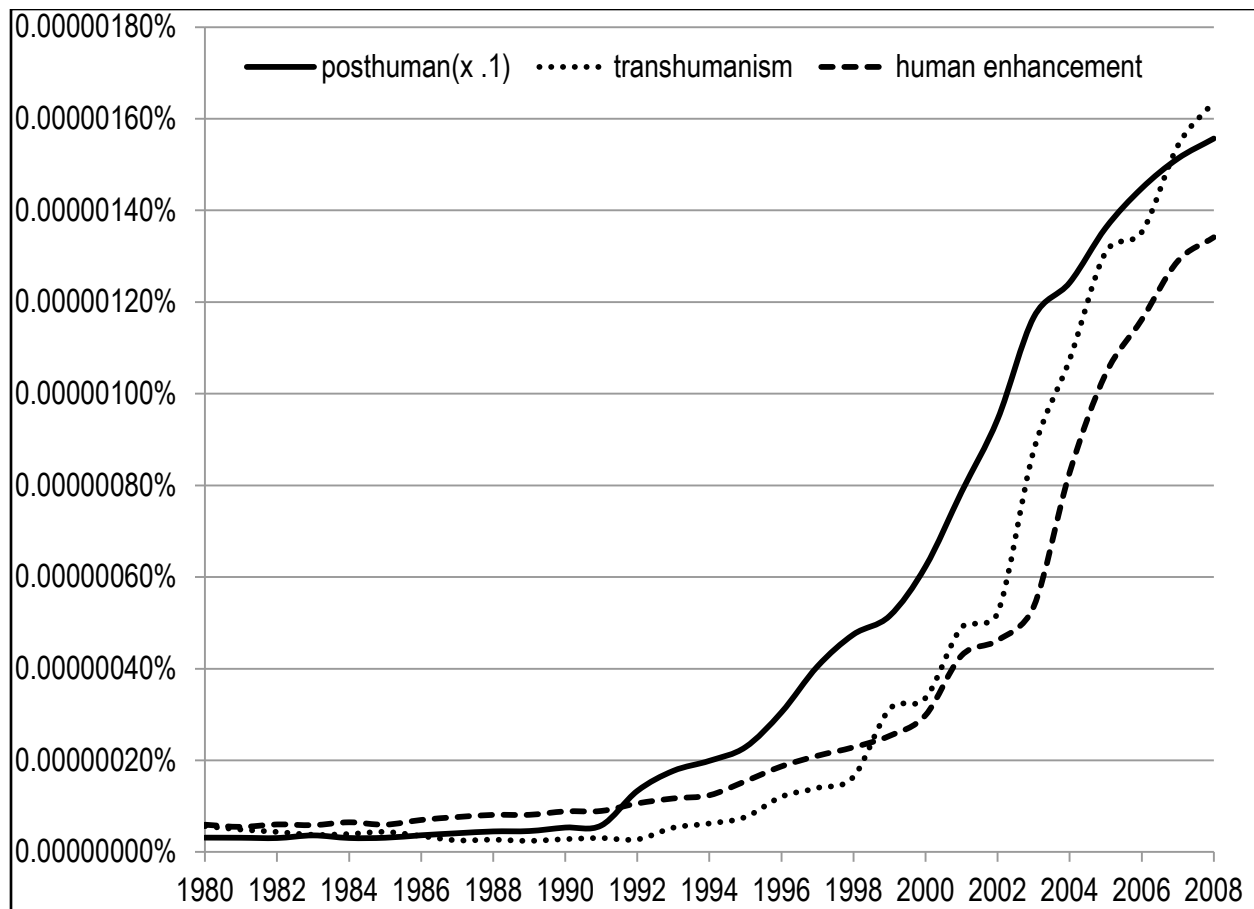


Figure 1: Relative Frequency of Terms

This kind of dataset can only provide a rough idea of the trend, but it is a reasonable gauge of the extent to which these terms came up in a wide range of publications (keeping in mind that ‘posthuman’ occurred ten times more frequently than is represented on the graph). What is most striking is the degree to which the frequencies of the terms increase roughly in parallel to one another. The jump in frequency of ‘human enhancement’ beginning in the middle of the 1990s is consistent with the bioethics-specific results from EthxWeb described above. Similarly, a Boolean search for ‘transhuman or transhumanism or transhumanist’ on EthxWeb shows only two results between 1990 and 1999 and seventy from 2000 through 2009. The same search on the Philosopher’s Index (online edition) shows similar results: three from 1990-1999 and forty-five in

the subsequent decade; from 2000 to the present there are already thirty-six results.²⁹ Along these lines, though the 1995 edition of the *Encyclopedia of Bioethics* has no entry for transhumanism,³⁰ the 2004 edition contains an extended discussion.³¹

The organization Humanity+ (formerly the World Transhumanist Association) co-founded by the philosopher Nick Bostrom, describes transhumanism as “the intellectual and cultural movement that affirms the possibility and desirability of fundamentally improving the human condition through applied reason, especially by developing and making widely available technologies to eliminate aging and to greatly enhance human intellectual, physical, and psychological capacities.”³² This might be a reasonable description of the views of many who favor human enhancement. What puts the ‘trans’ in transhumanism is the further claim that this process will (or ought to) lead to the existence of posthumans: “it is sometimes useful to talk about possible future beings whose basic capacities so radically exceed those of present humans as to be no longer unambiguously human by our current standards.”³³

By 2007 transhumanism had gained enough standing as both a topic and stream of

²⁹ Searches last conducted January 21, 2013.

³⁰ Warren T. Reich, ed., *Encyclopedia of Bioethics*, 2nd ed. (New York: Macmillan, 1995).

³¹ C. Christopher Hook, “Transhumanism and Posthumanism,” ed. Stephen G. Post, *Encyclopedia of Bioethics* (New York: Macmillan Reference, 2004).

³² Humanityplus.org, “Transhumanist FAQ.” Accessed January 21, 2013.
http://humanityplus.org/philosophy/transhumanist-faq/#answer_19.

³³ Ibid. Though transhumanism is often taken to refer to ‘transcending’ humanity, it originally referred to the transitional state of humanity between human and posthuman. ‘Posthuman’ itself carries a multiplicity of meanings and more specific implications, especially within cultural studies, but for present purposes I use them interchangeably.

thought within bioethics that *The Hastings Center Report*, the oldest and perhaps most traditional of bioethics journals, published an article summarizing transhumanist thinking (as well as opposition to it) within bioethics;³⁴ by 2009, transhumanism was the theme of an issue of *The Journal of Medicine and Philosophy*.³⁵ This is not as incongruous as it sounds because some of the core ideas of transhumanism had already been at play within mainstream bioethics for quite a while, in particular via discussions of the normativity of human nature.³⁶ Implicitly or explicitly, the debate over human genetic engineering advances the idea that we are contemplating the use of technologies that will significantly change aspects of human nature (if a stable concept of human nature exists), or at least key aspects of the current human condition.

I am not particularly interested in the tenets of transhumanism, nor do I wish to give the impression that it dominates bioethics; however, it does present the leading edge of bioethics focused on highly speculative ends and is conspicuous within the enhancement discourse. The emergence of prominent discussions of transhumanism and enhancement within bioethics inaugurated a period when speculative futures have featured ever more prominently, and

³⁴ Nicholas Agar, "Whereto Transhumanism? The Literature Reaches a Critical Mass," *Hastings Center Report* 37, no. 3 (2007): 12–17.

³⁵ *The Journal of Law Medicine and Philosophy* 35, no. 6 (2009).

³⁶ "The discussion of genetic engineering has as a central theme the question of whether it is desirable to try to modify human nature." Jonathan Glover, *What Sort of People Should There Be?* (Middlesex, UK: Penguin Books, 1984), 16. For an earlier discussion see President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research, *Splicing Life: A Report on the Social and Ethical Issues of Genetic Engineering with Human Beings* (Washington, DC, 1982), 68–71.

frequently with less tentativeness, in the argumentation and rhetoric in the field.³⁷

Transhumanist thought had already been around for some time before it entered bioethics, so it is not the affinity between transhumanism and the idea of human enhancement alone, nor the existence of transhumanist bioethicists, that explains why it became a factor within bioethics. To an extent, the explanation goes back to the discourses surrounding the HGP that helped to launch a ‘third wave’ of transhumanism that was much less of a fringe movement than it had been earlier.³⁸ Attaching transhumanism to a concrete multibillion-dollar scientific project certainly helped to give the proponents of transhumanism greater credibility. However, as the Google n-gram graph reflects, it was in 2002 that interest in transhumanism, human enhancement, and the posthuman spiked. This corresponds to the publication of two books which offered competing visions of the coming future of biotechnology. The first was Gregory Stock’s *Redesigning Humans: Our Inevitable Genetic Future*, which offered an optimistic picture of the ‘inevitable’ changes that genetic technologies would bring to humanity;³⁹ the second was Francis Fukuyama’s *Our Posthuman Future: Consequences of the Biotechnology Revolution*, which warned that the genetic

³⁷ For Bostrom’s own account of the history of transhumanism see Nick Bostrom, “A History of Transhumanist Thought,” *Journal of Evolution and Technology* 14, no. 1 (April 2005). Also see Andy Miah, “A Critical History of Posthumanism,” in *Medical Enhancement and Posthumanity*, ed. Bert Gordijn and Ruth Chadwick, vol. 2 (Dordrecht: Springer, 2008), 71–94.

³⁸ Greg Klerkx, “The Transhumanists as Tribe,” in *Better Humans? The Politics of Human Enhancement and Life Extension*, ed. Paul Miller and James Wilsdon (London: Demos, 2006), 59–66.

³⁹ Gregory Stock, *Redesigning Humans: Our Inevitable Genetic Future* (New York: Houghton Mifflin, 2002).

revolution, left unchecked, would destroy the sociopolitical order.⁴⁰ The appearance of the two books by mainstream authors, along with Stock and Fukuyama's public debates, clearly helped to popularize transhumanism.⁴¹ Also of import is that Fukuyama was then a member of the President's Council on Bioethics under the leadership of Leon Kass, which, during the next year, published the report *Beyond Therapy: Biotechnology and the Pursuit of Happiness*, a sustained critique of the drive toward human biomedical enhancement.⁴²

A final convergent factor that gave the enhancement discourse a boost with an imprimatur of scientific feasibility and a sense of imminence was an influential discourse in U.S. science policy on 'converging technologies' that itself reflected transhumanist aspirations.⁴³ This discourse included a number of government-sponsored working groups and reports organized by Mihail Roco and William Bainbridge, the most influential of which, *Converging Technologies for Improving Human Performance*, argued that nanotechnology, biotechnology, information technology, and advances in cognitive science (NBIC) were poised synergistically to accelerate the pace of

⁴⁰ Francis Fukuyama, *Our Posthuman Future: Consequences of the Biotechnology Revolution* (New York: Farrar, Straus and Giroux, 2002).

⁴¹ Miah, "A Critical History of Posthumanism."

⁴² President's Council on Bioethics, *Beyond Therapy: Biotechnology and the Pursuit of Happiness* (Washington, DC, 2003).

⁴³ Hence, criticism of the PCBE's discussion of speculative technologies with the retort that "science fiction should not be allowed to drive and shape science policy," (Guyer and Moreno, "Slouching Toward Policy," W17), ignores the extent to which science policy is already bound up with speculative science.

technoscientific achievement and make human powerful enhancements a reality.⁴⁴ The report's utopian vision of almost limitless potential for improving humankind served as a conduit of transhumanist ideas into the mainstream of bioethics and STS.⁴⁵ Beyond the curious fact that transhumanist ambitions were now codified in a series of National Science Foundation initiatives (the first footnote in *Beyond Therapy* points to *Converging Technologies for Improving Human Performance* to justify pursuing an outré subject), the idea that technological convergence, and nanotechnology in particular, would soon usher in a golden age of technological possibility helped to spur worries that the ethical discourses on emerging technologies were rapidly falling far behind the pace of the technologies themselves.⁴⁶ The sense that ethical analysis was lagging, thereby hindering public support for promising research or letting it proceed without adequate oversight, became the primary engine for legitimizing research in speculative ethics and helped to inaugurate 'nanoethics' as a (somewhat) distinct area of ethical discourse.⁴⁷ However, concerns that technology was worryingly outpacing ethical discourse had already taken root within bioethics a few years earlier with the birth of a famous sheep.

⁴⁴ Mihail C. Roco and William Sims Bainbridge, *Converging Technologies for Improving Human Performance: Nanotechnology, Biotechnology, Information Technology and Cognitive Science* (Dordrecht; Boston: Kluwer Academic Publishers, 2003).

⁴⁵ Joachim Schummer, "From Nano-Convergence to NBIC-Convergence: 'The Best Way to Predict the Future Is to Create It,'" in *Governing Future Technologies*, ed. Mario Kaiser et al., *Sociology of the Sciences Yearbook* 27 (Dordrecht: Springer, 2010), 57–71; Christopher Coenen, "Deliberating Visions."

⁴⁶ Anisa Mnyusiwalla, Abdallah S. Daar, and Peter A. Singer, "'Mind the Gap': Science and Ethics in Nanotechnology," *Nanotechnology* 14, no. 3 (2003): R9–R13.

⁴⁷ The emergence of nanoethics is discussed in the next chapter.

c. The Legacy of the Cloning Controversy

The enhancement discourse is characterized not only by the degree to which it revolves around speculative futures, but by the sense that the technologies that presage these scenarios already exist, and the futures in question are therefore not far off or are already upon us. The success and ubiquity of genetic engineering in biological research coupled with the excitement over the HGP surely played a key role in fostering this notion, but the lasting influence of the cloning controversy is also a factor. The successful cloning of a sheep in 1996 unleashed a frenzy of media coverage and speculation accompanied by a deluge of bioethical commentary. Here, suddenly, was a far-out speculative biotechnology come to fruition, and surely many others would soon be realized as well. Riding high on the public's fresh credulity were books like *Remaking Eden* by Lee Silver, in which a respected scientist assured his readers that a number of existing and emerging biotechnologies would soon remake society.⁴⁸ The public tumult spurred by the successful cloning of just one mammal struck some bioethicists as precisely what happens when it ignores speculative possibilities. What looks unlikely today may be front page news tomorrow, and we ought to get the ethics straightened out in advance. Perhaps if we had, the response to cloning might have been less manic and more reasoned.

Suppose that prior to 1997 there had been a wide debate about human cloning, with contributions from representatives of many different moral traditions. We might now have reached some kind of moral consensus about the various uses to

⁴⁸ Lee M. Silver, *Remaking Eden: Cloning and Beyond in a Brave New World* (New York: HarperCollins, 1997).

which the technology should be put.⁴⁹

Yet, the idea that this was all new seems profoundly unmindful of the early (but not very distant) history of bioethics in which human cloning was a subject of speculation and moral analysis.

While many commentators have lamented that cloning is yet another example of how ethics (and law) is continually racing to keep up with scientific research and technology, a review of this history reveals that it is science that has finally caught up with the theological imagination of the 1960s and 1970s. In any event, it reflects an inadequate historical memory to portray human cloning as a new issue in bioethics.⁵⁰

The fact that cloning had been dealt with earlier did little to prepare the public or generate any formal consensus in advance of the technological possibility becoming closer to reality. Either the original discourse was inadequate, or the idea that bioethics can achieve some kind of useful preparatory consensus in advance is faulty.⁵¹ Useful or not, bioethics had a significant impetus to get ahead of the soon-to-be-realized future of human enhancement.

II. From Thought Experiments to Likely Futures

Speculation did not suddenly appear in bioethics literature, but a gradual allaying of fears over recombinant DNA technologies followed by the confluence of the HGP, Dolly the Sheep, and

⁴⁹ Nicholas Agar, *Liberal Eugenics: In Defence of Human Enhancement* (Malden, MA: Blackwell, 2004), 33.

⁵⁰ Courtney S. Campbell, "Prophecy and Policy," *Hastings Center Report* 27, no. 5 (1997): 15.

⁵¹ This is the subject of Chapter Five. But in sum, the answer is that the original discourse was in the speculative-prophetic mode. It was not an attempt to achieve a consensus about how technologies ought to be regulated, but to reflect on the way that technologies might alter the bonds of family and community and change the way that we perceive ourselves. Agar's wish is for a forward thinking regulatory discourse aimed at achieving a consensus; something that I argue is essentially impossible.

mainstream discussions of transhumanism changed the way in which many bioethicists conceived of and discussed the biotechnological future. In comparing works leading up to the ‘enhancement’ discourse (circa 2000) with those written as it blossomed, noticeable differences can be observed. First, the implementation of genetic technologies with potential enhancement uses begins to appear as a looming future; next, discussions increasingly concern how enhancement technologies ought to be regulated as matters of public policy. I look at four books that discuss the ethical issues that are thought to arise with the use of advanced genetic technologies. This highly selective survey is not meant to prove that the changes I described have taken place; only to illustrate some of them.

a. 1984: *What Sort of People Should There Be?*

Philosopher Jonathan Glover retrospectively describes his 1984 monograph *What Sort of People Should There Be?* (WSP) as “the first philosophical book on the ethics of genetic choices, and (in its second half) the first book on what is now called ‘neuroethics’,” making it an apt place to begin.⁵² But we should rightly go back a good bit farther than 1984 in reviewing the literature on the ethics of human genetic engineering. There was a burgeoning discourse on the ‘new genetics’ beginning

⁵² “Jonathan Glover’s Philosophy Website.” Accessed January 23, 2013.
<http://jonathanglover.co.uk/books/what-sort-of-people-should-there-be>.

in the early 1970's.⁵³ It was at that point that creating viable human embryos in a laboratory and then controlling their genetic makeup began to look like an increasingly likely possibility.

Presentations of the ensuing bioethical questions in the popular media and national politics also factor into a thorough history of speculative bioethics, as they influenced the agenda of bioethics, solidified its standing in American society, and helped to secure sources of funding for bioethics research.⁵⁴ However, because my focus is on the enhancement discourse and not on what preceded it, I begin with Glover whose writing is within the mainstream of 'philosophical bioethics' (bioethical work done primarily by analytically trained philosophers) and anticipates much of the later discourse on enhancement.

WSP would today be placed firmly within the enhancement discourse, but the term does not appear in the book in that sense. Aside from the use of the earlier, more neutral terms to describe types of genetic modification there are several notable elements to the books structure and style. First, Glover makes it clear that he considers it useless to delimit the discussion based on "which technical developments are probable or improbable," and instead claims to "take the

⁵³ e.g., Amitai Etzioni, *Genetic Fix* (New York: Macmillan, 1973); Bruce Hilton et al., eds., *Ethical Issues in Human Genetics*, Fogarty International Proceedings 13 (New York: Plenum Press, 1973); June Goodfield, *Playing God: Genetic Engineering and the Manipulation of Life* (New York: Random House, 1977). All three of these books stem in one way or another from conferences composed primarily of scientists. Etzioni based his discussion on the proceedings of a 1972 Council for International Organizations of Medical Sciences conference; Hilton et al. was a response to an earlier 1970 NIH conference; Goodfield was spurred to write after the famous 1975 Asilomar Conference on Recombinant DNA. Other books that deal with the much of the same material in a more popular format include Michael Rogers, *Biohazard* (New York: Knopf, 1977); and Albert Rosenfeld, *The Second Genesis: The Coming Control of Life* (Vintage Books, 1975).

⁵⁴ Renee C. Fox and Judith P. Swazey, *Observing Bioethics* (New York: Oxford University Press, 2008), chap. 1.

generous view of what may happen, so that we develop the habit of thinking about the best policy well in advance, rather than always too late.”⁵⁵ However, his aim is ostensibly not to suggest the best policies for governing future technologies, but to use future scenarios as the basis for “thought experiments” with which he attempts clarify our present values.⁵⁶ To this end, he prefers to use more extreme scenarios rather than moderate ones, and appeals to the problem of aggregative effects which gradually lead to unwanted outcomes.⁵⁷

Glover’s stated program makes it clear that WSP is intended to be speculative bioethics in the reflective mode. However, the book also points to a tension that makes it difficult to sustain a reflective discussion and avoid long-term regulatory strategizing. Reflecting on the book many years later Glover recalls seeing his challenge as convincing his audience that the issues he was discussing were not simply thought experiments, but practical future questions: “It all seemed very futuristic then, and I had to convince readers that the issues might one day become practical. Discussing genetic choices, I had to invent thought experiments rather than, as now, discussing actual cases. It

⁵⁵ Glover, *What Sort of People Should There Be?*, 14.

⁵⁶ The entire middle section of the book is titled “thought experiments” though these concern technologies born from neuroscience. There is comparatively little in the genetics sections that utilizes real thought experiments, likely due to the fact that Glover was drawing on the extensive use of thought experiments in philosophy of mind; in the genetics sections he was looking at practical discussions of eugenics.

⁵⁷ Glover, *What Sort of People Should There Be?*, 16–18.

is striking how the genetic issues became real.”⁵⁸ Clearly Glover viewed himself as talking about the potential actual future, and not merely an exotic possible imagined future. His ‘thought experiments’ begin to look more like predictions, and his arguments—which tend toward a critique of centralized decision-making and a libertarian endorsement of the autonomous pursuit of the good—begin to sound more like policy guidelines.

b. 1996: *The Lives to Come*

1996 brings us up to the point at which excitement about the possibilities that would follow from the HGP was on the rise and the bioethical discussion was already shifting to the enhancement discourse. I turn to Philip Kitcher’s *The Lives to Come* as something of a deviation from the trend I described earlier.⁵⁹ If one looks at bioethics journal articles which appeared around the same time, the focus had already begun to turn to enhancement; yet the term rarely appears in his book. There are other contrasts as well, and this perhaps reflects the fact that Kitcher is not a bioethicist in the professional sense. As a philosopher of science, he takes great pains to clarify the state of scientific knowledge and capability before embarking on speculation that he feels is firmly grounded in a realistic portrait of current science. Kitcher therefore offers few concrete predictions

⁵⁸ “Jonathan Glover’s Philosophy Website.” I am interested to know what “actual cases” of human genetic enhancement Glover has in mind that match the questions posed in WSP, as I am thus far unaware of any. This reflects either an equivocation between engineering and selection, or a sense that human genetic enhancement is imminent. It is also important to point out that Glover did not ‘invent’ these technological possibilities or scenarios. They reflected speculation by scientists and science fiction writers.

⁵⁹ Philip Kitcher, *The Lives to Come: The Genetic Revolution and Human Possibilities* (New York: Simon & Schuster, 1996).

of what kinds of genetic interventions may be possible and qualifies these with the caveat that extensive genetic modifications may well be out of reach. Kitcher is most interested in stimulating reflection as a means of guiding the ongoing development and use of biotechnology. He switches between discussions of current genetic technologies and the challenges they pose and possible future ones, showing persistent lines of concern that run from present to future uses of genetic technology.

Kitcher correctly perceives that the first fruits and challenges in the wake of the HGP would concern the uses of genetic information, but that genetic interventions would for the most part remain in the more distant horizon—or even prove to be impossible. His idea of the genetic revolution is primarily a revolution founded on a rapid increase in genetic knowledge, not on our ability to manipulate human genes. He is therefore much more focused on the issues involved with selecting against children with unwanted traits; enhancement is not presented as the burning question society will need to contend with over the coming decades. Kitcher describes the challenge of formulating what he terms ‘utopian eugenics,’ in which society will address hard questions regarding which kinds of lives are worth living without forcing these views on individuals, and without coming to believe that there are easy answers in many cases. But there is another thread of inquiry that runs through the book: why are we so caught up in thinking about (and funding) research on genetics and biotechnology when so many causes of human suffering and a wide range of factors that prevent flourishing have little if anything to do with biology?⁶⁰

⁶⁰ This echoes an early critique of Glover’s book discussed in the coming chapter.

c. 2000: *From Chance to Choice*

From Chance to Choice: Genetics & Justice (CtC) is generally regarded as a seminal book in bioethics and is probably among the most influential works on enhancement.⁶¹ Written by four prominent bioethicists, it is also highly representative of the way in which the discourse had changed with the HGP and the promise of a coming genetic revolution.⁶² CtC wastes no time in setting its agenda via future speculation. It begins with “previews of perplexities,” a series of speculative scenarios built from biotechnologies such as human cloning, genetic screening (with eugenic policies), and germline genetic engineering. According to the authors, CtC had been under development for quite some time, but the effects of futurist writings like Silvers’s *Remaking Eden* are apparent, particularly in the extent to which it delves into the question of how ‘reprogenetics’ may exacerbate social inequalities (a central prediction in Silvers’s book). And despite caveats about the limits that might be encountered in human genetic engineering, the authors’ enthusiasm for and belief in the power of genetic technologies is apparent: “humankind’s future abilities to rewrite our genetic code are apparently limitless.”⁶³

To understand what a striking change this kind of speculation evinces in the writings of professional bioethicists, consider the following report by John Evans in his history of the bioethical discourse on genetic engineering:

For the first time in the debate, in the 1992-95 period we see emerging a separate

⁶¹ Allen Buchanan et al., *From Chance to Choice: Genetics & Justice* (Cambridge; New York: Cambridge University Press, 2000).

⁶² CtC was itself a product of the ELSI funding program.

⁶³ Buchanan et al., *From Chance to Choice*, 56.

community, composed of analytic philosophers, who largely use formally rational arguments, but with a concern for what bioethicists would call abstract, speculative questions. This suggests that philosophy and bioethics are indeed separate professions, and that those analytic philosophers who did not become bioethicists retained their interest in the less practical questions.⁶⁴

The analytic philosopher whom Evans has in mind is none other than Glover, and the professional bioethicists, who supposedly do not take up speculative questions, include the authors of CtC. Clearly, during the period covered by Evans's study (up until roughly 1998) it seemed, at least to him, that professional bioethics was eschewing just the type of speculation that CtC delved into shortly thereafter. Granted, Evans's claim here may amount to a circular definition of who counts as a 'bioethicist' in the professional sense, but the more likely explanation is that speculation became part and parcel of professional bioethics precisely because speculative questions of the sort discussed in CtC began to appear more practical as the HGP neared its initial phase of completion.

CtC is not casual about the fact that the futures it discusses are speculative, and devotes a few pages to the question of how speculative scenarios fit into their methodology.

We begin this introduction with several hypothetical scenarios, some more farfetched than others. Is there any reason to include such science fiction cases as the genetic enhancement certificate and the genetic communitarianism in serious moral deliberations?

The use of concrete cases—both real and hypothetical, complex and simplified—to stimulate moral reflection is essential to the method we use in this book. Our procedure here is far from novel; we rely on the now-familiar method of reflective equilibrium...

The aim of systematic moral reasoning is to develop a coherent set of beliefs that includes moral principles, other elements of moral theory (such as an account

⁶⁴ John H. Evans, *Playing God?: Human Genetic Engineering and the Rationalization of Public Bioethical Debate* (University of Chicago Press, 2002), 161.

of which sorts of beings have rights), and beliefs about what is right and wrong in particular cases—actual and hypothetical—as well as beliefs about how the world is and how people in it behave. Moral arguments appeal to some elements of this system of beliefs in order to bring critical reflection to bear on others. This process aims at what Rawls calls “wide reflective equilibrium.” Our moral beliefs are thus held to be revisable in light of other things we believe or reasonably come to believe.⁶⁵

What the authors do not address is whether there are any constraints on how speculative future scenarios ought to figure into this method—a problem I address at length later (Chapter Four, I.b and Chapter Seven, III.c).⁶⁶ For now, consider the difference between beliefs about a future one thinks is unlikely, likely, or inevitable. The degree of belief attached to a future expectation determines how it may subject other beliefs to scrutiny and potential revision. An unlikely scenario may be a mere thought experiment in which intuitions are tested against the application of general principles. But a scenario which one considers likely or inevitable subjects many other kinds of beliefs to revision because it changes our picture of the actual world in which moral decisions are made. In this sense, any speculative scenario espouses a technological inevitability when it is predicated on the existence of technologies the authors believe to be likely. The use of speculative futures in reflective equilibrium is therefore problematic to the extent that it assimilates subjacent

⁶⁵ Buchanan et al., *From Chance to Choice*, 22–23.

⁶⁶ They do, however, express concern over the reinforcement of ‘gene mania’ and fallacious beliefs in genetic determinism. Ironically, the book which they cite as a study of this trend, in its second edition, references CtC itself as being at the forefront of the new eugenics movement which in turn contributes to the public’s belief in genetic determinism; Nelkin and Lindee, *The DNA Mystique*, 198. This quirk of unanticipated self-reference reflects one of the recurring rhetorical slights of hand by the authors of CtC: accusing opponents of enhancement of the “crudest sort of genetic determinism” while endorsing the power of genetic technologies to reshape humans; Allen Buchanan, *Beyond Humanity?: The Ethics of Biomedical Enhancement* (New York: Oxford University Press, 2011), 5.

beliefs about the future which revise existing beliefs about “how the world is and how the people in it behave”—and hence how the world ought to be and how the people in it ought to behave—without due scrutiny.

CtC is also notable for the way in which it looks at future technologies from the perspective of how they ought to be regulated. Although they keep the discussion at a certain level of generality, on the whole, their purpose is to set out a theoretical basis for coming policy decisions that balance a state interest in eugenics with individual liberty to use (or not use) genetic technologies as one sees fit—mediated by the demands of justice.

d. 2011 and beyond: *Beyond Humanity* (and an Embarrassment of Riches)

Since CtC, the number of monographs on enhancement has multiplied greatly along with an ever increasing number of articles and edited collections.⁶⁷ Despite the fact that the genetic revolution promised by the HGP had not quite arrived, the sense that enhancement technologies are coming

⁶⁷ The following is a small sample of the books published on enhancement between 2000-2011: Gregory Stock and John H. Campbell, eds., *Engineering the Human Germline* (New York: Oxford University Press, 2000); Agar, *Liberal Eugenics*; Jonathan Glover, *Choosing Children: Genes, Disability, and Design* (Oxford; New York: Oxford University Press, 2006); Ronald M. Green, *Babies by Design: The Ethics of Genetic Choice* (New Haven: Yale University Press, 2007); Bert Gordijn and Ruth Chadwick, eds., *Medical Enhancement and Posthumanity* (Dordrecht: Springer, 2008); Leo Zonneveld, Huub Dijkstra, and Danielle Ringoir, eds., *Reshaping the Human Condition: Exploring Human Enhancement* (The Hague: Rathenau Institute, 2008); Maxwell J. Mehlman, *The Price of Perfection: Individualism and Society in the Era of Biomedical Enhancement* (Baltimore: Johns Hopkins University Press, 2009); Nicholas Agar, *Humanity's End: Why We Should Reject Radical Enhancement* (Cambridge, MA: MIT Press, 2010); Julian Savulescu and Nick Bostrom, eds., *Human Enhancement* (Oxford; New York: Oxford University Press, 2009); Julian Savulescu, Ruud ter Meulen, and Guy Kahane, eds., *Enhancing Human Capacities* (West Sussex: Wiley-Blackwell, 2011).

soon or are eventually inevitable is mostly undiminished.⁶⁸ In the next chapter, I survey the small amount of pushback by bioethicists who are concerned about excessive and inappropriate discussions of futures of uncertain likelihood. More authors have by now taken the time to justify their discussion of speculative scenarios either by explaining why enhancement technologies are a virtual certainty,⁶⁹ or by stressing the importance of surveying such possible futures in case they do come about.⁷⁰

Allen Buchanan's *Beyond Humanity* is notable for the degree of inevitability he attributes to the widespread use of enhancement technologies. Buchanan argues that enhancement technologies of many sorts are already here, with more coming shortly, and that this fact must form the basis of all further discussions:

[B]eing for enhancement or against enhancement makes as little sense as being pro-globalization or anti-globalization or, for that matter, being pro-technology or anti-technology. In all three cases, we are faced with a complex but undeniable fact: something momentous is happening on an increasingly large scale, there is every reason to believe it will continue, it is impossible to make sweeping claims about whether its effects will be good or bad overall, and there is no realistic prospect of stopping the development in its tracks.⁷¹

This is a rather startling claim given that much of Buchanan's book appears to talk mainly about technologies that are far more capable than any current human enhancement technology such as performance-enhancing pharmaceutical. Also puzzling is that Buchanan has such an expansive

⁶⁸ See Françoise Baylis and Jason Scott Robert, "The Inevitability of Genetic Enhancement Technologies," *Bioethics* 18, no. 1 (2004): 1–8211.

⁶⁹ Green, *Babies by Design*, chap. 2. I discuss this book in greater detail in Chapter Six, II.c.

⁷⁰ Agar, *Liberal Eugenics*, chap. 2.

⁷¹ Buchanan, *Beyond Humanity?*, 11–12.

view of enhancement that it includes “literacy, numeracy, and computers.”

There are several rhetorical moves being made here. First, there is the conception of an enhancement as ‘that which allows me to do things I could not do before,’ in which case every technology is an enhancement. Being against some form of enhancement is thereby equated with being against technology—which all agree makes little sense. Second, Buchanan portrays objections to certain technologies as based upon their predicted effects—a misunderstanding of the significance of critiques of possible future technologies. Third, and most significant, is Buchanan’s deterministic collapse of the distance between past, present and future. Past enhancements have led to present ones, and present ones will lead to futures ones. Once the technological future is set, any discussion of whether it is wise or good to pursue a particular technology is rendered moot, and the dominant mode of regulatory bioethics must take the reins and steer society on a course upholding wellbeing, autonomy and justice. To this end, Buchanan offers the ultimate regulatory response, a proposal for the ‘Global Institute for Justice in Innovation’ that will make sure that the benefits of enhancement technologies diffuse through societies and do not only benefit the rich and well-off.⁷²

Somehow in the span of roughly twenty-five years—without a truly revolutionary enhancement technology in sight—bioethics went from discussing thought experiments to the pressing need for global regulation, all while discussing the same technologies and scenarios. What happened?

⁷² Ibid., chap. 8.

III. From Reflective to Regulatory Modes of Thinking

a. Callahan: The Secularization of Bioethics

The difference between reflective and regulatory bioethics was broached in the introduction, but the roots of this division within bioethics reach beyond the rather basic methodological distinction I offered there, and reflect the historical development of bioethics itself. The shift away from discussions of a reflective or prophetic nature may be the defining trend which characterizes contemporary bioethics. As Callahan describes it, what began as a substantive theologically motivated discourse founded on deeply conflicting worldviews rapidly turned to secular moral philosophy to justify its foundational assumptions, and in the process became an instrument of institutionalized policymaking.

How was the acceptance of bioethics in fact gained? I would say that the first thing that those in bioethics had to do—though I don't believe anyone set this as a conscious agenda—was to push religion aside... What we began seeing was the movement of many in bioethics toward a different kind of moral language in the mainstream of public policy, toward a language of rights, worries about questions of pluralism, efforts to find moral consensus and moral strategies in the face of a diverse cultural situation. And particularly it was the need to find some way to cope with the hostility toward ethics in general.

The solution that gradually emerged, though I believe without any set or conscious plan, was for mainline bioethics to move in the direction of what I call “regulatory ethics.” Instead of either going along the Joseph Fletcher route of totally blessing everything that came along, or the Paul Ramsey route of seeming to reject everything, bioethics chose a kind of middle course.

That middle course is regulation, regulation being the way we in the United States typically deal with controversial issues. On the one hand you avoid the extremes of simple prohibition of things, while on the other hand you show that you are serious and willing to be cautious. What we began seeing increasingly was the creation of oversight bodies, and of monitoring, regulatory bodies. The institutional review boards would be a classic example of that, and of course the first instance of real regulatory efforts. That was followed by committees established

to deal with the recombinant DNA issues and the like.

At the same time, Congress began to get interested in these issues. It established the National Commission for the Protection of Human Subjects, and then the President's Commission later on. Those commissions, I think it fair to say, were trying to find some common ground, some consensus, a middle way that would help the nation in terms of its public policy to deal with these controversial and delicate issues.⁷³

By operating with a secularized mode of argumentation and justification, bioethics also tended to eschew reflection on questions that invite religious or particularistic appeals to axiomatic values on the belief that such appeals are not only non-universal and not up to the demands of public reason, but potentially corrosive to civility: “ours is a society extraordinarily wary of provoking fundamental debates about basic worldviews and ethical premises. Such debates are seen as more likely to produce destructive battles than illuminating social insights, more anger and intransigence than peace and compromise.”⁷⁴

However, by pursuing bioethics primarily as a regulatory endeavor, Callahan believes that the field has “eliminated more speculative forms of philosophy, especially those that might look to

⁷³ Callahan, “Why America Accepted Bioethics,” S8.

⁷⁴ Daniel Callahan, “Religion and the Secularization of Bioethics,” *The Hastings Center Report* 20, no. 4 (1990): 2–4. Callahan’s various accounts of the history of bioethics are illuminating. His understanding of the process by which bioethics turned ‘regulatory’ explains the vexation felt in bioethics when the debate over the procurement and use of embryonic stem cells became embroiled in the so-called ‘culture wars’. After years of systematically avoiding hot-button issues like abortion, over which no formal consensus was likely to emerge (indeed, the most cited articles on abortion in bioethics were written by philosophers who are not bioethicists), bioethics was drawn into discussing just the kind of questions it had eschewed. But instead of admitting that bioethics had no choice but to address substantive but ‘fuzzy’ questions that had occupied theologically tinged bioethics, it instead theorized that a new kind of conservative bioethics had emerged to compete with it that played by a different set of rules; see Ruth Macklin, “The New Conservatives in Bioethics: Who Are They and What Do They Seek?,” *Hastings Center Report* 36, no. 1 (2006): 34–43.

nature or organism for moral direction,” shown “enormous reluctance to question the conventional ends and goals of medicine, thereby running a constant risk of simply legitimating, by way of ethical tinkering and casuistical fussiness, the way things are,” and “eschew[ed] vision and speculation about goals and meaning.”⁷⁵

Elsewhere, Callahan anticipates that this trend will be seen by social scientists as a key aspect of understanding the state of bioethics discourse.

For those social scientists who have deplored the dissociation of bioethics and questions of human meaning—a critical part of the cultural life of most societies—the move of bioethics away from religion is a good place to look for its origin. Religion is all about the meaning of life. The old joke I heard as a graduate student in analytic philosophy some years ago is not all that dead: “life doesn't have a meaning; only propositions do.” One will search in vain in the bioethics literature for any full and rich effort to connect questions of meaning to questions of ethics...

The goal here is not just to make a place for religion, though that seems only pluralistically fair and intellectually sensible to me. It is instead to find room for a capacious view of bioethics, one that allows it to dig more deeply into the way biomedical progress can restructure the living of a life and the possible meanings that can be given to life. Just what should be counted as genuine human progress as distinguished from mere change and innovation? [...]

I am not claiming that bioethics utterly fails to address those larger questions. My point is instead that they tend to take a decidedly second place to regulatory problems and to matters of individual preferences and rights.⁷⁶

The present study is concerned somewhat less with the overall state of bioethics as dominated by regulatory approaches, and more with what I find to be its most puzzling consequence: the application of regulatory goals and concepts to possible future technologies.

⁷⁵ Callahan, “Religion and the Secularization of Bioethics,” 4.

⁷⁶ Callahan, “The Social Sciences and the Task of Bioethics,” 281–282.

b. Evans: The Rise of Formal Rationality

How does this general trend in bioethics, one that Callahan would surely agree admits to many exceptions,⁷⁷ set the stage for the expanding discourse on enhancement? John Evans, in an extended study echoing Callahan's critiques, offers such an account, ending around 1998 just as 'enhancement' was gaining ground as a focal point of bioethics.⁷⁸ Nonetheless, its explanatory thesis readily covers the years following the book's publication as well.

Evans essentially agrees with Callahan's description of the changes that occurred in the field, and fills it in with a detailed history of the processes by which bioethics (which arose in part to address public concerns over recombinant DNA technology) paved the way for an acceptance of human genetic engineering. Evans argues that at the heart of the 'thinning' of the bioethical discourse described by Callahan is the displacement of 'substantive rationality,' in which the means and ultimate ends envisioned by the use of a new technology are the subject of public debate, by 'formal rationality', in which only the means by which certain ends are pursued are subject to ethical scrutiny.⁷⁹ Beyond the secularization of bioethics, Evans argues that it was the professionalization of bioethics, its assumption of jurisdictional control over the regulation and oversight of scientific and biomedical research via national commissions, and its settling on four consensus-based mid-level ends (the 'Georgetown Mantra' of autonomy, beneficence,

⁷⁷ cf. Carla M. Messikomer, Renée C. Fox, and Judith P. Swazey, "The Presence and Influence of Religion in American Bioethics," *Perspectives in Biology and Medicine* 44, no. 4 (2001): 485–508.

⁷⁸ Evans, *Playing God?*.

⁷⁹ Substantive rationality in this sense characterizes the kinds of considerations explored in what I refer to as reflective bioethics. Conversely, regulatory questions for the most part are addressed from the standpoint of formal rationality.

nonmaleficence, and justice) that allowed a formally rational discourse on genetic engineering to flourish. This was apparent in the 1982 presidential commission report on human genetic engineering, *Splicing Life*, in which philosophical and theological considerations were noted, but, from a formally rational perspective were not viewed as having relevance to regulatory decisions.⁸⁰

There is of course much more to Evans's account, as well as places to quibble with his analysis. He gives too little credit to the fact that recombinant DNA technology turned out (thus far at least) not to pose the grave and immediate dangers that many imagined it would. Had this not been the case regarding both recombinant DNA and in vitro fertilization (IVF), bioethics might have taken a completely different approach to regulating human genetic engineering in which there naturally would have been significantly more sustained public scrutiny of the regulatory process itself—although the kinds of arguments put forth may nonetheless have remained formally rational.

Also missing is adequate attention to the stream of self-criticism within bioethics over many of the same issues that he highlights. This may, however, simply be the result of the book not covering the years of controversy during Leon Kass's leadership of George W. Bush's President's Council on Bioethics (PCBE), during which the undercurrents of self-critique came to the surface.⁸¹ A final quibble with Evans's approach is that he does not discuss why formal rationality courses deeply through the veins of modern society at the level of sociolinguistic cultural formation, complicating attempts at substantive public discourse outside of bioethics as

⁸⁰ President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research, *Splicing Life*.

⁸¹ This is discussed in many of the essays in Eckenwiler and Cohn, *The Ethics of Bioethics*.

well.

Yet, even if Evans's narrative is incomplete in places, for the most part it is descriptively accurate and offers a compelling explanatory model for understanding the evolution of the bioethical discourse on genetic engineering toward its current focus on enhancement. To see what Evans is getting at, it is best to get a brief sense of what substantively rational (what I somewhat infelicitously term 'reflective') considerations look like. A 1982 report by the National Council of Churches summarizes its concerns over genetic technologies as follows:

Possibilities such as cloning, mass genetic screening, and gene therapy challenge our understanding of the nature of personal identity, the meaning of human community, the inviolability of the body, the structure of human parenthood, and the limits on human intervention into natural processes.⁸²

The disquiet this statement expresses—notably without religious language—can remain no matter the use to which a given technology is put. Hence there is no mention of the therapy/enhancement distinction. However, even without explicit theological references, these concerns may be particular to certain communities or cultures, and not shared by many members of a diverse society.

Regulatory bioethics, aimed at formulating consensus-based public policies, cannot take such particularistic considerations into full account; instead, it fixes its gaze on the four ends mentioned earlier which are justified in various ways as possessing an important degree of universality within modern liberal societies. When a technology is evaluated based on this reduced

⁸² National Council of Churches Task Force on Human Life and the New Genetics (Washington DC, 1982). Cited in Rose M. Morgan, *The Genetics Revolution: History, Fears, and Future of a Life-Altering Science* (Westport, Conn: Greenwood Press, 2006), 23.

constellation of values, the therapy/enhancement distinction becomes crucial. Therapies rise high along the axes of beneficence and (at least in the account favored by many mainstream bioethicists) justice, and therefore have a lower threshold to clear in demonstrating that they are not potentially harmful. Enhancements do not appear to rise nearly as high in terms of beneficence and justice, and therefore must show a much lower potential for producing harm. So long as germline therapies appear no more potentially harmful than those targeting somatic cells (or potentially more therapeutically efficacious), the distinction between them—which can be rather pronounced when applied to concerns like those expressed by the National Council of Churches—becomes slight.

Writing a decade after the above-mentioned report, Fletcher and Anderson observed that in an increasing number of articles on genetic engineering, “morally relevant differences between somatic cell gene therapy and germ-line therapy appear to be less significant than the difference between both of these and enhancement of human traits having little to do with disease.”⁸³ Therapies that are safe and efficacious are seldom controversial, so the pressing regulatory task is to then sort out the nitty-gritty of how research on genetic therapies may proceed, much in the same way that all research on new medical technologies is regulated.⁸⁴

⁸³ John C. Fletcher and W. French Anderson, “Germ-Line Gene Therapy: A New Stage of Debate,” *The Journal of Law, Medicine & Ethics* 20, no. 1-2 (1992): 28.

⁸⁴ In practice this is not quite the case as the legacy of the recombinant DNA controversies and several lapses in oversight led to the establishment in the U.S. of a distinct regulatory body for genetic interventions. See LeRoy Walters, “Human Genetic Intervention: Past, Present, and Future,” in *Is Human Nature Obsolete?: Genetics Bioengineering, and the Future of the Human Condition*, ed. Harold W. Baillie and Timothy Casey, Basic Bioethics (Cambridge, Mass: MIT Press, 2005), 367-384.

The next phase in the discourse was to take up the lingering question of how to assess enhancement uses of genetic technologies. Here it was the values of autonomy and justice that came to dominate in the bioethics literature. The rights of individuals to pursue their own conception of the good via biotechnology had already been put forth by Glover, and it gained prominence with the notion that the genetic selection and enhancement of future children was rightfully an expression of reproductive autonomy.⁸⁵ However, the possibility that genetic engineering could greatly exacerbate social inequalities pushes up against the demands of justice as they are typically construed among bioethicists, making it suspect even under the four principles. The authors of CtC turn this concern on its head by arguing that society might achieve justice in the form of equality of opportunity to an even greater extent than is possible today via genetic engineering. In this view, the distinction between therapy and enhancement is not fundamental—only the extent to which providing a given intervention advances equality of opportunity. Access to technologies that do not substantially increase equality of opportunity could be restricted when they threaten the wellbeing of others or limit the opportunities afforded to the unenhanced. And although talk of making society more equal and better-off by focusing on genetics evokes memories of horrific attempts at eugenics, the principle of autonomy ensures that the new eugenics will proceed in a noncoercive, non-authoritarian manner, driven by parents who will naturally embrace the possibility of having better children.

⁸⁵ John A. Robertson, *Children of Choice: Freedom and the New Reproductive Technologies* (Princeton University Press, 1996), chap. 7.

c. Formal Rationality and the Rhetoric of Inevitability

Although Evans's perspective helps us to understand the rise of a regulatory approach to the ethics of human enhancement, it is missing a crucial account of the rhetoric that has arisen within the enhancement discourse in the years following the period covered by his study. 'Inevitability,' such as the kind evinced most strongly by Buchanan, is a rhetorical feature of many discourses on technology and public policy. The rhetoric of technological inevitability urges us to shift our gaze from substantive questions of the ends implicit in ongoing technological programs toward the formal or instrumental questions of means. If the ends are a *fait accompli*, then only the means warrant attention.

Future-oriented regulatory bioethics is, as I argue in Chapter Five, not so much a moral discourse as it is an aspect of public governance with a limited evaluative vocabulary. It has a good deal in common with areas of policy studies like technology assessment and forecasting that deal in "instrumentally rational representations of the future," where "the critical focus of an instrumentally rational technique such as technological foresight is primarily upon means, processes by which to reach an end which remains largely 'uninterrogated.'"⁸⁶ Inevitability is a hallmark of instrumentally rational representations of the future because it allows its advocates to represent themselves as realists—as Buchanan so often does. Michael's analysis of the rhetorical construction of the future sheds light on the contours of the enhancement discourse.

Thus, advocates of 'instrumental futures' can claim they are being realistic, dealing

⁸⁶ Mike Michael, "Futures of the Present: From Performativity to Prehension," in *Contested Futures: A Sociology of Prospective Science and Technology*, ed. Nik Brown, Brian Rappert, and Andrew Webster (Aldershot, UK: Ashgate, 2000), 28.

with the way the world really is and will continue to be. They are thus making claims about the longevity of certain fundamental aspects of the present and, relatedly, the foreseeability of certain fundamental aspects of the future (e.g. the centrality of market). This ‘realism’ is a powerful rhetoric insofar as it can be turned on opponents who are dubbed ‘dreamers’ or ‘optimists’, and worst of all, utopians. But such rampant realism can also be a handicap insofar as it can reduce the sorts of options and possibilities available to, for example, a policy-maker. More generally, realism that attaches to instrumental rationality is itself up for grabs. Within these sorts of representations of the future, we can envisage a rhetorical game of ‘more realistic than thou’ where actors draw futures whose rhetorical potency (for some audiences at least) lies in their intense continuity with the verities of the present.⁸⁷

This matches the overall rhetorical strategy of *Beyond Humanity*. The enhancement future is real for it has already begun and is ongoing; Buchanan can therefore claim his regulatory approach to be realistic because it draws a direct line of continuity between the present and future.

When we reflect on the central role of enhancement in human history and on the fact that biomedical enhancements will *inevitably continue* to emerge from efforts to prevent and treat disease, we see that the idea of banning enhancements is *unrealistic*.⁸⁸

Authors who wish to reverse current trends or who envision futures that may be changed in undesirable ways are *inter alia* portraying a future that is less continuous with the present and therefore less ‘realistic’.

Since the enhancement future is simply a ‘realistic’ continuation of the present Buchanan is freed from having to argue in any detail that it is good or bad; it is simply what existing technological trends and socioeconomic factors will lead to. To the extent that he does argue for it being good, its goods lay in tangible contributions to economic development. Buchanan also

⁸⁷ Ibid., 29.

⁸⁸ Buchanan, *Beyond Humanity?*, 60. My emphasis.

claims to limit himself in the main to discussions of pharmaceutical enhancements—again, in the service of being realistic. However these two preceding claims are undermined by his suggestions that genetic enhancement technologies may save us from various social ills or environmental catastrophes.⁸⁹ Buchanan’s rhetorical strategy again matches the schema outlined by Michael a decade earlier.

However, the [division between substantive and instrumental portraits of the future] is never so simple. These rhetorics of the future crossover. Thus we have instrumental accounts which take on the trappings of utopian substantive futures and vice versa.... environmental activists suggest that their ‘utopian’ futures are the only ‘realistic’ ones if we (the human race, the planet) are to survive. These crossovers of substantive and instrumental futures will clearly be shaped by whether the represented future is viewed as a good or a bad one.⁹⁰

Understanding speculative bioethics requires that we peer past arguments and look carefully at the manner in which the future is portrayed. The rhetorical force inherent in depictions of technological futures does much argumentative work and should not be underestimated. One does not need to paint a utopian picture of the future or offer technology as salvation to establish the tenor of the discussion—although this surely can be effective. All that is necessary is the claim that particular technologies are inevitable.

d. Consensus Obviates Justification

Regulatory bioethics may be necessary for dealing with pressing issues and setting practical policy guidelines. In such instances, one can make a case for setting aside various substantive

⁸⁹ Ibid., 55–57.

⁹⁰ Michael, “Futures of the Present: From Performativity to Prehension,” 29–30.

considerations and focusing on a constrained range of goals and values in the hope of achieving consensus. However, when that becomes the *modus operandi* for bioethics generally and is applied freely in discussions of the future, the results can be disconcerting. The apotheosis of global regulatory thinking that colonizes the future appears at the end of CtC when the authors consider the role that substantive conceptions of the good might play in formulating (ostensibly noncoercive) eugenic state policies. They conclude that any ends endorsed by a majority of the citizenry via democratic processes could legitimately be instantiated in such policies, so long as the bounds of justice are not violated.

In principle, there is nothing more (or less) problematic about a public policy directed toward implementing a certain conception of human improvement through genetic means than there is about a policy of enriching the cultural opportunities of citizens or of building beautiful parks. In both cases proponents and opponents of the policy may mistakenly assume that what they happen to value is objectively valuable, but this neither disqualifies them from attempting to gain democratic support for their projects nor bars the state from implementing the projects if they succeed.⁹¹

What in Rawls's work was enshrined as the priority of the right over the good,⁹² has in a bioethical imagining of a future world apparently become the priority of the right over the 'whatever.' Regulatory bioethics, like liberal democracy itself, is supposed to be concerned only with ensuring that people are treated equally, are not harmed by others, and have their fair say; both are now agnostic not only to substantive notions of the good, but as to whether the good need instantiate any substantive notions at all. Buchanan et al. appear to characterize substantive

⁹¹ Buchanan et al., *From Chance to Choice*, 344.

⁹² John Rawls, "The Priority of Right and Ideas of the Good," *Philosophy & Public Affairs* 17, no. 4 (1988): 251-276.

considerations not simply as particularistic or parochial, but as more or less arbitrary. This not only devalues the role that substantive conceptions of the good play in maintaining a well-functioning society,⁹³ it also allows the authors to avoid defending their central, implied, substantive claim: a society with ‘better’ people is a better society. Maybe it is, maybe it isn’t; even the fact that the authors seem to endorse it is ultimately immaterial so long as such a society is what most people want, or just happen to end up with in the course of time.⁹⁴ One wonders whether any society in which corporations spend hundreds of billions of dollars to shape people’s conceptions of their wants and needs can afford to take what it happens to desire for granted. Moreover, if moral discourses surrounding the future are not the right place for a robust discussion of the ends that society ought to pursue then where precisely are such discussions supposed to take place?

IV. Closing Thoughts

I hope to have shown that a key discourse in bioethics has turned to human enhancement—a possibility that is contingent on the successful development of certain future technologies—and that some of the most influential work on enhancement is characterized by an increasing sense of

⁹³ Ibid.

⁹⁴ Engelhardt argues that secular bioethics is bound to be content-less, and thus in his view my critique of CtC here would amount to accusing it of being exactly what it is supposed to be; H. Tristram Engelhardt, *The Foundations of Bioethics* (Oxford; New York: Oxford University Press, 1996). Yet, I think there is a profound gap between the contention that secular liberal morality required in a pluralistic society can find no firm foundation on which to base substantive concerns, and the idea that it cannot (and therefore need not) deal in substantive considerations at all. This a far broader question than can be addressed at present.

inevitability. Once bioethicists believe that the actual future is one in which human beings can and will alter themselves and their children with the goal of improvement, they then perceive an imperative to lay out a path for that future using the language and concepts developed in the service of regulation and governance.

But regulating the possible future is not the same as regulating the present. When bioethics looks to possible futures and uses them not as hypothetical thought experiments for testing intuitions, but as representations of the actual future demanding practical responses, the resulting discourse offers neither insight for today, nor useful guidance for the future. Instead of treating this kind of possible future as a given that society will arrive at, a reflective/prophetic speculative bioethics holds every scenario at arm's length and asks what conceptions of the good, what substantive values, what visions of human flourishing it reflects. These are not arbitrary or peripheral considerations, and should be brought to bear in the course of public deliberations.

CHAPTER THREE – TRESPASSING INTO THE FUTURE?

A SURVEY OF THE CRITICAL LITERATURE

The year 2000 is too easy to predict—few of us will be held accountable if we prove to be false prophets.

– Amitai Etzioni, *Genetic Fix* (1973)

In this chapter, I offer a brief survey of some of the existing critiques of bioethics' engagement with speculative futures as well as some of the responses offered as to why it is necessary. My purpose is not to aggregate every dismissive or critical remark ever made, but to develop a sense of the major themes over the years. This survey is somewhat brief for two reasons: first, sustained critiques of speculative bioethics have been few and far between until fairly recently. Second, the significant lines of critique are taken up and elaborated upon at various points in the course of this study.

Although there is a degree of continuity among all critiques of speculative bioethics, there is a noticeable gap—one that this dissertation attempts to bridge—between discussions within bioethics and those that have taken place within the more recent field of nanoethics. Because my approach draws from literature in the latter area written from the perspective of science and technology studies (STS), I begin with critiques that have arisen within, or are directed to, bioethics specifically. I then briefly describe the emergence of nanoethics and how it differs from bioethics, before moving on to a powerful critique of speculative ethics directed primarily at the enhancement discourse, which I return to in subsequent chapters.

I. Internal and External Critiques of Speculative Bioethics

Before turning to specific critiques, I will briefly point out that when pushed everyone within

mainstream bioethics will agree that we cannot see into the future and that the actual course of developments in biotechnology in the longer term are largely unpredictable. The unpredictability of biotechnology coupled with the even greater unpredictability of the social systems in which a given future technology may exist renders the technological future indeterminate. To my knowledge, this is not in dispute. What is in dispute is the implication of indeterminacy for speculative ethics.

a. What Sort of People Should Be Talking about the Future?

We first return to Jonathan Glover's *What Sort of People Should There Be?* That Glover's presentation of the future was highly speculative was not lost on contemporary reviewers. British geneticist Ruth Clayton's review in the *Journal of Medical Ethics* is a worthy starting point as it touches on many varied lines of critique.

It is the fate of scientists to have their work and their methodology explained to them by philosophers, while the possible problems they may unleash upon the world are also regarded by philosophers, theologians and writers of science fiction as being essentially in their province. It is also the fate of philosophers to meet with approval from a few scientists, with irritation from some and with total indifference from most. Nevertheless not all scientists are uninterested in the ethics and social implications of their work. Many scientists have publicly taken ethical stands which owe nothing to the promptings of moral philosophers. It was scientists who were concerned about genetic engineering and pressed for standards and safeguards to govern future research in these areas. It was scientists who warned that the indiscriminate use of antibiotics in agribusiness would lead to the appearance of resistant forms of organisms which infect humans. It is scientists who are warning us of nuclear winter. Those scientists who are not interested in such issues when their own colleagues raise them are unlikely to be moved by moral philosophers.⁹⁵

⁹⁵ Ruth Clayton, "Review of: *What Sort of People Should There Be?* By Jonathan Glover," *Journal of Medical Ethics* 12, no. 3 (1986): 163.

Clayton explains that she has been far more enlightened by reading science fiction novels dealing with similar speculative scenarios (she names several popular works) than by Glover's book. She goes on to criticize "his inclusion of all imaginable outcomes; wholesale extrapolations from current techniques without consideration of the biological realities and the contexts in which biological systems operate."⁹⁶ Yet it is not just the wild extrapolation that she finds irritating; her "dissatisfaction stems rather from the tenor of the book as a whole. Clear though the arguments, are, they remain within limits and strictures that make the book a mere exercise, without any feeling of reality or urgency."⁹⁷ Better to focus on "making conditions possible for an enriched environment—we already know that this can produce remarkable results."⁹⁸

Clayton's review breaks down into the following four points: (a) the actual consequences of scientific research are understood by scientists who are already capable of examining the ethical aspects of their work; (b) in the realm of the merely possible, speculative fiction does a better job of exploring the moral aspects of a transformed future; (c) Glover's presentation confines the ethical problems to a possible future, and makes no attempts to bring them into contact with the present; and (d) why focus on the potential benefits of speculative technologies to improve social welfare when there are many concrete steps we could take today to achieve similar results? Clayton does not appear to suggest that speculative ethics be dispensed with completely, only that when aimed at a nonscientific audience it must, "distinguish clearly between the imaginative, the possible and the

⁹⁶ Ibid.

⁹⁷ Ibid., 164.

⁹⁸ Ibid.

likely.”⁹⁹

The latter three points reverberate through other critiques of speculative bioethics, including the present study. Clayton’s first point, along with her overall tone and oppositional attitude toward ethicists stands in marked contrast to the much more conciliatory and collaborative approach that American bioethics succeeded in cultivating.¹⁰⁰ However, at the time, bioethics had not yet become institutionalized in Britain as a blending of philosophical inquiry with regulatory goals.¹⁰¹ Although bioethics did get a foothold there somewhat later, Clayton’s attitude can be seen years later in the writing of neurobiologist Steven Rose. In a review of Fukuyama’s *Our Posthuman Future*, Rose associates bioethics with discussions of various biotechnologies imagined on the horizon.

First information technology and then biotechnology have come to be seen as presenting the greatest challenges. Gung-ho geneticists promise to encode human life on a CD, to create designer babies, to extend human life indefinitely. Only slightly more soberly, psychopharmacologists offer the prospect of tailor-made drugs to ease the mental pain of living, enhance intelligence, and control disruptive behaviour. A new trade of bioethics has grown up around such prospects, providing gainful, albeit generally vacuous, employment to otherwise out-of-work moral philosophers.¹⁰²

At first it is hard to tell if Rose thinks that the vacuity of bioethics lies in its discussion of speculative possibilities or how they go about it. That it is the latter becomes apparent a few paragraphs later.

⁹⁹ Ibid., 163.

¹⁰⁰ This is discussed in Chapter Six.

¹⁰¹ Duncan Wilson, “Creating the ‘Ethics Industry’: Mary Warnock, in Vitro Fertilization and the History of Bioethics in Britain,” *BioSocieties* 6, no. 2 (2010): 121–141.

¹⁰² Steven Rose, “Don’t Mess with Human Nature...,” *The Guardian*, June 1, 2002, sec. Books.

That some of us are sceptical about its feasibility should not prevent us from looking hard at its potential consequences. We should be warned by the example of Sir Ernest Rutherford, who knew more about the structure of atoms in the early decades of the past century than anyone else, but still insisted that the prospect of atomic power was “moonshine.”¹⁰³

Rose is so unimpressed by Fukuyama’s approach that it “almost makes one wish for the return of the bioethicists.”¹⁰⁴

Although Clayton and Rose both are suspicious of the ability of ethicists and philosophers to say something useful about possible future technologies, they are not opposed to the practice itself.¹⁰⁵ Judging from Rose’s other writings, he believes (perhaps justifiably) that scientific debunking of scientistic ideologies coupled with a critique of the corporate interests that fuel the push for enhancement technologies is more important and effective than much of what is discussed under the rubric of bioethics.¹⁰⁶

b. Bioethics’ Unseemly Technological Fixation

The charge that bioethics is too often enthralled with the problems generated by new and future technologies may be as old as bioethics itself. One of the etiological ‘myths’ of bioethics’ founding is that it was called into being by the rapid introduction of new biomedical technologies. Whether bioethics answered to a genuine need to apply moral analysis to the newly introduced technologies

¹⁰³ Ibid.

¹⁰⁴ Ibid.

¹⁰⁵ As it happens, those who are skeptical of biotechnology have criticized bioethics for various degrees of complicity. I have attempted to separate critiques of engagement with possible future technologies and those directed at the technologies themselves.

¹⁰⁶ Most recently see Hilary Rose and Steven Rose, *Genes, Cells and Brains: The Promethean Promises of the New Biology* (London: Verso Books, 2013).

or simply capitalized on public concerns that scientists could not police themselves, bioethics has maintained a perennial engagement with the cutting edge of biomedicine.

I am not going to spend much time on this criticism because it has less to do with technology itself than with three more basic, trenchant critiques: that practical ethics has become too problem-based; that bioethics is focused on the problems of rich folks living in rich countries, while ignoring the problems of the disadvantaged in their own countries and the plight of those living in extreme poverty elsewhere in the world; that corporate contexts in which technologies are developed and marketed are the true source of systemic ethical problems.¹⁰⁷ All three are extremely vital issues for bioethics to address, but the preoccupation with future technologies tends to factor into these critiques as symptoms of larger structural problems.

Although he has addressed methodological questions at length, Carl Elliot's best known critiques of bioethics fall into these latter two categories by contextualizing an inappropriate preoccupation with advanced and future technologies in the milieu of corporate interests and against a background of failures to address serious systemic problems in access to healthcare and ethical standards in human subject research both locally and globally. Aside from these problems, Elliot highlights the degree to which bioethics often takes the desire for an idealized technology for

¹⁰⁷ For examples of each these three critiques see the following respectively: Leigh Turner, "Medical Facilities as Moral Worlds," *Medical Humanities* 28, no. 1 (June 1, 2002): 19–22; Stephen John, "Titanic Ethics, Pirate Ethics, Bioethics," *Studies in History and Philosophy of Science Part C: Studies in History and Philosophy of Biological and Biomedical Sciences* 35, no. 1 (2004): 177–184; David Ehrenfeld, "Unethical Contexts for Ethical Questions," in *Expanding Horizons in Bioethics*, ed. Arthur W. Galston and Christiana Z. Peppard (Dordrecht: Springer, 2005), 19–34. For something of a synthesis of all of these concerns, see Howard Brody, *The Future of Bioethics* (New York: Oxford University Press, 2009).

granted when the perceived need is often as manufactured as the technology itself. After recounting how the current incarnations of the technological utopians and pessimists have exchanged barbs and vastly overestimated the others' influence, Elliot concludes by reflecting that "in the end, neither of them seems to understand the mutually reinforcing nature of medical enhancement and the market. The market creates the demand for medical enhancement just as surely as it produces the technologies to satisfy that demand."¹⁰⁸

c. Speculation Distorts Bioethical Deliberation

1. Slouching toward policy

I can only conjecture as to why it took until about 2004 for bioethicists to begin expressing concerns about widespread discussions of future biotechnologies that would not be achievable in the near to medium term, if ever. A cluster of factors appear to have contributed to this delayed recognition, including the end of the HGP's hype cycle, the emergence of transhumanism within bioethics, and the corresponding critique of the drive to human biological perfection. However, what may have ultimately brought this all to a head was the contemporaneous beginning of the high-period of self-conscious reflection in bioethics triggered by the response of mainstream academic bioethicists to the President's Council on Bioethics.

That, at least, is what appears to have motivated the writing of an article excoriating bioethics for its attraction to all manner of technological imaginings as the legitimate focal point of

¹⁰⁸ Carl Elliott, "Adventure! Comedy! Tragedy! Robots! How Bioethicists Learned to Stop Worrying and Embrace Their Inner Cyborgs," *Journal of Bioethical Inquiry* 2, no. 1 (2005): 23.

moral inquiry: “Slouching Toward Policy: Lazy Bioethics and the Perils of Science Fiction” by Ruth L. Guyer and Jonathan D. Moreno.¹⁰⁹ The article is short, suggestive, and a bit vague on who they are complaining about outside of the PCBE. However, I take the liberty of quoting it at some length because, to my knowledge, it is the first among a handful of such critiques coming from within the field of bioethics itself.

The hyped stories and promises of these technologies have helped sell newspapers, magazines, and advertising for the non-print media, have stirred the public imagination, have excited and agitated policymakers, and have kept scientists and a range of commentators—including bioethicists—gainfully employed.

A common and disturbing feature of the ubiquitous bioethical commentaries is the short shrift—often, complete inattention—given to the feasibility of the technologies under discussion. So many of the commentaries include the caveat “when the technology is good enough” and then carry on with the ethical analyses and risk-benefit assessments. Yet, many of the futurist therapies and fixes are never going to become standard or useful, because the technologies are not now and never will be precise, predictable, and reliably controllable. What is especially disturbing is that, on occasion, even when the failure of the procedure or technology is known and clearly documented, commentators have continued to talk on about ethical issues as though the science will still, somehow, inexorably succeed...

Why is it that the bioethics commentators, like the news media, continued acting irresponsibly and even unethically in the face of negative results? Analysts inside and outside bioethics have suggested many motives—ignorance of or inability to read primary data, laziness toward mastering the relevant science, financial incentives, the triumph of hope over realism, personal aggrandizement, pressures from publishers, funding sources, and others—and all of these may have played a part at times...

Bioethicists’ obsession with deliberations about the ethical issues and implications of brave new fantasy technologies like cloning may be a version of the well-known joke in which a person searches fruitlessly under a lamp post for keys

¹⁰⁹ Guyer and Moreno, “Slouching Toward Policy.” I see this as an important article only because it caught my attention and helped to generate the idea for the present study; it does not appear to have had much of an impact within bioethics.

lost a block away, because the light is strongest under the lamp post. Science fiction technologies, like cloning, dazzle Hollywood, TV, and other media, which shine the spotlight on them and thereby dazzle the public. But should the bioethics community succumb to the sci-fi lure?...

In ignoring the biological red flags of cloning in favor of ethical ruminations that lead nowhere useful, bioethicists disavow their role in providing oversight—watchful care and general supervision—to contemporary science and medicine. As it turns out, oversight also means overlooking and omission. Bioethicists who spend time lending credence to silly proposals, worthless technological fantasies, and the trivial pursuits of science fiction-loving policymakers act in accord with oversight's second definition.¹¹⁰

In the course of the article, the authors invoke Callahan's distinction between prophetic and regulatory bioethics. Their contention is essentially that to the extent that any of this belongs within bioethics, it should be confined to the prophetic aspects and left out of discussions of regulation and science policy, where it distorts some issues, detracts attention from proper oversight of others, and generates a bioethical discourse in which people are speaking two different languages. I return to these claims over the next two chapters.

For an article with much insight packed into a short space, "Slouching toward Policy" is nonetheless a frustrating read. Though they fault bioethics generally for sliding away from real science and into speculation without any thought to feasibility, Guyer and Moreno finger only the PCBE as an example and cite it as the most egregious case of confusing prophetic with regulatory bioethics. And though they accuse it of distorting science policy, they do not give a single example of such an occurrence. No doubt the authors have in mind Leon Kass's role in formulating the Bush-era stem-cell funding guidelines, but this was prior to the public work of the commission. The immediate target, not mentioned explicitly, seems to be the 2003 report *Beyond Therapy*, which

¹¹⁰ Ibid., W14-W17.

was publicly criticized by scientists on the commission who faulted it for drawing lessons from fiction and discussing possible future technologies.¹¹¹ Guyer and Moreno either were intent on avoiding the conclusion that *Beyond Therapy*, whatever its faults, was certainly not written as regulatory bioethics, and could be plausibly be described as prophetic—or they simply forgot to explicate the claim that presidential commissions should not be in the business of reflective/prophetic bioethics.¹¹² If, instead of taking the convenient route of tying the PCBE to the whipping post for yet another lashing, they had used the occasion to go after just a few of the many prominent examples of their colleagues “who spend time lending credence to silly proposals, worthless technological fantasies, and the trivial pursuits of science fiction-loving policymakers,” it would surely have been of greater benefit to the field. Moreno in particular has contributed much to discussions of the intersection of politics and bioethics in the wake of the “end of the great bioethics compromise,”¹¹³ and I cannot help but view this article as a powerful reproof of the field that was a missed opportunity to begin a necessary conversation about the direction of bioethics.

2. Wallowing in enhancement fantasies

Aside from Guyer and Moreno’s article, the only other sustained criticism of speculative bioethics

¹¹¹ Elizabeth Blackburn and Janet Rowley, “Reason as Our Guide,” *PLoS Biology* 2, no. 4 (2004): e116.

¹¹² In this vein Robert Cook-Deegan criticizes *Beyond Therapy* for not having any policy content; “How Bioethics Can Inform Policy Decisions About Genetic Enhancement,” in *Altering Nature*, ed. B. Andrew Lustig, Baruch A. Brody, and Gerald P. McKenny, *Philosophy and Medicine* 98 (Dordrecht: Springer, 2008), 161–198.

¹¹³ Jonathan D. Moreno, “The End of the Great Bioethics Compromise,” *Hastings Center Report* 35, no. 1 (2005): 14–15.

I have found dating from what I will shortly characterize as the “pre-nanoethics” era has come from D. Gareth Jones. Writing specifically of the enhancement discourse, Jones surveys some choice expressions of the extreme enthusiasm and extreme moral concern over future enhancement technologies and contends that:

What is emerging here is an increasingly close relationship between futuristic visions of medical accomplishments, a conflation of such visions with present reality, grandiose visions of human self-modification and genetic perfectibility, and eugenic aspirations. It is within this morass of competing expectations and world views that we encounter the notion of enhancement, because it is viewed as promulgating these far-reaching visions.¹¹⁴

As Jones sees it, this tendency to take the discussion of enhancement out of the realm of current possibilities and into the future distorts arguments both for and against. There are now, and someday may be more, biotechnologies that could justifiably be categorized as enhancements which are therapeutic and in line with the current understanding of the goals of medicine. Radical enhancements, however, are far removed from what appears to be in the realm of possibility. Yet the speculative contours of the enhancement discourse have made it such that:

It is all too easy to move from rejection of these extreme scenarios to rejection of any interventions in the genome or brain, as is done by bioconservatives. This is because any use of technology to improve the quality of life, say, or improve mental functioning, can be viewed by those who regard such endeavours as intelligible as part of a much broader endeavour, that of extending the life span indefinitely or giving individuals unlimited mental powers. In other words, no room has been left for category 1 measures, as these are now seen only in terms of the far more radical and idealistic goals of category 3. The underlying assumption is that the ethos of medical practice and research has already been transformed from that of care to one of an all-domineering cure, with serious implications for human dignity.

¹¹⁴ D. Gareth Jones, “Enhancement: Are Ethicists Excessively Influenced by Baseless Speculations?,” *Medical Humanities* 32, no. 2 (December 1, 2006): 78.

The repercussions for ethical discussion are that the pros and cons of human embryo research, PGD, the derivation of embryonic stem cells, the possibilities of regenerative medicine and the place of psychopharmaceuticals in an array of psychiatric conditions are often assessed against a back-cloth of these extreme paradigms. They are viewed as tantamount to a posthuman agenda, and are often assessed negatively by those who find this agenda troublesome.

As a consequence, discussion of enhancement and even treatment, has become embroiled in this much wider debate, leading to neglect of the dimensions of current and imminently foreseeable technology. The science of these areas has become submerged beneath a welter of fanciful aspirations, most of which are so far removed from scientific reality as to pose imponderable hurdles to serious ethical (and theological) debate.¹¹⁵

As to why the discussion has not been constrained by present and near-term scientific realities and has taken up residence in the imagined future:

By their nature, these debates are far removed from what is or is not currently possible in the scientific realm. This consideration seems to be regarded as irrelevant, either because it is part of a misguided endeavour and should not be taking place, or suggestive data are overblown and the nuances that are so important to scientists are overlooked.¹¹⁶

I am generally in agreement with this assessment of the problems with the enhancement discourse. However, I am struck by the fact that Jones does not pay attention to any of the writings on enhancement that are not as overtly enthusiastic about powerful future enhancement technologies, but nonetheless treat them as if they were virtually inevitable. This is a subtler but potentially more problematic feature of the enhancement discourse. A later, more comprehensive, article by Jones et al. does better in this regard.¹¹⁷

¹¹⁵ Ibid., 80.

¹¹⁶ Ibid., 80-81.

¹¹⁷ D. Gareth Jones, Maja Whitaker, and Michael King, "Speculative Ethics: Valid Enterprise or Tragic Cul-De-Sac?," in *Bioethics in the 21st Century*, ed. Abraham Rudnick (InTech, 2011).

Although a critique of speculative bioethics is not his focus, Thomas Murray briefly expresses similar sentiments regarding the distorting effects of speaking of projected futures:

Kass's critique is in the thrall of the same Promethean fantasies being peddled by biotechnology hucksters. We may be on the threshold of learning to manage some of the diseases that cause great sorrow and early death. But we are nowhere near to knocking on the door of eternal life. Rooting our analysis of biotechnological enhancement in a far distant fantasy of unlimited life extension may be visionary. But it may also be a colossal distraction from the actual challenges posed by enhancement technologies.¹¹⁸

3. *Genetic enhancement is a myth*

A line of skepticism that has been omnipresent in bioethics has tried to temper enthusiasm for genetic technologies with the warning that genetic determinism and reductionism are faulty doctrines.¹¹⁹ However, this has obviously not put an end to the segment of the enhancement discourse concerned with genetic engineering. What it has done is encourage authors to hedge about what the technologies will ultimately be able to accomplish, toss charges of genetic determinism at their opponents, and claim that, in discussing enhancement, their immediate concern are the various forms of biomedical enhancement currently available, not powerful future technologies. These provisos tend to be forgotten by the time the author has moved on to the next paragraph.

A welcome retort comes in a recent paper by Philip Rosoff, who claims that “the enhancement project is doomed to failure not for moral reasons but for scientific reasons, and that

¹¹⁸ Thomas H. Murray, “Enhancement,” in *The Oxford Handbook of Bioethics*, ed. Bonnie Steinbock (Oxford; New York: Oxford University Press, 2007), 506.

¹¹⁹ Erik Parens, Audrey R. Chapman, and Nancy Press, eds., *Wrestling with Behavioral Genetics: Science, Ethics, and Public Conversation* (Baltimore: Johns Hopkins University Press, 2006).

both opponents and proponent err in their understanding and appreciation of the complex science that is entailed.”¹²⁰ Rosoff’s argument is built on a combination of conceptual and technical problems. On the conceptual side Rosoff leans on Richard Lewontin’s attack on sociobiology and the mistake of taking a socially and historically contingent description of a trait and reifying it into a biological entity.¹²¹

Many articles, essays, and books have suggested such things as aggression, shyness, attractiveness, impulse control, courage, amiability, musical ability, etc. as traits or characteristics (other than intelligence) that enhancers want to enhance or that their critics think would damage the very essence of human nature if successful. We cannot really specify these or pretty much any other such personality or behavioral trait as a definitive, a feature they bear in common with intelligence...

To make a complex trait amenable to the techniques and methods of genetic engineering, one would have to instantiate it, to reify it as a “thing” that had a definite molecular cause that would be susceptible to biochemical manipulation; and that is virtually impossible to do with characteristics that are “arbitrary construct[s], historically determined and useful as a way of describing human socioeconomic activity.”¹²²

On the biological/technical, side he looks at the recent revision in understanding the degree to which epigenetic factors influence development. His point is not that one could never manipulate the genome in very specific ways; it is that enhancing the complex traits that predominate in speculative discussions of human enhancement will always remain a very chancy

¹²⁰ Philip Rosoff, “The Myth of Genetic Enhancement,” *Theoretical Medicine and Bioethics* 33, no. 3 (2012): 165.

¹²¹ In a meeting of the PCBE contributing to its *Beyond Therapy* report Steven Pinker offered a similar warning about the unlikelihood of genetically modifying complex traits and pointed as well to the fraught nature of attempting to predict the future of technological capabilities (see n. 5). President’s Council on Bioethics, “Transcript: Session 3.”

¹²² Rosoff, “The Myth of Genetic Enhancement,” 167–168.

proposition with limited prospects for real success; it is thus unlikely to ever be considered worthwhile. Like Jones, he would like to see the debate focused much more narrowly:

The future anticipated by both the doomsayers for genetic enhancement and its supporters is both conceptually and scientifically unlikely. This is not to say that genetic engineering might not someday be capable of offering us a tableau of remedies for single-gene Mendelian diseases at both the somatic and even germline levels. If that turns out to be true, then some of the moral and philosophical issues that have been raised by both the critics and proponents may well be worth discussing, especially with respect to the advisability of altering one's germline genome.¹²³

Rosoff implies that the bioethical debate has consequences outside of academia and has the potential to distort research agendas as well:

At its core, my point is a moral one: one should not pursue scientific projects based upon false premises. And an understanding of the science underlying any form of meaningful or socially significant genetic enhancements reveals an irreducible complexity and overwhelming probabilistic under-determinism that clearly undermines the goals of such a project.¹²⁴

II. Nanoethics and the STS Critique of Speculative Ethics

a. A Brief History of Nanoethics

In the previous chapter, I mentioned the influence that a discourse on 'converging technologies' had on the evolution of the enhancement debate within bioethics. This originated outside of bioethics in a series of National Science Foundation sponsored workshops beginning in 2000, led by Roco and Bainbridge, on strategic research and development planning centered on

¹²³ Ibid., 173.

¹²⁴ Ibid.

nanotechnology. Their 2002 report, *Converging Technologies for Improving Human Performances*, put forth the idea of human enhancement against the background of soon-to-be realized synergy of nanotechnology, biotechnology, information technology, and cognitive science (NBIC) that would rapidly accelerate the pace of technological capabilities and the potential for human enhancement.

We stand at the threshold of a new renaissance in science and technology, based on a comprehensive understanding of the structure and behavior of matter from the nanoscale up to the most complex system yet discovered, the human brain. Unification of science based on unity in nature and its holistic investigation will lead to technological convergence and a more efficient societal structure for reaching human goals. In the early decades of the twenty-first century, concentrated effort can bring together nanotechnology, biotechnology, information technology, and new technologies based in cognitive science. With proper attention to ethical issues and societal needs, the result can be a tremendous improvement in human abilities, new industries and products, societal outcomes, and quality of life.

Rapid advances in convergent technologies have the potential to enhance both human performance and the nation's productivity. Examples of payoffs will include improving work efficiency and learning, enhancing individual sensory and cognitive capabilities, fundamentally new manufacturing processes and improved products, revolutionary changes in healthcare, improving both individual and group efficiency, highly effective communication techniques including brain-to-brain interaction, perfecting human-machine interfaces including neuromorphic engineering for industrial and personal use, enhancing human capabilities for defense purposes, reaching sustainable development using NBIC tools, and ameliorating the physical and cognitive decline that is common to the aging mind.¹²⁵

Although interest in nanotechnology was not new, the fact that this admittedly visionary report emerged from a government-sponsored project certainly enhanced its credibility and visibility. It had a great deal of influence in shaping the 'meta' discourse on future technologies—by which I mean discussions of science policy, work in STS, and bioethics—by putting human enhancement

¹²⁵ Roco and Bainbridge, *Converging Technologies for Improving Human Performance*, 1.

front and center as the point where convergence would have the potential to transform society. As I mentioned in the previous chapter, Roco and Bainbridge's report was thematically very much in line with transhumanist aspirations for science and technology.¹²⁶

The report stressed the need for governance, and ethical oversight along with a strong sense that this convergence was already occurring—for example by noting how molecular biology (here presented as a nano-level science) was converging with information technology to harness the data generated by the HGP and other genome-mapping programs. It suggested that the government sponsor a program very much like ELSI to address the consequences of this rapidly advancing technological revolution:

Special effort will be required to identify future technological developments; explore their implications for human performance; study unexpected consequences of NBIC developments; and consider ethical, legal, and policy issues. Governments must provide support for education and training of future NBIC workers and to prepare society for the major systemic changes envisioned for a generation from now. Policymakers must envision development scenarios to creatively stimulate the convergence. Ethical, legal, moral, economic, environmental, workforce development, and other societal implications must be addressed from the beginning, involving leading NBIC scientists and engineers, social scientists and a broad coalition of professional and civic organizations. Research on societal implications must be funded, and the risk of potential undesirable secondary effect must be monitored by a government organization in order to anticipate and take corrective actions. Tools should be developed to anticipate scenarios for future technology development and applications. The transforming measures outlined... suggest the dimensions of the Federal Government role.¹²⁷

¹²⁶ See Nigel M. de S. Cameron and M. Ellen Mitchell, eds., *Nanoscale: Issues and Perspectives for the Nano Century* (Hoboken: John Wiley & Sons, 2007), chap. 16; also see Schummer, "From Nano-Convergence to NBIC-Convergence" in the same volume.

¹²⁷ Roco and Bainbridge, *Converging Technologies for Improving Human Performance*, 25.

This recommendation echoed earlier proposals and is best understood in the context of how nanotechnology became a key organizing term in science and technology discourses. As Bennett and Sarewitz argue, nanotechnology entered the mainstream in no small part due to the influence of Bill Joy's anti-technology manifesto, "Why the Future Doesn't Need Us,"¹²⁸ which transfigured nanotechnology evangelist Eric Drexler's 'grey goo' description of self-organizing nano-replicators into a doomsday scenario.¹²⁹ In a sense, just as genetic engineering carried the baggage of totalitarian eugenics and *Brave New World*, nanotechnology entered public consciousness as a potentially dangerous form of technology that could get out of control. And just as ELSI was arguably an attempt to calm public misgivings about the HGP, visionary calls for heavy investment in nanotechnology R&D also requested that foresight and oversight accompany the process from development to diffusion. However, what distinguished the call for ethics here is that it was couched in a belief of the inadequacy of ethics for guiding a transformed world. The purpose of involving ethics from the get-go is not to question the project, but to formulate a new ethics that was not stuck in merely contingent configurations of human life:

People may possess entirely new capabilities for relations with each other, with machines, and with the institutions of civilization. In some areas of human life, old customs and ethics will persist, but it is difficult to predict which realms of action and experience these will be. Perhaps wholly new ethical principles will govern in areas of radical technological advance, such as the acceptance of brain implants, the role of robots in human society, and the ambiguity of death in an era of increasing

¹²⁸ Bill Joy, "Why the Future Doesn't Need Us," *Wired*, April 2000.

¹²⁹ Ira Bennett and Daniel Sarewitz, "Too Little, Too Late? Research Policies on the Societal Implications of Nanotechnology in the United States," *Science as Culture* 15, no. 4 (2006): 309–325.

experimentation with cloning. Human identity and dignity must be preserved.¹³⁰

Bioethicists, among other scholars, took notice and warned that nanotechnology was already getting ahead of the ethics.¹³¹ After *Converging Technologies for Improving Human Performance* ‘nanotechnology’ became a synecdoche for vast technological transformations resulting from convergence. A number of initiatives looking at nano-ELSI issues were begun and thus was born ‘nanoethics’ as an area of ethical research, focused as much on revolutionary potential future technologies as actual present-day nano-scale research and development. From the beginning there was overlap between bioethics and nanoethics—particularly in regard to human enhancement—but critical differences between them emerged early in the discourse.

b. Foundational Differences between Bio- and Nano-Ethics

It was understood from the outset that the NBIC convergence thesis was visionary and not a simple representation of the state of the art. Although here and there one could see productive interfaces between fields like informatics and genomics, the idea of NBIC coming together synergistically was located in the future and the ethical discourse was, from the beginning, conscious of the profound differences between present issues that nanoethics ought to address (e.g., the safety and environmental impact of nano-particles) and the bigger questions that emerged out of predictions and expectations for convergence. The inaugural editorial of the journal *NanoEthics* addressed this directly: “many of the so-called ‘ethical issues in nanotechnology’ are in areas where there has as yet been little development, so discussion of them must be based on

¹³⁰ Roco and Bainbridge, *Converging Technologies for Improving Human Performance*, 22.

¹³¹ Mnyusiwalla, Daar, and Singer, “Mind the Gap.”

prediction. Prediction of course is notoriously unreliable, and this is nowhere more true than in predictions about the directions of scientific and technological developments.”¹³² Thus, nanoethics was motivated almost entirely by a speculative vision of the future and was conscious of this from the beginning.

Second, unlike bioethics which came of age in America as a discussion driven by philosophers and theologians before it was ‘exported,’ nanoethics had an international cast of participants from its inception, many of whom were connected with science and technology studies (STS). As a result, when we turn to human enhancement, despite the many intersections between nanoethics and bioethics, the latter had already developed a habit of discussing enhancement technologies as being on a continuum with current technologies. So, for instance, using genetic testing technologies to select offspring via PGD (a current technology) is often viewed within bioethics as being contiguous in many ways with genetic manipulation in the future. Similarly, the use of pharmaceuticals to improve mood, focus, or athletic performance is portrayed as the start of a continuum that will include genetic manipulation and human-machine interfaces. The result is that future genetic technologies are made to appear much more similar, closer, and less speculative than they may be—and thus amenable to regulatory inquiry. Bioethics as a whole has not given much thought to the idea that unlike ethics grounded in the present, exploring the future demands different theoretical and methodological assumptions.

In contrast, nanotechnology, especially when viewed as the product of technological convergence, is claimed to create a future that may be unprecedented and utterly different, lending

¹³² John Weckert, “Editorial,” *NanoEthics* 1, no. 1 (2007): 1.

support to the idea that we require different methods for thinking through their possible implications. Furthermore, unlike most of nanoethics, bioethics as a whole is not a speculative discipline built chiefly on promised technologies. The speculative/visionary nature of nanoethics has therefore attracted more scrutiny from participants than the speculative aspects of bioethics.

Finally, because a significant number of participants in the nano discourses come out of STS, they bring different methodological approaches and conceptual tools. These include contributions from the philosophy of technology—which had largely been jettisoned from bioethics in its early years; technological forecasting and technology assessment—which in the U.S. had once been the mandate of the now-defunct Office of Technology Assessment; and, of course, history and sociology brought theories of the social production of science and technology along with scholars who had begun to examine the nature and function of technological and scientific expectations systematically. Nanoethics arrived with much built-in reflexivity and self-conscious reflection on what it was trying to do,¹³³ while bioethics has maintained an uneasy relationship with its critics from the social sciences.¹³⁴ Further, apart from the influence of feminist epistemology and recurring discussions of the concepts of health and disease, bioethics has never shown much affinity with various constructivist perspectives on the production of scientific knowledge. Consequently, apart from divergences in subject matter, some have argued that the

¹³³ But see Alfred Nordmann, “Knots and Strands: An Argument for Productive Disillusionment,” *Journal of Medicine and Philosophy* 32, no. 3 (2007): 217–236.

¹³⁴ Callahan, “The Social Sciences and the Task of Bioethics”; Albert R. Jonsen, “Beating up Bioethics,” *The Hastings Center Report* 31, no. 5 (2001): 40; Leigh Turner, “Anthropological and Sociological Critiques of Bioethics,” *Journal of Bioethical Inquiry* 6, no. 1 (December 2008): 83–98.

term ‘bioethics’ demarcates a certain set of approaches, institutionalized roles, and normative assumptions that nanoethics is not limited to.¹³⁵

Noticeable points of divergence between the two also reflect larger political and cultural differences regarding governance. Compared to America, Western Europe has maintained a much more skeptical view of biotechnology and agribusiness, and its political culture leans toward a communitarian rather than libertarian approach to democracy. The result is a much more robust and cautious regulatory regime in the European Union, a long-standing belief in participatory governance as an ideal compared to expert-only panels and commissions, and greater focus on how radical technological change might undermine social solidarity. The title of the E.U.’s report/retort on converging technologies, *Converging Technologies: Shaping the Future of European Societies*, aptly reflects some of these differences.¹³⁶

Introducing a special 2007 issue of the *Journal of Medicine and Philosophy* devoted to NBIC convergence and nanoethics, George Khushf highlighted several key differences:

To capture the contrast between the European and American approaches, they coined the phrase “Converging Technologies for the European Knowledge Society” (CTEKS). Instead of presupposing a single agenda or goal—the “enhancement of human performance”—they sought to highlight the agenda-setting character of any convergence, and divert consideration to the many different research programs and problems that might serve as foci for concrete research initiatives. They also rejected any enhancement of human “hardware.” There should not be “engineering of the mind and of the body,” but rather “engineering for the mind and for the

¹³⁵ Christoph Rehmann-Sutter and Jackie Leach Scully, “Which Ethics for (of) the Nanotechnologies?,” in *Governing Future Technologies*, ed. Mario Kaiser et al., *Sociology of the Sciences Yearbook* 27 (Dordrecht: Springer, 2010), 234–235.

¹³⁶ Alfred Nordmann, *Converging Technologies: Shaping the Future of European Societies* (Office for Official Publications of the European Communities, 2004).

body.”¹³⁷

It should therefore come as no surprise that the most penetrating critiques of speculative ethics have come from work in nanoethics by scholars who are not affiliated with bioethics. As would be expected, these critiques enter bioethics via the topic of human enhancement, the main point of intersection between the two. It should also not be entirely unexpected that aspects of human enhancement, which have been discussed to the point of exhaustion in bioethics, are rehashed in the context of nanoethics.¹³⁸

c. Bioethical Skepticism toward Nanoethics

In retrospect, 2007—the year when the *Journal of Medicine and Philosophy* took on NBIC convergence and the journal *NanoEthics* was launched—looks like a year in which bioethics and nanoethics briefly met and then mostly continued on their separate, but often parallel, ways. This was anticipated by an article in the *Hastings Center Report* by Paul Litton attacking the need for nanoethics, which—from the perspective of bioethicists grown tired with the hype-driven calls for new sub-disciplines—looked to be speculative, premature, superfluous, and misleading.

We have “genethics.” We have “neuroethics.” And now there are pleas for a “nanoethics.” The nanotechnology hype, engendering both fanatical optimism and apocalyptic fears, has produced calls from different commentators for “a radical change in the way we address ethical issues” and a “novel [ethical] approach to the future” that must be divorced from existing moral theories. But what ethical issues

¹³⁷ George Khushf, “The Ethics of NBIC Convergence,” *Journal of Medicine and Philosophy* 32, no. 3 (2007): 187–188.

¹³⁸ e.g., Bert Gordijn, “Converging NBIC Technologies for Improving Human Performance: A Critical Assessment of the Novelty and the Prospects of the Project,” *Journal of Law, Medicine and Ethics* 34, no. 4 (2006): 726–732. Gordijn does not cite any of the then extant bioethics literature on enhancement.

will nanotechnology raise that will be novel? How could an ethical approach be novel, and why would that be necessary? Commentators also strongly urge ethical reflection to begin now on all aspects of nanotechnology, including the kind of atom-by-atom manufacturing predicted by optimistic futurists. But what issues call for immediate attention? And given that those responding to these calls would require intellectual and financial resources, does reflection on speculative visions of nanotechnology warrant that expense? [...]

But we must resist equating new technological powers with novel ethical challenges. These ethical issues are already raised by other technologies, and we would waste resources and forget lessons already learned by unreflectively assuming that nanotechnology requires us to invent a whole new ethics-as if that were possible-with its attendant conferences, journals, centers, and funding mechanisms. Moreover, even if the most radical futuristic visions of nanotechnology are realized, history teaches us that such extreme prophecies should not, at this time, frame debate or warrant ethical attention.¹³⁹

Aside from the degree to which the future of nanotechnology is speculative, Litton notes that there is no reason to reinvent the wheel when discussing human enhancement:

Nanomedical issues do not require novel ethical theorizing, either. The convergence of nanotech, biootech, information technology, and cognitive science may empower us to enhance our cognitive abilities significantly, and ethical debate about the desirability of human enhancement is now already well under way, with the work of the President's Council on Bioethics representing the most widely known discussion. Whether enhancement is based on biotechnology or its convergence with nano- and other technologies, the relevant values and moral principles are the same.¹⁴⁰

Litton also offers important considerations about the limitations of predicting the course of future technologies and hence the inadvisability an ethical discourse that proceeds from such predictions.

Predictions about the underlying science and technology are simply too speculative. The history of futurism is fraught with fantastic mistakes by great minds. John von Neumann foresaw global warming, but predicted that by now, nuclear energy would "be free-just like the unmeasured air." Many of the predictions made in 1975

¹³⁹ Paul Litton, "Nanoethics? What's New?," *The Hastings Center Report* 37, no. 1 (2007): 22.

¹⁴⁰ Ibid., 23.

by Asilomar conferees about recombinant DNA either have never been realized or took longer than expected, and very few of the scientists foresaw the technology's actual or positive ramifications.

Predicting nanotechnology's long-term future is impossible because it requires foreseeing how it will affect society and how, in return, societal and economic forces will shape it. But just taking nanoscience in isolation, we do not know whether the radical control over nature implied by molecular manufacturing is possible.¹⁴¹

Finally, Litton points out that public discussions of speculative future technologies have a tendency to polarize along utopian and dystopian visions, obscuring the practical ethical questions that need to be addressed. Echoing Guyer and Moreno (and the ethos of the Hastings Center more generally), he concludes that "for ethical debate to serve its purpose, it must be properly informed by the science."¹⁴²

In contrast, Khushf describes his invitation to discuss nanoethics/convergence in the context of a bioethics journal as hearkening back to bioethics' prophetic tradition; an attempt to recover the ability to address the 'big questions' that had characterized this bygone theologically-inflected era which had rapidly been superseded by tamer regulatory approaches.¹⁴³

With this shift, there was a movement away from Ramsey's global, integrative

¹⁴¹ Ibid., 24.

¹⁴² Ibid., 25.

¹⁴³ Khushf does not actually use the prophetic/regulatory distinction but the intent is the same. He refers to an article by Eric Juengst written at the dawn of the ELSI program advocating for a conscious transition from prophetic to regulatory analyses of germ-line genetic engineering as a move from the 'romantic' early period characterized by global concerns and anxiety that can be translated only into research moratoria, to a 'civilized' and 'precise' mode of bioethical discourse concerned with professional ethics and regulation. Juengst ties the need to transition to increasing technical feasibility: "As the technical potential for human germ-line interventions materializes, the need for such a translation becomes imminent and urgent." Eric T. Juengst, "Germ-Line Gene Therapy: Back to Basics," *Journal of Medicine and Philosophy* 16, no. 6 (1991): 589.

assessment toward a piecemeal analysis. As this more scientific ethical discourse took over, people turned from grand questions about the nature of science and ethics, our place in history, and human nature and purpose. A single, entangled, somewhat fuzzy debate about the future of humanity fragmented into a host of smaller debates. Now one asked whether earlier bans on DNA cloning were warranted, whether the therapy/ enhancement distinction can be sustained, or whether and how genetic information can be kept private, just to name a few of the new topics. These questions were no longer linked to one another.¹⁴⁴

The fact that NBIC convergence was a visionary image of the future intertwined with a particular view of humanity and progress made it ripe for reinvigorating bioethics, which had become narrowly focused on smaller piecemeal regulatory issues.

Instead of chopping off new stuff for our bioethical machine, or providing a premature precision, I thus tried bring together those who might help us ask questions afresh; those who struggle at the edges of dream and reality, and who seek to discern the novel features of a science and technology that is similar yet also different from what came before.¹⁴⁵

The present study is in many ways an attempt to synthesize Litton's skepticism with Khushf's desire for a renewed 'big picture' bioethics. To this end, I take pains to not only delineate the nature, goals, and scope of the regulatory and prophetic aspects of bioethics, but to understand how discussions of speculative futures change/distort the nature of ethical discourse itself. For my purposes this analysis of speculative ethics may be the most important development to emerge from nanoethics, and I turn to Alfred Nordmann, who drafted the EU's report on convergence, for an entrée to such a critical perspective.

¹⁴⁴ George Khushf, "Open Questions in the Ethics of Convergence," *Journal of Medicine and Philosophy* 32, no. 3 (2007): 300.

¹⁴⁵ Ibid., 301.

d. Nordmann's "If-and-Then" Critique

Appropriately, Nordmann's critique of the project of speculative ethics appears in the inaugural issue of *NanoEthics* and focuses upon discussions of human enhancement. Where the previous critiques I looked at argue that *speculation distorts ethical analysis*, Nordmann's key insight is that it is the *ethical analysis which transforms the nature of speculation*. Speculative ethical exploration then has the ability to profoundly distort our conception of the present. Nordmann first offers a description of the "if-and-then" syndrome.

To be sure, technological dreams and the conditional "if only we could do this..." are by no means ethically neutral. But whatever the ethical concerns with technological hubris may be, they are becoming exacerbated by a radical foreshortening of the conditional, that is, by what one might call the "if and then" syndrome. An if-and-then statement opens by suggesting a possible technological development and continues with a consequence that demands immediate attention. What looks like an improbable, merely possible future in the first half of the sentence, appears in the second half as something inevitable. And as the hypothetical gets displaced by a supposed actual, an imagined future overwhelms the present.¹⁴⁶

In speculative ethics the displacement of the hypothetical occurs precisely because the possible future is presented as demanding answers today.

If the requisite human enhancement technologies become reality, we are now to know, for example, whether people have a right of access to them—and failure to address this issue might leave us unprepared for the time when these technologies arrive (note the displacement of the "if").¹⁴⁷

Once the ethical questions present themselves as such, the result is a "reification of a possible future" and "the transition from a merely claimed possible future to the issues that undoubtedly

¹⁴⁶ Nordmann, "If and Then," 32.

¹⁴⁷ Ibid., 33.

will arise.”¹⁴⁸ Nordmann offers a wide range of examples of this slip from the ‘if’ to the ‘when’ in discussions of enhancement, along with a number of representative argumentative strategies, such as the conflation of transformative future technologies with current ones, and the shifting of a burden of proof from justifying the desire for a vision of the possible future to justifying a preference for the actual present, as if the two were on epistemically equal footing.

In other words: If we can’t be sure that something is impossible, this is sufficient reason to take its possibility seriously. Instead of seeking better information and instead of focusing on the programs and presuppositions of ongoing technical developments, we are asked to consider the ethical and societal consequences of something that remains incredible. Again and for the last time in this survey of examples, considerations of the present are overwhelmed by the supposed imminence of a highly speculative future.¹⁴⁹

Nordmann’s analysis is also distinguished by the fact that his critique applies equally to those who are for and those who are opposed to future enhancement technologies. In offering an ethical analysis that begins with an attempt to anticipate the future, both reify the enhancement future instead of treating it as a mere hypothetical.¹⁵⁰

Nordmann seeks to reframe discussions of future technologies away from the future and return them to the present. From the ineluctable epistemic and agentic constraints of the present, Nordmann suggests that we engage in a kind of ‘vision assessment’ and ask why we should accept a given promise of a technological future? Do these visions answer present needs or those which we have good reason to believe will arise? Are they credible? Do they make reasonable demands on us

¹⁴⁸ Ibid.

¹⁴⁹ Ibid., 39.

¹⁵⁰ Ibid., 40.

or require us to change in ways we might not desire? Nordmann further suggests that visions of the future are discursive incursions that carry an implicit critique of the present and should be addressed on those terms.¹⁵¹

It is worth pausing here to briefly consider the degree to which much of speculative bioethics has gotten this wrong by attempting to understand every critique of future enhancement technologies (1) in predictive terms; or (2) as making very strong claims from the normativity of human nature as it is now constituted; or (3) as making moral claims regarding the would-be future consumer of enhancement, rather than the pursuit of those enhancements from a current standpoint. If there is a point where the enhancement discourse meets the Tower of Babel and prophetic and regulatory bioethics fail to speak the same language, it is here. However, instead of the language changing, it is the tense that has shifted. Undoubtedly, there is sufficient blame to go around: speaking of the future is inherently resistant to eliminating the language of prediction; some authors do argue from a normative/teleological view of nature; and examples they offer tend to speak of individuals. Nordmann, however, points to the root of the issue: a failure to properly characterize visions of the future as intrusions into the present that can be evaluated solely in terms of the present.

Nordmann goes on to clarify that the speculative aspects of philosophical discourse do not need to be abandoned, only reconfigured in the traditional mode of the thought experiment, such that ethicists “take such scenarios seriously enough to generate insights from them and to discover values that might guide decisions regarding the future. But they do not take them seriously enough

¹⁵¹ Ibid., 40–41.

to believe them.”¹⁵² The goal of a de-reified speculative ethics is solely to reflect upon and understand the unfolding present, and this can be pursued by linking the present with visions of the future, so long as they are not taken to represent the future itself.

Although there is much more to discuss in this article—including a series of interesting contrasts between approaches to questions that begin with the future and those that begin with the contingencies of the present—I will conclude by noting that like many densely-argued pieces, it is prone to being oversimplified and misconstrued. It is very much in favor of looking at the ‘big picture,’¹⁵³ and it does not claim that “the main problem... is that it leads to the scarce resource of ethical concern being ‘squandered on incredible futures’ and thereby being ‘distract[ed] from ongoing developments that demand our attention.’”¹⁵⁴ Arguably, this is a big problem indeed—especially within bioethics—but Nordmann’s main concern is that the speculative ethical discourse itself is distorting rather than enhancing moral reflection on the goals of science and the purpose of technology—and, more generally, reworking our conceptual self-understanding.

¹⁵² Ibid., 43.

¹⁵³ Khushf misunderstood an earlier paper of Nordmann’s as claiming the exact opposite; Khushf, “Open Questions in the Ethics of Convergence.”

¹⁵⁴ Rebecca Roache, “Ethics, Speculation, and Values,” *NanoEthics* 2, no. 3 (2008): 317–327. I would take up Roache’s argument in favor of speculative ethics if not for the fact that it simply proceeds from a mistaken understanding of the problem (not speculating per se, but applying a certain kind of ethical analysis to a speculative future) and in the end offers a response that never clarifies the difference between ethics critiquing visions of the future, ethics guiding visions of the future, and ethics gaining insight from speculating on the future. For a more detailed response see Jones, Whitaker, and King, “Speculative Ethics.”

III. Closing Thoughts

Over the years, there have been a number of trenchant critiques of speculative bioethics, but it is difficult to tell whether their impact has been more than negligible. On the one hand, speculative bioethics is but a small, though conspicuous, corner of the bioethics landscape. On the other hand, the fact that very few bioethicists have directly questioned whether there are valid reasons to engage in speculative inquiries into the future—and if so, where, how, and to what end—points to a failure to give this question its due. Failure, at least, can beget opportunity—if only an opportunity to analyze the failure.

CHAPTER FOUR – PROPHETIC AND REGULATORY BIOETHICS

IN THE IMAGINED FUTURE

While science attempts to describe nature and to distinguish between dream and reality, it should not be forgotten that human beings probably call as much for dream as for reality.

– François Jacob, *The Possible and the Actual* (1982)

I. Speculation across the Generations – 1974 to 2004

Future scenarios explored within bioethics consist of two kinds of speculation, primary and secondary. Primary speculation concerns the technologies that will be developed in the future. Authors frequently draw on current technological capabilities and research interests to extrapolate toward a future application, or use recent trends in technological progress to project the developments we can expect. Within bioethics literature, there is widespread primary speculation that genetic engineering technologies will be developed that can endow people with traits at or beyond the upper limits of current species function in health and cognition. Secondary speculation concerns the social consequences of the future technology or of a current technology that has not yet been widely implemented or reached a degree of acceptance and utilization an author believes is probable. Secondary speculation can range from a very basic sketch to a detailed scenario.

One might assume that evaluating the usefulness of speculative bioethics begins with asking whether its predictions pan out. But the flaws that distinguish useful from problematic speculative inquiries are not so obvious. Some writing appears to proceed on the basis of wildly inaccurate predictions but may have other merits; others, which initially seem benign, reveal

themselves to be highly problematic on deeper reflection. A pair of contrasting examples will help to illustrate this phenomenon. In both cases, authors describe a future technological scenario, yet the article in which the imagined future is described vividly but has failed to turn out as predicted arguably remains a valuable contribution to bioethical discourse. The other article describes a future technological capability in very abstract terms and the entire discussion takes place at the level of abstract ethical principles, but I argue that it fails to contribute much to bioethics. The key difference, as will be seen, is that the first article is written in a prophetic/reflective mode, while the second attempts to develop regulatory principles for the future.

a. 'Neomorts' and the 'Bioemporium'

1. *Predictive failure*

In 1974, roughly six years after the Harvard Ad Hoc Committee on Brain Death published its report and about a decade before brain death attained the legal status of death in all fifty states, Willard Gaylin, co-founder of what would later be known as the Hastings Center, argued that adopting brain death criteria, coupled with recent advances in artificially-maintained life-support, would result in the widespread 'farming' of these living cadavers, neologically referred to as 'neomorts.'¹⁵⁵ Neomorts would be maintained on life support for extended periods and housed *en masse* in the wing of a hospital to be known as a 'bioemporium.' They would be used as sources of transplantable organs, a continual supply of blood for transfusion, and bodies for medical education and experimentation. In sum, Gaylin warned of the grave impending consequences of

¹⁵⁵ Willard Gaylin, "Harvesting the Dead," *Harper's* 249, no. 1492 (September 1974): 23–30.

adopting a specific technology under a regulatory approach to neurological death that was gaining momentum.

While the new definition of death avoids one complex problem, euthanasia, it may create others equally difficult which have never been fully defined or visualized. For if it grants the right to pull the plug, it also implicitly grants the privilege *not* to pull the plug, and the potential and meaning of this has not at all been adequately examined.

These cadavers would have the legal status of the dead with none of the qualities one now associates with death. They would be warm, respiring, pulsating, evacuating, and excreting bodies requiring nursing, dietary, and general grooming attention—and *could probably be maintained so for a period of years*. If we chose to, we could, with the technology already at hand, legally avail ourselves of these new cadavers to serve science and mankind in dramatically useful ways. The autopsy, that most respectable of medical traditions, that last gift of the dying person to the living future, could be extended in principle beyond our current recognition. To save lives and relieve suffering—traditional motives for violating tradition—we could develop hospitals (an inappropriate word, because it suggests the presence of living human beings), banks, or farms of cadavers which require feeding and maintenance, in order to be harvested. To the uninitiated the “new cadavers” in their rows of respirators would seem indistinguishable from comatose patients now residing in wards of chronic neurological hospitals.¹⁵⁶

With the benefit of hindsight, we know that Gaylin’s assessment of the technical feasibility of the bioemporium was off the mark and his macabre prediction never came to pass. It was found that absent a functioning brainstem, bodies generally do not persist very long on life support without intensive efforts to regulate blood pressure and body temperature. In practice, bodies are only kept on life support after neurological death for extended periods in very rare occasions such as when a patient is pregnant and there is hope that the fetus will reach a sufficient gestational age for survival after delivery. Even when the family of a brain dead patient successfully prevents the

¹⁵⁶ Ibid., 26. Emphasis in original.

withdrawal of life support, the situation usually resolves itself with cardiac death within days or weeks at most.

Biological realities and technological limitations prevented the bioemporium from becoming a practical possibility, but one wonders whether it would have been implemented anyway. The legal recognition of brain death does not constrain its social meaning, which in many ways differs greatly from cardiac death. In the minds of many, it is something of an ambiguous state between the death of the person and the death of the body. Regardless of their attitudes toward organ donation, both families and medical staff are uncomfortable leaving bodies on life support any longer than is absolutely necessary. The profound difficulties that families face in their decisions regarding consent to organ donation maintain a tension between viewing the dead as sources of interchangeable parts and seeing the body as retaining vestiges of personhood.

What then do we make of Gaylin's article? Does the fact that it is largely based on a prediction that never materialized render it completely moot? Did the author implicitly promise that a dire prediction would come to pass—and has the fact that it has not occurred automatically invalidated his point? On the one hand, we would surely say that Gaylin has failed to tell us about the shape of the actual future that came to pass; on the other, perhaps this speculative scenario is presented as a possible future, but Gaylin's concern is with the present. If we read "Harvesting the Dead" not as a window on the future, but as a meditation on the present, it takes on a rather different meaning.

2. Reflective success?

In 1974, the practice of successfully transplanting vital organs from brain dead patients was still in

its earliest stages and came not long after harvesting organs from ‘regular’ cadavers started to gain feasibility. There was an ongoing debate about the morality of these practices,¹⁵⁷ and Gaylin’s article is clearly intended to engage that conversation. If we can recast the discussion of neomorts as a kind of thought experiment, then its relevance is no longer contingent on the fulfillment of its predicted future. Gaylin raises a series of questions about the benefits of harvesting organs compared to the incommensurable losses society may experience in ignoring its revulsion to the practice. He magnifies both the scale of medical benefit (ready supplies of organs, blood, and objects of medical research) and repugnance (‘living cadavers’ maintained on artificial life support by the thousands) by introducing the framing device of the bioemporium. In so doing, he brings the tension between the two to a sharp point: if one can justify the practice of treating the newly dead as a source of spare parts *en masse*, then it should be justifiable on a much smaller scale as well. But, if the thought of the bioemporium is too troubling despite the significant benefits for medical research and treatments, then perhaps it is not the scale of the practice, but the practice itself, which rightly elicits such a negative response.

“Harvesting the Dead” is an early example of speculative bioethics going wrong by not explicitly treating the imagined future as a construct in service of broader moral reflection. It is all too easy to read it as an argument confined to a predicted future and to legitimately fault Gaylin, writing for a popular audience, for provoking public fear of the imaginary consequences of a new biomedical possibility. However, it is also a case where speculative bioethics has gone right.

¹⁵⁷ William May, “Attitudes toward the Newly Dead,” *The Hastings Center Studies* 1, no. 1 (January 1973): 3–13.

Gaylin's considerations are substantively reflective; he invokes a possible future as a means of clarifying present dilemmas. Further, Gaylin makes no case for enacting policies in response to these predictions. Whether or not this was Gaylin's intent, the article is amenable to a type of rereading in which its contemporary significance can be disentangled from the accuracy of its prognostications.¹⁵⁸

Even today "Harvesting the Dead" can give us pause to reflect on the peculiar practice of organ donation, both from living and deceased donors. As much as society embraces the 'gift of life,' it remains a very circumscribed practice, with developments and proposals such as harvesting organs shortly after cardiac death, conceiving 'savior siblings', soliciting living donors directly, presumed consent, and compensating donors or their kin all provoking intense ethical scrutiny. Although human bodies are fairly routinely harvested for spare parts, the practice has not become banal in the way that it does in the imagined world of the bioemporium.

¹⁵⁸ In an earlier article on cloning, perhaps because the technology itself was so speculative, Gaylin makes it explicit that his purpose in examining human cloning was because it served as metaphor for other reproductive technologies:

Cloning commands our attention more because it dramatizes the developing issues in bioethics than because of its potential threat to our way of life. Many biologists, ethicists and social scientists see it not as a pressing problem but a metaphoric device serving to focus attention on identical problems that arise from less dramatic forms of genetic engineering and that might slip into public use, protected from public debate by the incremental nature of the changes they impose. (Willard Gaylin, "The Frankenstein Myth Becomes a Reality," *New York Times Magazine*, March 5, 1972.)

b. The Just Distribution of Genes

1. Justice after the genetic revolution

In a 2004 article, Colin Farrelly tells us that the expected coming of effective technologies to manipulate the human genome raises novel questions of distributive justice:¹⁵⁹

The genetic revolution raises many fundamental questions of distributive justice. Distributive justice concerns the fair distribution of the benefits and burdens of social cooperation. Advances in genetic and biological knowledge bring us closer to a world where we might have the ability, or at least a much greater ability than we currently have, to manipulate our genetic make-up. With this new ability will come new questions concerning the nature of the demands of distributive justice...But as our knowledge of how genes work increases, and with it the prospects of being able to directly intervene in the natural lottery of life through gene therapies and possibly even enhancements, this may no longer be the case. The decisions we make regarding the regulation of biotechnology will determine who receives the greatest share of the benefits these technologies confer.

This article aims to help clarify how we should begin to start thinking about what the demands of justice will be in the post-genetic revolutionary society. In particular, I tackle the following abstract question: *What distributive principle should regulate the distribution of our genes in the post-genetic revolutionary society where the successful utilisation of gene therapies and enhancements is more of a reality than it is today?* I do not intend to put forth a conclusive answer to this question but rather examine three distinct principles which have begun to emerge in recent discussions of genetics and justice. These are: “genetic equality” (GE), a “genetic decent minimum” (GDM) and the “genetic difference principle” (GDP).¹⁶⁰

As in the previous case, the usefulness of this type of discussion seems to hinge on the technology central to its premise actually coming into existence as predicted. If the genetic revolution does not produce these biomedical capabilities, then what is the benefit of discussing it? Even prior to

¹⁵⁹ Colin Farrelly, “The Genetic Difference Principle,” *The American Journal of Bioethics* 4, no. 2 (2004): W21–W28.

¹⁶⁰ *Ibid.*, W21. Emphasis in original.

considering the likelihood of the predictions we can detect a significant difference between discussing a new but existing technology, the ventilator, and misjudging its impact, and discussing a technology that simply does not exist in the form discussed in the article. In the former case there is at least the appearance of a pressing ethical concern; in the latter there is no similar imperative.

The next curiosity is that Farrelly slips from the possible future, qualified by “may” and “might,” to the new questions that arise from the possible future but present themselves with urgency in the present. One would think that if in the future we *may* be able to do X, then we *may* have new questions to answer. Instead, the future possibility already “raises” such questions, such that we are compelled to begin answering them now. This is one of the most common moves in speculative bioethics—what Nordmann refers to as the ‘if *and* then’ phenomenon.

However, let us grant that the ‘genetic revolution’ will continue as Farrelly projects, and the imagined possibility of genetic interventions with the potential to dramatically enhance people does come to fruition. Even in such a case, it is unlikely that this kind of inquiry would provide any useful guidance. Farrelly discusses the results of the genetic revolution in the most abstract manner possible, devoid of any social or future-historical context. It is almost as if the technology went from the laboratory to the clinic overnight and instantly became a distributable good. At first pass this may sound like a good strategy as it avoids the pitfall of having one’s arguments tied too closely to the specific implementation of an expected technological capability (Gaylin’s apparent mistake). An author writing in the speculative mode might reason that the greater the level of specificity, the greater the chance of failing to accurately predict what is to come and having such arguments rendered moot. But the lack of a future history detailing how we get from now to then

and the absence of any details concerning the actual form the technology might take often pushes the authors toward an exceptionlist paradigm in which both the technology and the ethics are imagined to be unique and novel. In point of fact, in the long course of time from incremental development to widespread implementation, it is unlikely that a given technology will actually be viewed as quite so exceptional.

Furthermore, the form that a given technology takes will determine many of the contours of the ethical discussion. If taking advantage of genetic enhancement requires that potential parents avoid unassisted reproduction and turn first to IVF, doing so will have different social ramifications than a technology where would-be parents could get a shot with a viral vector or nano-machine that would alter their gametes or their fetus in vivo. History has shown that cost, convenience, and similar considerations play an enormous role in the social ramifications of a technology, whether it is cars or contraceptives. Even a small degree of perceived risk can dramatically alter the course a technology takes. The actual distributive questions that might arise are heavily contingent on these facts. Farrelly admits as much, but he seems to think that abstraction in the form of not making specific policy recommendations is an adequate remedy for radical indeterminacy.

Basic biological concepts can also become distorted when ethical exploration becomes unmoored from reality. Since the basis of the discussion is a highly abstracted picture of a future genetic technology, Farrelly quickly turns to a bizarre conflation of the technology with the biological entity (or more precisely, abstract biological concept) it is meant to act upon. Farrelly explains his project in terms of the “distribution of our genes,” as if genes could become distributable goods. It pains me to clarify this, but whatever the actual technology ends up looking

like, it is only access to the technology that could be distributed. The author clearly knows as much, but since the discussion concerns an abstract future with abstract technological capabilities governed by abstract distributive principles, the very thing to be distributed might as well be abstract too.

Perhaps the most puzzling thing about the entire discussion (and here I include many of the authors with whom Farrelly is in dialogue with) is the premise that genetic technologies require distinct distributive principles. If genetic interventions become integral to the practice of healthcare, then they will presumably be subsumed under the same distributive principles as other forms of healthcare, and, depending on their efficacy and cost, factor into the balancing of healthcare with other goods, given the limitations of scarce resources. If they come to be seen as a distinct technological resource, then the distributive questions will still not be fundamentally different from current ones. It all depends on how that society, not any author today, understands the potential and necessity of the technology to secure opportunities for its members.

To take a contemporary example, as broadband Internet access increasingly comes to be seen as a necessary resource: should we propose that there is a right to a decent minimum bandwidth (BMP) or that we impose the bandwidth difference principle (BDP)? The answer is that we might, indeed, reasonably conclude on sufficitarian grounds that people's opportunities in a contemporary society will be constrained without a minimum level of bandwidth; or, we might reason on the grounds of fairness, that we should develop infrastructure in such a way that differences in bandwidth are allowed only to the extent that they maximize benefits for the least well-off. But to do so, we would not need to formulate the BMP and the BDP. We would only need to apply whatever conception of justice we reasonably agreed upon to our understanding of

how that technology fits into the larger picture of access to opportunity or basic functioning.

Yet since discussions of genetic justice in the future are wholly predicated upon the existence of one kind of technology, that technology is imagined—at least initially—to be conceptually distinct from all other forms of healthcare and other goods. This kind of thinking is endemic to speculative bioethics when it approaches future scenarios using a regulatory framework. There is an attraction towards constructing scenarios where current regulatory paradigms are rendered insufficient or problematic simply as an impetus to argue for new ones, when, in all likelihood, current regulatory paradigms are sufficient or quite adaptable. And, more importantly, we just do not know enough about the future to offer something that will truly be useful down the road.¹⁶¹ Indeed, by the time Farrelly settles on his “lax genetic difference principle,” it ends up looking like genetic technologies are simply factored as one resource among many in the distributive decisions of a society that conceives of justice in terms of fairness. What remains significant about genetic interventions compared to other resources that contribute to opportunity is that if you take some genetic reductionism and plug it into a list of important human capabilities, you might conclude that in some cases genetic interventions should take priority in our thinking about the demands of justice.

After reading “The Genetic Difference Principle,” a number of times I am unsure whether the author, editors, or reviewers gave serious thought as to whether this kind of speculative

¹⁶¹ My approach generally agrees with Ronald Lindsay’s detailed critique of various distributive schemes proposed to regulate future genetic technologies: Ronald A. Lindsay, “Enhancements and Justice: Problems in Determining the Requirements of Justice in a Genetically Transformed Society,” *Kennedy Institute of Ethics Journal* 15, no. 1 (2005): 3–38.

exploration would ever be a useful part of bioethics' conceptual toolkit, or whether it is merely an exercise in philosophical taxonomy and theory-building. I think the answer is that they did not, because the idea that we can and must build a theory of justice that takes into account genetic interventions had already become bioethical dogma. Turning back to CtC we find the claim that:

In contemplating the disturbing challenges that the possibilities of genetic intervention pose for our traditional ways of thinking about justice, it is tempting to conclude that we are ill equipped to make any firm judgments about what justice requires. This temptation, however, ought to be resisted. Some conclusions can indeed be drawn about the requirements of justice in the genetic age.¹⁶²

In the next section, I discuss the consequences of developing “firm judgments about what justice requires” in the imagined future. What are described only as “possibilities of genetic intervention” somehow already “pose [challenges] for our traditional ways of thinking about justice.” Once our traditional ways of thinking about justice are shown to be inadequate, the revised theory demands a reality to match it.

2. The encroaching demands of a more just future

If the discourse on justice in the post-revolutionary society has not substantively contributed to either current or future regulatory bioethics, should we nonetheless allow that ultimately ‘no harm, no foul’? The deeper problem is that once theorists have established the existence of an abstract distributive principle for ‘genes’ prior to the capacity to implement such a principle, this entails that we bear the rights to those goods to the extent determined by the distributive principle, at least in theory. Nicholas Agar describes the purpose of moral inquiry into speculative technological

¹⁶² Buchanan et al., *From Chance to Choice*, 95–96.

futures in exactly these terms:

Answers to questions about what would be right or wrong in these technologically ideal scenarios tell us about the ‘in principle’ obligations governing the technologies and about the ‘in principle’ liberties opened up by them.¹⁶³

Liberties and obligations of this sort cannot generate absolute rights; nonetheless, if some of us have these rights already *in potential*, it follows that we ought to develop the necessary technologies to provide for those most entitled to them. That is after all how things usually go: if society decides that there is a universal right to education then we ought to build schools; if everyone has a right to access a minimum level of healthcare then we should build clinics; if we have the right to clean water and sanitation we need to build water treatment facilities, pipes and sewers. If we prospectively “think of a solid genetic endowment as a basic human right,”¹⁶⁴ then developing genetic engineering technologies should be a priority.

These arguments are therefore no longer about what the future ought to look like *if* a certain technology exists, but what it ought to look like, *simpliciter*. If genetic technologies as capable as those imagined ever come to exist, then society might well make the reasoned decision that, as an effective and efficient means to equality of opportunity, they should be distributed in a fair manner instead of being left wholly to market forces. But that potential future discussion is not left in the possible future once its central questions impose themselves onto the present. Instead of working toward the kind of society that the demands of justice direct us to construct with the means at our disposal today, we look to the technological future as offering a more just

¹⁶³ Agar, *Liberal Eugenics*, 34.

¹⁶⁴ Green, *Babies by Design*, 157.

possibility than the present. How else to understand a statement that “in at least one respect, advances in genetics have made [Rawls’s] theory out of date”?¹⁶⁵ That is a strong statement to make regarding an ideal account of justice based on principles that any self-interested rational individual, ignorant of her own identity or the level of technological or socioeconomic development she lives in, ought to endorse.

A number of authors have complained that speculative bioethics, born of a preoccupation with novel technologies, distracts attention and resources from much more important real-world problems.¹⁶⁶ I would suggest that in some cases the problem is deeper still, and that a perverse sense of eschatological complacency may be percolating within discussions of post-revolutionary technological futures. By the standards of Rawlsian principles the present is not unjust because we have not yet found a way to ‘distribute genes’; it is unjust because we do not justly distribute what we do have. We therefore do not need technology to redeem society; we need society to redeem itself. What seems like a rather staid discussion of moral theory absent any explicit transhumanist or techno-utopian aspirations, simply by giving us a picture of a genetically just future, transforms technological possibility into a secular messianic idea.¹⁶⁷ As Gershom Scholem argued in his study of Jewish messianism, the defining feature of messianic ideas is that they operate outside the plane of human history; as much as they give hope for a better future, they also compel “a life lived in

¹⁶⁵ Ibid., 151.

¹⁶⁶ Guyer and Moreno, “Slouching Toward Policy”; Elliott, “Adventure! Comedy! Tragedy! Robots!”; Nordmann, “If and Then”; Brody, *The Future of Bioethics*.

¹⁶⁷ For a discussion of transhumanism as secularized messianism see Charles T. Rubin, “What Is the Good of Transhumanism?,” in *Medical Enhancement and Posthumanity*, ed. Bert Gordijn and Ruth Chadwick, vol. 2 (Dordrecht: Springer, 2008), 137–156.

deferment, in which nothing can be irrevocably accomplished.”¹⁶⁸ Speculative bioethics investigating a reified future similarly conceives of technologies as existing outside of the contingent space of human history. Imagined technologies, which are thought to exist now *in posse* trace a vector into the future which creates history, instead of the other way around.¹⁶⁹ That ahistorical future becomes the locus for achieving a properly just—or free, democratic, happy, productive—society,¹⁷⁰ and in the process, an image of the present is formed in which the ideals of justice appear to be unachievable. With justice out of reach for now, can bioethicists be blamed for preferring to analyze an ethics of the future over addressing current inequities?

3. *Reflective equilibrium in the reified future*

A discourse on justice unmoored from history is particularly startling when the foundation of the discussion is Rawlsian distributive justice. Rawls stressed that justice as fairness is not a transhistorical/metaphysical notion; rather, it is situated within a historical and political reality. The process of working toward reflective equilibrium therefore begins with the historically grounded constitutional state, and the reflective agent situated therein.¹⁷¹ Theorists who launch Rawls into a future epoch of human capability may be distorting the method, which is only

¹⁶⁸ Gershom Scholem, *The Messianic Idea in Judaism and Other Essays on Jewish Spirituality* (New York: Schocken Books, 1971), 35.

¹⁶⁹ Nordmann offers a similar analysis based on the work of Günther Anders; Nordmann, “If and Then,” 39–41.

¹⁷⁰ James Hughes, *Citizen Cyborg: Why Democratic Societies Must Respond To The Redesigned Human Of The Future* (New York: Basic Books, 2004).

¹⁷¹ John Rawls, “Justice as Fairness: Political Not Metaphysical,” *Philosophy and Public Affairs* 14, no. 3 (1985): 223–251.

claimed to work for refining our understanding of the basic political structure of society. In a bare-knuckled critique of bioethics, Stephen John goes after reflective equilibrium as bioethics' methodological jugular:

The real problem ... is their confusion of success in reaching a reflective equilibrium between their suggestions and considered moral judgements, and an ethical method. Rawls's own work looks at the basic structure of society, not at isolated problems within a society. Rawls's method is for the assessment of the most general institutions and practices, not for the application of principles in a narrow set of cases."¹⁷²

Reflective equilibrium functions for Rawls because it establishes a conception of justice that coheres with many firm convictions and our identities as free and equal participants within the political order. Bioethicists working via reflective equilibrium have not been completely blind to the problem that John points to. Their alternative, wide reflective equilibrium, allows more space for both moral convictions and theoretical commitments to be up for review until everything settles into a coherent whole. John Arras, perhaps bioethics' most vigilant deflator of theoretical and methodological pretense, has also questioned the power that has been ascribed to wide reflective equilibrium and concluded that it claims to deliver far more than it can. As useful as methods like reflective equilibrium may be, it is the archer, not the arrow, that matters when it comes to practical moral guidance.¹⁷³

If reflective equilibrium can work for purposes beyond what Rawls had in mind—and

¹⁷² John, "Titanic Ethics, Pirate Ethics, Bioethics," 181.

¹⁷³ John D. Arras, "The Way We Reason Now: Reflective Equilibrium in Bioethics," in *The Oxford Handbook of Bioethics*, ed. Bonnie Steinbock (Cambridge; New York: Oxford University Press, 2007), 46–71.

within bioethics this is virtually taken for granted—at minimum it still needs certain “fixed points” on which considered judgments can rest. A physician’s firm belief in twin duties to her patients can be a fixed point abstracted to nonmaleficence and beneficence; confidence that it is not for strangers to tell me what conception of the good to pursue or unreasonably restrict my liberty can be universalized to autonomy. But an imagined future in which revolutionary technologies have enabled the rejiggering of basic natural and social parameters has no such fixed points, and whatever our judgments about such hypothetical futures, so far as the actual future is concerned, they are not “rendered under conditions favorable to the exercise of the sense of justice,” and are unreliable precisely because speculating about the indeterminate future is quite the opposite of “circumstances where the common excuses and explanations for making a mistake do not obtain.”¹⁷⁴ The Rawlsian futurist does not lead us to a refined understanding of the demands of justice in the actual future; he merely creates a fictive image of the future constituted solely by one technological capability which covertly refashions our beliefs about the present. Rawls, in contrast,

Wisely doubted that philosophy should pronounce on the complex choices faced by actual political actors in highly specific historical moments. Tactics, causal processes, relative weights of countless values, both personal and political—the confluence of these matters in a political choice—goes beyond what philosophy can claim to settle.¹⁷⁵

A final oddity is that although many theorists have turned to Rawls for guidance on how to regulate the future, they fail to appreciate that for those of us who exist in the present, all discussions of the future that transgress the limits of our own prudential concerns and center on

¹⁷⁴ John Rawls, *A Theory of Justice*, Original Edition (Harvard University Press, 2005), 47.

¹⁷⁵ David Estlund, “The Audacious Humility of John Rawls,” *Dissent* 50, no. 2 (Spring 2003): 91.

future persons (and surely discussing the capabilities of possible future technologies to affect future people is an example of this) fall under the rubric of intergenerational justice. This has a number of important consequences within Rawlsian justice—not least of which is the generally recognized inadequacy of Rawls’s own account of intergenerational justice. Nonetheless, with Rawls as a starting point, it is clear that intergenerational justice is not a variety of distributive justice and is therefore not governed by the difference principle, but by a principle of preservation and accumulation—the ‘just savings principle.’ Principles of intergenerational justice serve as a limitation on what a given generation can do, even in seeking to achieve a distributive ideal.¹⁷⁶ If the only way to effect the kinds of powerful genetic interventions under consideration is by intervening on future people, then distributive considerations may not even enter the picture until we first consider whether doing so complies with intergenerational principles.

A digression into intergenerational justice is beyond the scope of the present discussion. I will, however, note that it is conceivable to see in Rawls’s depictions of intergenerational justice a notion of progress toward a well-ordered society and the claim that the obligations of intergenerational justice include the duty to ensure, as best as possible, that the next generation will come closer to achieving the ideals of justice: “The just savings principle can be regarded as an understanding between generations to carry their fair share of the burden of realizing and preserving a just society.”¹⁷⁷ I therefore would not deny that, to the extent that technological development can help a society toward becoming well-ordered, it may be something that should be

¹⁷⁶ Roger Paden, “Rawls’s Just Savings Principle and the Sense of Justice,” *Social Theory and Practice* 23, no. 1 (1997): 27–51.

¹⁷⁷ Rawls, *A Theory of Justice*, 289.

legitimately pursued under the rubric of justice. But this is not a question for ideal theory; it is a question for us to debate today in a context where basic economic justice is wanting and investment in technology is already very high. Taking intergenerational justice into account circumscribes what we can do today, but even if it limits present-day distributive obligations, it cannot supplant them.

II. Alternatives to Regulatory Forays into the Future

a. Reflective Exploration

What could be gained by exploring a speculative future scenario in which there are powerful genetic interventions? In a more open-ended reflective mode in which the goal is not to develop a theoretical basis for specific policy initiatives, it could be instructive to compare a possible future society that implements a just distribution of certain possible genetic technologies with a present-day society. From certain perspectives the two may diverge significantly. Are the members of such a future society better off? Does such a society have a greater capacity for achieving the ideals of justice than our own? Does it have room for true diversity and people who eschew enhancements? Do its denizens lead lives that they perceive to be increasingly deterministic or medicalized? Do people have more opportunities to achieve their own conception of the good? Is the society more democratic or increasingly technocratic? Obviously we are in no position to know the answers to these questions, but exploring them can aid in our understanding of the futures we may be pursuing versus other potential possibilities.

What is crucial is that this approach does not take the promises of future technologies

seriously because they represent predictions likely to come true (ideally, the language of prediction is eliminated altogether), but because these visions, expectations, and promises present an “image of a technologically conceived future that is fully contained in the present.”¹⁷⁸ This understanding of prophetic Bioethics does not entail a one-sided critique of technological visions. On the contrary, one would hope to see more attention to the visions themselves, regardless of whether the response is one of support or resistance.

b. Thought Experiments

In what follows, I attempt to transform the regulatory inquiry into the demands of genetic justice into a thought experiment. Framing the possible future as the basis of a thought experiment avoids reification and associated pitfalls. However, it does not necessarily produce very useful results either.

If we explicitly treat the speculative future as a construct in which to conduct thought experiments that are meant to test and refine our intuitions, then we need to first ask what current practices, perspectives, or conceptualizations the experiment is designed to address. The most plausible way to reconstitute questions of distributive justice in the post genetic revolution future as thought experiments—without stretching their existing content—is to construe them as interrogating the idea that justice is not concerned with remedying the vicissitudes of the natural lottery. Are natural deficits and talents outside the purview of justice, or does justice demand that they be compensated for? Let us grant that within a thought experiment where ‘powerful genetic

¹⁷⁸ Nordmann, “A Forensics of Wishing,” 13.

interventions' have been developed, an understanding of justice as fairness and its concern with fair equality of opportunity would direct us to provide access to genetic interventions that compensate for natural deficits. If one accepts this contention, then this thought experiment successfully revises our understanding of justice, and in the process of reflective equilibrium we recognize that distributive justice does not in principle distinguish between the natural lottery and social barriers to equality of opportunity.¹⁷⁹ Our theory, intuitions, and beliefs about what certain technologies might be capable of are now in harmony. This appears to be a reasonable outcome of such a reflective process.

But is this a novel insight? Before CtC, Daniels had already argued as much regarding the role of healthcare in securing equality of opportunity.¹⁸⁰ Moreover, simply by examining our existing considered judgments and practices, it is clear that within our current understanding of justice, our society compensates for deficits that result from the natural lottery. This is apparent in approaches to education, health, and disability; all point to an understanding of justice that is not limited to the social bases of inequality.¹⁸¹

Perhaps genetic justice takes things a step beyond; it shows that that not only does the basis of the inequality not matter, the point of intervention is not limited to distributing material goods

¹⁷⁹ I am not actually convinced that this has been demonstrated at all. See Thomas Nagel, "Justice and Nature," *Oxford Journal of Legal Studies* 17, no. 2 (1997): 303–321.

¹⁸⁰ Norman Daniels, *Just Health Care* (Cambridge; New York: Cambridge University Press, 1985).

¹⁸¹ "The redistributive component of the welfare state rests on a premise that some qualities of individuals are morally arbitrary. Minimally, these include inborn abilities and disabilities. The welfare state corresponds to a widespread belief that it would be unfair to let individuals suffer from genetic accidents outside their control." Jon Elster, *Solomonic Judgements: Studies in the Limitation of Rationality* (Cambridge: Cambridge University Press, 1989), 211.

or social advantage, but extends to intervening in nature itself. Again, this does not appear to substantially differentiate between various other forms of healthcare and genetic interventions—both intervene in nature in some sense. (Farrelly further contends that genetic justice conceives of genetic endowments themselves as distributable, but as I explained earlier, this simply confuses the issue by conflating a technology with an abstract biological concept.) CtC plausibly argues that so long as a given genetic intervention is perceived as compensating for a deficit and restoring typical function, it will likely be thought of in similar terms.

I believe that we have by now reached the limits where our intuitions have a reasonable basis on which to proceed within the thought experiment. The result amounts to little more than: “if we had genetic interventions today, we might very well apply the distributive considerations that frame our approaches to healthcare, education, and disability.” Beyond this, I do not see any firm intuitions emerging: I do not know whether certain interventions should be restricted in service of the difference principle, or whether fair equality of opportunity entails supplying enhancements that level the playing field. Perhaps my powers of moral imagination are not up to the task, but I simply have no intuitions concerning regulating enhancements on considerations of justice in a very abstract future, once they no longer resemble current medical interventions that function in a

roughly similar fashion.¹⁸² Understood in these terms, I do not believe that we have learned anything useful from this thought experiment that we did not know already, with the possible exception of the following consideration: To the extent that we justify investing resources in biomedical research for its ability to aid in securing fairer equality of opportunity, and to the extent that genetic technologies might accomplish the same more effectively, we can justify investing in genetic technologies despite the potential benefits being farther off. This too is not a unique insight, but simply a specification of a general consideration that justifies allocating resources to research and development that could otherwise be used for the direct provision of care. Whether this fits within inter- or intra-generational justice will depend on how far down the road we realistically think that these investments will return real dividends.

c. Intermezzo: An Unproductive Dialogue

In Socratic fashion, I now take up this contention as the starting point of a dialogue between two bioethicists, one whose approach is largely reflective or ‘prophetic’ (P) and the other whose concerns are for the most part ‘regulatory’ (R). Unlike Socrates’s foils, this latter persona—an amalgam of theorists of genetic justice and enhancement—does not come around to the prophetic

¹⁸² There is no barrier to conceiving of thought experiments regarding powerful enhancements that elicit firm intuitive responses, but the specificity required renders them uninformative for present day deliberations regarding genetic technologies. Take a thought experiment such as: “If there were a very powerful enhancement technology only available to the rich and powerful that would allow a select few elites to exert vast control over economic resources, the media, and political institutions, should society move to keep it out of their hands?” If our intuition is that we should intervene, it does not tell us anything about current decisions regarding the development of genetic technologies. Rather, it provokes us to consider why it matters at all that it is genetic enhancement technologies we are worried about instead of the concentration of power itself.

way of thinking, or vice versa. My purpose is not rhetorical, but to condense what would otherwise be an overly long and less perspicuous examination of how the prophetic and regulatory approaches—absent a desire to or view each other as complementary aspects of bioethics—tend to talk past one another with only occasional flashes of mutual understanding.

R: How can you claim that nothing has been learned from examining the future in which genetic enhancement technologies are available? Surely it supports the notion that genetic interventions are suited to compensating for the dis-equalizing effects of the natural lottery?

P: No, we have only supported the notion that if they existed, we might think of them as the best way of addressing such natural deficits.

R: But since our current intuition is that they are so suited *if* we had them, then does it not lead to the conclusion that we are justified in devoting considerable resources to developing these technologies?

P: No, that is a complex decision that requires weighing the possible benefits of a technology that might not pan-out with diverting resources from other ways of addressing the same issues that already exist or are closer to realization.

R: But didn't you yourself ask whether such a society has a greater capacity for achieving the ideals of justice than our own?

P: I don't think that our current thought experiment offers any guidance on this point.

R: Very well, let's propose an optimal scenario where genetic technologies have eliminated most congenital diseases and disabilities and brought everyone up to what is now above average cognitive capacity while not allowing the better-off to enhance themselves, such that the technology is really limited to helping those who would otherwise be worse off.

Doesn't this elicit the intuition that a society with powerful genetic interventions could be more just than one without them?

P: This sounds more like a utopian vision than a thought experiment. In any event, it describes equality of talent, not fair equality of opportunity, which, unless regnant social arrangements changed significantly, would not generate significantly fairer equality of opportunity.

R: But still, that society seems better off than our own.

P: Perhaps, but these utilitarian considerations do not figure into Rawls's account of the principles of distributive justice. If we want to pursue genetic interventions so that we will be better off, that is a separate discussion.

R: I disagree. Rawls endorsed accumulating a certain excess of savings to leave to future generations so they would be better off materially and better equipped to achieve the ideals of justice—he even mentions ensuring that our descendants have the best genetic endowment and raising everyone's natural talents. The conclusion I draw is that if we take the potential that genetic interventions offer for narrowing the disparities between the best and worst off, combined with its ability to make us better off overall, we have good reason to pursue these technologies.

P: This possible future sounds very attractive, but it's an imagined future and we don't even know if those technological capabilities will be possible. In fact, if you leave aside talk of justice—and let's face it, if society cared that much about justice it would not look remotely like it does today—it seems to explain why we already are investing so much of our resources in genomic research. But all this amounts to is a restatement of the vision

motivating our current allocation of resources. That is not a thought experiment, nor has it provided any justification for preferring this course over others that may achieve dramatic increases in wellbeing and reductions in unjust levels of inequality sooner or with greater confidence in their feasibility.

R: What you fail to acknowledge is that the pursuit of those technologies is happening no matter what we think. The considerations of justice are important in fending off claims that an ‘enhanced’ future is going to be less just.

P: All I can conclude from such a dispute is that a future with powerful genetic interventions is not necessarily just or unjust—we can’t know one way or the other. It will depend on the actual path the technology takes from development to application and the choices people make when they face regulatory decisions.

R: Exactly, and that’s why we are laying out a theory of genetic justice.

P: But now you are just back to regulating the indeterminate future; something that isn’t coherent or possible. Meanwhile I’m trying to bring the thrust of the discussion back to the present—what substantive considerations are driving this research goal forward and are they adequate?

R: Very well. In the present, since we have no empirical evidence that genetic interventions will cause any of the bad the naysayers are decrying, we shouldn’t ban their development.

P: Perhaps bans are hasty, but shouldn’t we demand good reasons for pursuing these technologies in the first place? Most of this research is ultimately getting paid for out of the general coffers.

R: But alas, that’s a done deal—the development of something like these technologies is almost

inevitable.

P: Even if you are right, we can still offer reasoned critiques.

R: That's a waste of effort—bioethics is a pragmatic enterprise. We deal with reality as it is, not a possible world in which the direction of biomedical research is itself determined by deliberative processes. Ignoring the future is not going to help at all.

P: I'm not ignoring *the* future, I'm questioning your attempts to offer regulatory guidance for *a* future that does not exist outside of the imagination. I don't think you have paid adequate attention to where these imagined futures come from and the effect your approach has on making them appear inevitable.

R: These futures are the very ones that scientists believe to be on the horizon. I make no claim as to when they will come to be or exactly what they will look like, only that we are already on the path toward them. Nothing in your arguments, as critical as they may be, will change that.

P: If I understand correctly, you subscribe to an ideal theory of justice and expend much effort thinking about how it should be implemented in a possible future, but when it comes to the actual present you assume a sort of agnosticism as to whether society has chosen the right ends?

R: I resent the implication that I don't care about the present. Rampant injustice within this country and globally are a perennial concern of mine, and I have done plenty of work on current bioethical dilemmas. Nonetheless, I'm not going to change the world today, but I can lay out a regulatory framework in which these virtually inevitable technologies tend to lead to a just future. As for ultimate ends, it would be an act of foolish arrogance to assume

that I know what's best for all of society beyond that it should seek to achieve the ideals of justice.

P: That would be a reasonable demurral if not for the fact that you are clearly committed to a particular vision of the future in which humanity is improved by enhancement technologies.

R: You seem to have me confused with some of my colleagues who are into that sort of thing. I don't even define an enhancement as something that improves human wellbeing. It's a value-neutral term.

P: I understand that you are not a transhumanist, but your writings convey at least a general notion of a future in which enhancement indirectly improves people's wellbeing—say by increasing talent and productivity.

R: That is a reasonable and achievable outcome of the judicious implementation of enhancement technologies. It's the very goal that motivates my work on enhancement.

P: That's not value neutral. Shouldn't we take the time to first reflect on whether becoming super-efficient enhanced people is something we want for ourselves or children? Surely we'll lose something important in the process.

R: So you are worried about losing a sense of authenticity, or is it gratitude or social solidarity? Or maybe you won't love your child or they will resent you meddling in their genes? You can't show me a shred of evidence to this effect and yet I'm the one who is accused of being too speculative. And even if there are downsides, there are very concrete upsides we cannot ignore.

P: It's not the prediction that matters; the possibility you treat as inevitable is already

changing the way we conceive of ourselves, our families, etc.

R: I really don't see it that way. Change itself is not morally suspect, and even if I sympathize with some of these concerns, they are moot from a policy perspective, absent evidence that they are damaging individuals or society.

P: But I'm not trying to make policy; I'm trying to develop a critical approach that will challenge embedded ideologies and help guide us in thinking through these issues.

R: I'd have no objection if not for the fact that your critical approach lacks clear arguments, yet always seems to be brought up as if it did.

P: What you seem to want is an impoverished discussion lacking substance that only takes place in the narrow terms you allow.

R: I call it clear, to the point, and informed by empirical evidence.

P: That's reasonable when speaking of the present, but since we can't import empirical evidence from the future, or extrapolate from the present to a future that is supposed to be transformed by technology, then what would you say "no" to?

R: Plenty of things: human experiments without adequate safety protocols, technologies that stand a decent chance of producing harm or destroying humanity or the planet, coercive eugenic policies.

P: That leaves quite a wide berth for things to head south.

R: Don't confuse pessimism with ethical acuity.

I will spare the reader the rest of the dialogue, which I imagine devolves quickly. Clearly this is not a productive way for the two modes of bioethical inquiry to interact. If we believe that there is value in both regulatory and prophetic approaches and that both contribute to the goals of

bioethics, then we need a better sense of how they can complement one another.

III. The Prophetic Voice in Bioethics

In this section I attempt to show that although the prophetic and regulatory approaches each have their own domain and should not intrude into one another's zone of applicability, we can envision them as two practices in dialogue within the larger practice of bioethics. This requires coming to a better understanding of the regulatory/prophetic distinction, as well as some explication of the concept of bioethics as a 'practice.'¹⁸³

Until now I have been using the distinction to indicate the difference between bioethics that ultimately aims at contributing to public policy (anything from formulating higher-level regulatory principles to working on a review board, panel, or commission, to drafting legislation and policy guidelines) versus bioethics that is occupied with reflective and critical considerations as they arise within the context of biomedicine and its future. I would like to refine and expand these definitions by looking at the way that several authors have applied these and similar distinctions.

a. Far-sighted and Reflective

In 2005, two articles appeared in the bioethics literature which drew on Daniel Callahan's distinction between regulatory and prophetic bioethics. Curiously, both took aim at the President's Council on Bioethics under Leon Kass—though one critiqued the commission for confusing regulatory bioethics (the implied proper role of a federal commission) with its prophetic

¹⁸³ In this section I focus on understanding the prophetic mode of bioethics. I pursue a more detailed understanding of regulatory bioethics in the next chapter.

counterpart,¹⁸⁴ and the other criticized it for not being prophetic enough.¹⁸⁵ Although I do not believe that there are fundamental disagreements between the authors regarding what prophetic bioethics encompasses, they highlight different aspects of the practice. I begin with the article by Guyer and Moreno discussed in the previous chapter.

Bioethics went self-conscious in the late 1960s, and the issues raised by the solution of the structure of DNA, the successful transplantation of organs, and the development of artificial organs and dialysis methods... stimulated a rich conversation among philosophers, physicians and theologians. Their eyes, visionary but not bionic, were set on the distant horizon and the implications these and other developments might have for human nature and society.¹⁸⁶

Unlike prophetic bioethics of this sort, the authors argue that today the primary function of bioethics is regulatory, and in those contexts, speculative explorations should be excluded, as they distort the way in which we approach practical question.

The confusion between ‘blue sky’ prophetic bioethics (where science fiction-driven discourse may be appropriate) and regulatory bioethics (where science fiction-driven discourse is a red herring and a horrible distraction) began to permeate and later to demean bioethics, and this has continued in the present.¹⁸⁷

The authors contend that bioethics, as a field devoted to providing “authentic watchfulness over contemporary science, medicine, and in the end, public well being,” should “switch away from the lure of the easy, sexy, trivial subjects under the lamp post to the weighty dilemmas that face us

¹⁸⁴ Guyer and Moreno, “Slouching Toward Policy.”

¹⁸⁵ Mary R. Anderlik, “Respecting Difference and Moving Beyond Regulation: Tasks for U.S. Bioethics Commissions in the Twenty-First Century,” *Kennedy Institute of Ethics Journal* 15, no. 3 (2005): 289–303.

¹⁸⁶ Guyer and Moreno, “Slouching Toward Policy,” W16.

¹⁸⁷ Ibid.

today.”¹⁸⁸ Although unstated here, in Moreno’s view, prophetic bioethics, whether speculative or simply “the critique of modern medicine, its practices, and its values,” is unfit for regulatory policymaking because it is not a practice oriented toward achieving consensus.¹⁸⁹

Since Guyer and Moreno initially give the impression that prophetic bioethics belongs to a bygone era, where does this leave speculative prophetic bioethics today?

Long-range philosophical concerns are both appropriate and instructive for policy discussions, and the deep reflection stimulated by great literature can enrich public discourse.¹⁹⁰

Speculation and philosophical reflection, though fine for policy discussion (which I take to mean something like agenda setting and broad, long-term policy consideration) and public discourse, need to be checked at the door once bioethicists begin the process of developing actual policy and conducting oversight. The idea that speculating about the future is not appropriate or conducive to the regulatory function of bioethics is well taken and central to the approach I have adopted. However, Guyer and Moreno focus on the intrusion of prophetic bioethics into regulatory contexts, where my primary concern is the reverse: the intrusion of regulatory-style bioethics into (speculative) prophetic contexts. The first is a symptom of speculative futures overwhelming discussions of much narrower present-day issues; the latter is a symptom of the larger problem of regulatory bioethics spilling over into areas where it does not belong.

¹⁸⁸ Ibid., W17.

¹⁸⁹ Jonathan D. Moreno, *Deciding Together: Bioethics and Moral Consensus* (Oxford University Press, 1995), 154.

¹⁹⁰ Guyer and Moreno, “Slouching Toward Policy,” W17.

b. Activist and Critical

If we go back to Callahan's distinction between the prophetic and regulatory modes of bioethics, the point of differentiation is that prophetic bioethics functions in a critical outside mode, and regulatory bioethics is a collaborative consensus-oriented process.

The great dilemma was whether the ethicist should be the prophet, the outside critic, the one who raises the hard and unpleasant questions against the establishment—or whether those in ethics should be friendly collaborators, one more set of experts or specialists among the medical team trying to be helpful and to resolve dilemmas...

The solution that gradually emerged, though I believe without any set or conscious plan, was for mainline bioethics to move in the direction of what I call 'regulatory ethics.'¹⁹¹

Callahan's formulation of the distinction sees regulatory bioethics as having supplanted prophetic bioethics, reflecting the process of bioethics shifting from theological roots to secular ethics.¹⁹² As such, the use of 'prophetic' instead of simply 'reflective' or 'critical' carries a theological resonance. Mary Anderlik, picking up on the religious overtones, ties her understanding of prophetic bioethics to A.J. Heschel's portrayal of the biblical prophets as outsider activists critiquing society for its complacency, assumptions, and lack of concern for the poor and disadvantaged, "in the service of a redemptive project."¹⁹³ She expects a prophetic bioethics to do the same, and in particular to address systemic inequities such as lack of access to healthcare. In this sense, the prophetic voice, concerned with the here and now—not with a distant future—can, and should, call

¹⁹¹ Callahan, "Why America Accepted Bioethics," S8.

¹⁹² Callahan, "Religion and the Secularization of Bioethics."

¹⁹³ Anderlik, "Respecting Difference and Moving Beyond Regulation," 296.

for changes in policy.¹⁹⁴

Other bioethicists have similarly described bioethics as ideally (at least in part) an activist project—albeit without invoking the picture of the biblical prophets.¹⁹⁵ Whether as prophet or activist, the practice is driven by deep moral conviction and sense of social justice. However, fulfilling this role requires maintaining something of an outsider status. This suggests a deep bifurcation between mainstream bioethics, which Callahan describes as having gone regulatory, and the activist-critic bioethicist who must stand apart. Although I accept this as one understanding of the meaning of prophetic bioethics, I would like to move away from this extreme insider/outsider division, which suggests that there are in principle regulatory and prophetic *bioethicists*, and look to a dialectical model in which both modes coexist side-by-side, often in tension, as aspects of the practice of bioethics.

c. Historical Memory, Shared Values, and Reflexivity

Courtney Campbell—also writing in regard to a national bioethics commission, though of the previous administration—offers a description of prophetic bioethics which comes closer to my understanding of how it contributes to bioethics and public discourse more generally. The context for Campbell’s article is the work of NBAC¹⁹⁶ on the issue of human cloning:

¹⁹⁴ Courtney Campbell made this exact point fifteen years earlier; “Religion and Moral Meaning in Bioethics,” *The Hastings Center Report* 20, no. 4 (July 1, 1990): 9.

¹⁹⁵ Lisa S. Parker, “Bioethics as Activism,” in *The Ethics of Bioethics: Mapping the Moral Landscape*, ed. Lisa A. Eckenwiler and Felicia G. Cohn (Baltimore: Johns Hopkins University Press, 2007), 144–157.

¹⁹⁶ The National Bioethics Advisory Commission was established in 1995 by the Clinton Administration. Its charter expired in 2001.

It reflects an inadequate historical memory to portray human cloning as a new issue in bioethics. The enduring nature of the arguments and themes articulated by these religious thinkers over cloning is characteristic of the ‘prophetic’ voice in bioethics. Prophecy does not necessarily deliver denunciation and critique; it can also function as a historical memory for the broader society, reminding the community of those values constitutive of its common life and its flourishing. Prophetic voices witness to the values that are already embedded in a society’s practices and ideology, which may be compromised or in need of reinterpretation in the context of scientific developments.¹⁹⁷

Campbell provides a succinct description of the reflective nature of prophetic bioethics (identifying values at stake and conceptions of human flourishing) as well as its function as bioethics’ historical memory, all while hinting at the delicate position it occupies. I believe that the reflective aspects are clear enough, so I would like to focus on the concept of historical memory. Campbell points out that when cloning burst onto the scene there was a sense within bioethics that it was unprepared or had dropped the ball by not getting the ethical issues straight first. However, in the early days of bioethics (prior to the regulatory turn) cloning *was* discussed at length as a speculative possibility and that contours of the debate had already been outlined and filled-in by those for and against human cloning. And before there was anything called bioethics there were a number of theorists discussing the nature of modern technological societies, scientific knowledge, and prospects for the future. Bioethics seemed to have an institutional amnesia based on the idea that if the technologies are new, so it must be for the ethics.

An alternative explanation for this lack of historical memory is that regulatory bioethics, after developing useful consensus-based procedures, turned hermetic—or, in Evans’s formulation, formal rationality could no longer accommodate substantive considerations. In Campbell’s view,

¹⁹⁷ Campbell, “Prophecy and Policy,” 16–17.

prophetic bioethics is where a substantive discourse reenters policy-oriented bioethics—but how? He suggests that it begins by questioning the strictures of public reason which keeps substantive talk out, by pointing to moral dialogue that takes place between diverse moral communities concluding that “the prophetic voices in bioethics policy forums... offer critiques of political, philosophical and scientific pretensions.”¹⁹⁸ Prophetic bioethics is therefore not just a critique of the values implicated by modern medicine and advances in biotechnology, but a reflexive critique of the narrowness of bioethics itself.

d. Utopian and Dystopian Visions

Several years before Callahan described a shift to regulatory bioethics in his contribution to a conference on the “birth of bioethics,” James Gustafson described four approaches within bioethics.¹⁹⁹ Gustafson identifies these approaches as ‘ethical,’ ‘policy,’ ‘narrative,’ and ‘prophetic’ discourses. Briefly, ethical discourse is a theory-rich inquiry into the construction and application of moral theories in biomedical contexts. Policy discourse works toward the practical formulation of public policy. Narrative is a less formally structured anthropological approach to understanding the morally salient features of a bioethical issue. And prophetic is the future-speculative ‘big picture’ discourse.

One can say that prophetic discourse tends to be “macro” in comparison with ethical discourse, which tends to be “micro”. Prophetic discourse is usually more general than ethical discourse, and sometimes uses narratives to make prophetic points. It takes two distinguishable forms. One is indictment. Readers of the Bible know this from the writings of Hosea, Amos, and Jeremiah. The indictments are

¹⁹⁸ Ibid., 17.

¹⁹⁹ Gustafson, “Moral Discourse about Medicine.”

radical, i.e. they are not occupied with surface issues but expose the roots of what is perceived to be fundamentally and systematically wrong. Prophets are seldom interested in specific acts except insofar as they signify a larger and deeper evil or danger. The discourse usually is passionate and uses metaphors and analogies which stir the hearers' emotions. Often it is apocalyptic. Evidences are marshalled to sustain the indictment, and while some prophetic voices take counter-evidences into account and develop arguments, many do not. To the gloomy prophet much ethical discourse is simply re-arranging the deck chairs on the Titanic when it is already sinking. Or he construes developments to be on a course that is likely to lead to disaster if it is not halted. To the moral philosopher or theologian, the prophet's concerns often seem to be "global", her arguments poorly made, and her language too emotive. The second form is Utopian. The Utopian prophet describes an alluring future in which ailments and maladies of persons and societies will be relieved and a healthier and happier condition realized. Utopian language, like the language of indictment, is often symbolic and metaphorical; it is visionary; it arouses human hopes; it raises human aspirations. To the policy maker the Utopian prophet appears to be unrealistic; he seems unwilling to face the limits of the present time and does not have the patience to organize resources for the modest increments of improvement that can actually occur.²⁰⁰

One cannot read such a description without being struck by the degree to which the recent enhancement debate has brought these two prophetic voices from the periphery to the center of bioethical discourse and cross-pollinated with regulatory and policy discourses. Gustafson's prophetic and policy categories can be aligned fairly straightforwardly with Callahan's use of prophetic and regulatory—although regulatory bioethics would include what in Gustafson's scheme is the aspect of 'ethical discourse' that contributes to policy discussions via theory-building. Interestingly, Gustafson goes on to characterize Leon Kass's work as prophetic—a description echoed years later by Moreno.²⁰¹ I use 'prophetic' broadly to include Gustafson's 'narrative' and

²⁰⁰ Ibid., 130–131.

²⁰¹ Moreno, "The End of the Great Bioethics Compromise."

what Callahan has called ‘cultural’ bioethics.²⁰²

Despite the chronological precedence, I have turned to Gustafson last because he comes closest to offering a sense of where these approaches stand in tension and how they complement one another.

Prophetic discourse... often looks global and unrealistic to the policy maker, but its

²⁰² Some further background is necessary to explain why these two forms of bioethical discourse are rightly subsumed under the ‘prophetic’ heading. Although I have highlighted Callahan’s narrative of displacement of the prophetic by the regulatory, elsewhere his view is very similar to Gustafson’s. In a 1999 article he offers a pentamorous division of bioethics into foundational (theory building), clinical, health policy, cultural, and regulatory. The differences between this categorization and Gustafson’s are minimal once it is understood that Callahan breaks out aspects of bioethics both along theoretical/methodological (cultural, regulatory) *and* functional lines (clinical, health policy, foundational). Though the term ‘prophetic’ is not used by Callahan here, he describes something like it as the genesis of ‘cultural bioethics’, which includes narrative approaches:

In its earliest days, there were two powerful currents in bioethics, not necessarily incompatible but surely moving in different directions. One of them turned its attention to individual rights and choice, with which the analytically trained philosophers and lawyers were most comfortable, and the other to the social and cultural meaning of the biomedical developments, which profited from a religious and social-science presence as well as nonanalytic philosophical approaches.

The former of those currents was instigated by the struggle over human-subject research ... It was not a long step from that concern to a broader critique of the characteristic paternalism of the doctor-patient relationship, the generation of a patient rights movement, and the triumph of autonomy as the most prized patient value in an up to-date practice of medicine...

The other current, social and cultural in its thrust, saw the main role of bioethics as an exploration of the likely effects of biomedical knowledge and its application on the human condition... Bioethics was meant to be grounded in a broad examination of all the larger problems of the meaning and purpose of human life. (“The Social Sciences and the Task of Bioethics,” 279–280).

I use ‘prophetic’ broadly to refer to approaches that emerged from this ‘social and cultural’ current.

perspective can function to jar institutions from blind acceptance of the status quo. Narrative can inform the policy maker of the larger and more inclusive “story” of which they are developing a sub-plot, but it is not decisive in determining what ought to be done...

To focus moral discourse about medicine too exclusively on what I have described as ethical tends to lose sight of realms of choice and activity that are of great importance. Ethical discourse is not sufficient. But neither is prophetic, or narrative, or policy discourse. The location of choices, of the perceived moral uneasiness or possibilities, licenses each of the forms of discourse described. Perhaps, though it is not argued here, the location of the uneasiness should determine the concepts, approaches, language, and information that are appropriate, rather than a form of discourse determining what is and is not taken into account as morally relevant. At least there are different “moments” in medical morality when different forms are more appropriate. The contributions of each to the others in moral reflection about medicine is a topic for further investigation.²⁰³

Gustafson rightly points us toward asking where each mode of bioethics fits with the others, and where each is most appropriate for a particular ‘moment.’ If it is indeed the “location of choices, of the perceived moral uneasiness or possibilities” that licenses the proper discursive mode, then when we turn to speculative futures what is needed is the prophetic voice—or perhaps more accurately, a prophetic form of narrative ethics.²⁰⁴

IV. Prophecy as Practice

a. The Idea of Prophetic Bioethics

In some cases a genealogical approach to a conceptual distinction reveals a great deal of discontinuity. In the present case, I believe that a strong common thread runs through the

²⁰³ Gustafson, “Moral Discourse about Medicine,” 141.

²⁰⁴ I elaborate on narrative approaches in Chapter Seven.

descriptions of the prophetic mode of bioethics. In what follows, I attempt to synthesize these into an impression of the shape of prophetic bioethics that guides the critique and methodology I pursue throughout the present study. Many of the items in the following list coincide, and not every instance of prophetic bioethics will reflect every item, but such an outline nonetheless clarifies the various overlapping themes within the idea of prophetic bioethics.

1. A 'global' perspective that transcends local immediate questions.
 - a. Local questions are understood as signifiers of larger issues.
 - b. The local is woven into a larger narrative.
 - c. The local is viewed in relation to ultimate ends.
 - d. Questions are located at the social rather than individual level.
2. A critical perspective questioning assumptions implicit in biomedicine and bioethics.
 - a. Questions the adequacy of theory and method.
 - b. Questions the structural context in which bioethical inquiry takes place.
 - c. Asks whether bioethics is merely reinforcing the status quo.
 - d. Attempts to maintain some degree of 'outsider' status.
3. A substantive perspective that prioritizes conceptions of the good.
 - a. Concerned with the deep connection between values and culture.
 - b. Prioritizes moral praxis, character, and development over moral theory.
 - c. Discursive practices aimed at cultivating shared moral understandings, not merely consensus.
 - d. Actively promotes a vision of the good.

This understanding of prophetic bioethics corresponds not only with Gustafson's 'prophetic'

category, but also with ‘narrative discourse’ and aspects of ‘ethical discourse’ as well.

Policy/regulatory bioethics seems to be something else altogether.²⁰⁵ Are there nonetheless ‘moments’ where prophetic and regulatory approaches can meet?

b. Prophecy and Policy: Complementary or Incompatible?

The depictions of prophetic bioethics that I have discussed all convey the sense of an activity that stands outside of bioethics—at least in its regulatory mode. Campbell, however, points to the possibility of prophetic bioethics serving both as a critique and a bridge for substantive considerations and modes of thinking to have an impact on the workings of regulatory bioethics. Guyer and Moreno, on the other hand, think this is a grave mistake and that “the confusion between prophetic and regulatory bioethics has led to political controversies that are being exacerbated because the [PCBE’s] defenders and their critics are talking past each other using

²⁰⁵ I should point out that in many ways the prophetic/regulatory distinction is simply the manifestation within bioethics of other fundamental distinctions that have been made at the level of discourse and language—such as Habermas’s split between the moral and the ethical; Rawls’s split between right/good and public reason/comprehensive doctrines; Walzer’s theory of different spheres of moral discourse; Evans/Weber’s formal and substantive rationality and likely more that I am unaware of.

In STS, speculative-prophetic and regulatory bioethics mirrors the distinction Armin Grunwald recently termed ‘exploratory philosophy’ versus ‘practical ethics’; “From Speculative Nanoethics to Explorative Philosophy of Nanotechnology,” *NanoEthics* 4, no. 2 (2010): 91–101. Similarly, a group of scholars working at the crossroads of STS and bioethics echoes Juengst’s division between ‘romantic’ and ‘rational’ modes of discourse (see n.143) and borrowing from philosophy of science links them to the distinction between the ‘context of discovery’ and ‘context of justification.’ They link speculative-prophetic bioethics to Dewey’s idea of ‘dramatic rehearsal’ of future scenarios; Jozef Keulartz et al., “Ethics in Technological Culture: A Programmatic Proposal for a Pragmatist Approach,” *Science, Technology & Human Values* 29, no. 1 (2004): 3–29.

different bioethical dialects.”²⁰⁶ But this would appear to result in a form of public bioethics where “the contributions of religious perspectives were deemed politically important and ethically insignificant.”²⁰⁷ Who is right?

In the next chapter, I explain in detail what I believe to be the appropriate moments for each, and why the two should not overlap. If this sounds like a vote for Guyer and Moreno, it is only because their presentation does not provide enough detail to explain what regulatory bioethics is and where it belongs in the context of public bioethics; nor does it look at the problem of regulatory bioethics venturing into prophetic territory. Once this is clarified, the overall picture becomes one in which we can accommodate two forms of public bioethics that have well-defined functions and boundaries—at which point I think that Campbell’s complaint mostly resolves itself. However, without some understanding of how prophetic and regulatory bioethics ‘talk’ to one another, the problem is not resolved; it is merely relocated. I would like to preempt this portrayal of prophetic and regulatory bioethics as incompatible practices—protagonists in an unproductive dialogue—by turning to a more holistic account of bioethics.

c. Prophecy to Policy: From the Future to the Present and Back Again

I would like to begin by attenuating the magnitude of the shift from prophetic to regulatory discourses. Although Callahan describes the shift, with nostalgia and regret, as a failure of bioethics to retain a critical stance, the move takes on a far less monumental significance when it is

²⁰⁶ Guyer and Moreno, “Slouching Toward Policy,” W17.

²⁰⁷ Campbell, “Prophecy and Policy,” 17.

described as moving from speculative futures to current pressing issues. In Albert Jonsen's history of bioethics the shift to regulation was a matter of moving from theory and speculation to practice.

In the Early 1970s, genetics leapt ahead and ethical questions followed in profusion. These ethical questions were often posed as comprehensive worries: Where is this science leading us? What does it mean for our human future? However, the area of genetic advance that was closest to practice, screening for genetic diseases, lent itself to more precise questions and some practical recommendations.²⁰⁸

History is obviously open to many interpretations. On the one hand, there was a clear need for guidance regarding genetic screening, and this constituted some of the Hastings Center's most important early work. On the other hand, the pragmatic incrementalism of regulatory bioethics does not lend itself to exploring the 'big questions,' and, over time, ignoring them comes to look less like a temporary suspension of those larger questions in the face of the practical, and more like a commitment to a theory of practicality, one that is reflected in regulatory bioethics' interest in incremental regulatory moves, consensus formation, and formally rational considerations. At some point, those asking the big questions and those who are just trying to make sure that no one gets trampled in the course of biomedical progress appear to no longer be speaking the same language.

This is not a question faced only in bioethics. It is a question that fortunate individuals encounter throughout their lives, and one that societies contend with as well.²⁰⁹ In a modern

²⁰⁸ Albert R. Jonsen, *The Birth of Bioethics* (New York: Oxford University Press, 1998), 180.

²⁰⁹ As will become apparent, the following meditation is heavily influenced by Alasdair MacIntyre's narrative/virtue ethics and Judith Andre's application of his approach to understanding bioethics. Alasdair MacIntyre, *After Virtue: A Study in Moral Theory*, 3rd ed. (University of Notre Dame Press, 2007); Judith Andre, *Bioethics as Practice* (Chapel Hill: University of North Carolina Press, 2004).

society where people are relatively free and capable of choosing a course in life commensurate with their conception of the good, there is the enviable challenge born of relative affluence and opportunity to pursue a life in which those goods are maintained as a goal or guiding principle. No one can undertake every single decision by asking how it contributes to that pursuit; many day-to-day decisions are relegated to the realm of the practical, evaluated via a constrained set of guiding principles, shorter term goals, and useful heuristics. The challenge is to live a life in which incremental steps gradually cohere into a larger life story with the narrative arc bending toward the good. One way to do this is by cultivating sensitivity toward the good so that one's everyday choices cohere with the larger story, and so that one can recognize the pivotal points at which a given decision will either decisively move one toward or away from the good or instead require a fundamental reconsideration of one's conception of it.

If we think of bioethics holistically as a collection of practices that are ultimately aimed—as ethics presumably is—toward the good, then prophetic bioethics can be thought of as the set of practices that take a step back from the immediate decisions faced within a clinic, on a review board, or by a public commission, and asks how these isolated questions fit within a larger narrative and cohere with longer-term social goals. To put it another way, it is an attempt to ensure that practical moral inquiry achieves a global rather than local coherence by pursuing a form of reflective practice that looks at the larger picture. Although it sounds a bit grand, in doing so bioethics may help society to do the same when deliberating on the direction and limits of biomedical research and practice.

When a biomedical possibility appears somewhere in the indistinct future isolated from current practical questions it is natural to discuss it as evincing global concerns. The narrative

framework that connects the present with the envisioned future is by its very nature a story of the big picture—where technology has gotten us and where it will take us in the decades to come. But once a future technology appears closer to becoming technically achievable, it begins to appear as a feature of the present. In this liminal period between imagined technological futures and present realities what we see within bioethics is a push toward anticipatory regulation (even among ‘prophetic’ voices) and for practical local considerations to predominate.²¹⁰ For the many reasons I explore in this study, this should be resisted. Once regulatory questions do become appropriate—something that has not yet happened for the vast majority of speculative technologies driving the enhancement discourse—the function of prophetic bioethics, I would argue, is not to insert itself into regulatory processes. It is to maintain a discourse that reminds us which questions have not been answered and cannot be answered by regulation alone. In part, it does this by examining the practice within the global context afforded by envisioning the future. Continually looking from the present to the envisioned future and back toward the present allows us to understand how our current practices fit within a larger narrative so that we can better determine whether we find ourselves on the right track, and perhaps better recognize when we are facing decisions that are potentially pivotal.

d. Prophecy, Activism, and Moral Development

In my description of how the incremental decisions in an individual’s life can contribute to a coherent whole, I highlighted the importance of a disposition to decide and act in a way that

²¹⁰ The most direct argument along these lines is found in Juengst, “Germ-Line Gene Therapy,” 589.

ultimately reflects an understanding of the good. This seems a bit farfetched to ascribe to a multifarious discipline composed of many different individual actors; nonetheless, I will attempt to offer a parallel process within bioethics that can hopefully inform the decisions made within regulatory contexts as well.

The picture of bioethics as a ‘practice’ comes from Judith Andre’s reflective first-person ethnographic exploration of bioethics.²¹¹ Following MacIntyre, Andre describes a practice as “a coherent and complex set of activities, socially constructed. It has distinctive goals and standards of excellence that help make the practice what it is, and that cannot be fully understood apart from it.”²¹² Among the chief goals of bioethics is fostering public debate and focusing public attention in order to “help society think more deeply and act more wisely about matters of health”; therefore, bioethicists “need to ask whether we are making the world better, or dazzling it further into blindness.”²¹³ To this end, Andre explores various individual and communal virtues that bioethicists should strive to instantiate in their character and work. All of these virtues are important and could be brought to bear on the present discussion. For now, I focus on the one most relevant to the question of prophetic and regulatory bioethics.

In Chapter Six of *Bioethics as Practice*, Andre identifies a persistent tension within bioethics between two imperatives: to pursue a scholarly, ideologically-neutral discourse and to bring deeply-held moral values to bear in making a positive impact on the world. Instead of characterizing each

²¹¹ Andre, *Bioethics as Practice*.

²¹² Ibid., 60. I return to MacIntyre in Chapter Seven.

²¹³ Ibid., 76–77.

of these understandings of bioethics' proper role as mapping onto either the prophetic or regulatory aspects of the practice, I would suggest that they operate in both. Within prophetic bioethics, the tension is manifest in the difference between the description given by Guyer and Moreno versus the one offered by Anderlik. Where Anderlik emphasizes the prophetic voice as that of the activist—and criticizes the PCBE for offering only milquetoast societal critiques and ignoring issues of social justice, Guyer and Moreno's prophet is supposed to take up deep philosophical concerns, but be disengaged from policymaking.

Regulatory bioethics is likewise conflicted. However, in its case, the question is not whether it is supposed to have a practical impact—it is after all concerned with public policy—but whether it should do so via processes that are more-or-less divorced from deep moral and religious commitments—often perceived as ideological—or those which embrace them. This tension is evident in Campbell's call for prophetic voices to be involved in and inform the workings of national bioethics commissions. He argues that these voices, although they were called upon to take part in NBAC's hearings, had to translate substantive theological insight into a neutral language of public reason.

When the religious thinker is invited to participate in a public policy forum he or she must somehow translate these substantive norms and narratives into a discourse that is both accessible to those outside the tradition and faithful to the content and meaning of his or her tradition. Not surprisingly, some content and some meaning gets "lost in the translation."²¹⁴

The resolution to these tensions, richly drawn-out by Andre, lies in embracing "moral development" as a primary goal for bioethicists individually and for the bioethics community

²¹⁴ Campbell, "Prophecy and Policy," 16.

collectively. In far more detail than I can provide here, Andre describes as a process of refining one's capacities for moral sensitivity and perception, as well as a disposition to act to actualize one's understanding of the good. Andre situates this latter disposition *within* the process of working toward, and helping to elicit in others, deeper forms of moral understanding and perception. This is contrasted with the methods of the activist who looks to achieve the good through any political or rhetorical means necessary. But even if moral development will dispose us to making better decisions, how does a process that seems to be very comfortable in the prophetic mode translate into the regulatory domain? One possibility is that bioethicists engaging in both kinds of practices will make better decisions even within the confines of regulatory processes. Ideally, this would be the case, but, as we have seen, bioethicists who work in different modes often speak past one another.

Elsewhere, Andre describes how such a process of achieving growth in “first-order moral perception” requires “second-order moral perception,” the ability to see and understand one's audience or interlocutor as possessing their own perception of the moral landscape and to respect that perception.²¹⁵ It is only through the latter that one can foster the former. This suggests that in the encounter between the prophetic and the regulatory, second-order moral perception is necessary.

Second-order moral perception applied to the encounter between regulatory and prophetic approaches requires that those coming from the prophetic mode appreciate the moral landscape as

²¹⁵ Judith Andre, “Learning to Listen: Second-Order Moral Perception and the Work of Bioethics,” in *The Ethics of Bioethics: Mapping the Moral Landscape*, ed. Lisa A. Eckenwiler and Felicia G. Cohn (Baltimore: The Johns Hopkins University Press, 2007), 220–228.

viewed from the regulatory perspective. This involves not only appreciating that certain mid-level moral considerations are most salient in policy discourses, but understanding why. Much of the history of bioethics can be read as an attempt to frame moral concerns in a language that reflects values we can all be assumed to share to some degree within the framework of political liberalism. Beyond historical context, second-order moral perception requires understanding the vantage point of regulatory process as being necessarily limited by narrowly-defined goals and relatively short-term timeframe commensurate with the incremental approach appropriate for public policymaking.²¹⁶ In this encounter, things *will* get lost in translation, and very global concerns will not find a home. Nonetheless, there is room to offer context that reframes questions, and to broaden the conceptions of benefit, harm, autonomy, and justice by showing how they are open to other interpretations, emerging from different modes of thought and within particular communities.

Since the regulatory role is an ongoing process of monitoring and regulating biomedicine, and biomedical science has a very basic and necessary understanding of itself as an open-ended progressive enterprise, it will be difficult to get people to listen when the word ‘stop’ is invoked. But people will listen if asked that we clarify what we mean by progress, where things look to be going, and why we want to get there. Campbell, by dropping a necessity (but not possibility) for “denunciation and critique” from prophetic bioethics likewise signals that, within the practice of bioethics, the voices that are fundamentally averse to technology are unlikely to be heard. This explains why *Beyond Therapy* was written with gentle skepticism and concerned hesitation and not

²¹⁶ I explain this in detail in the next chapter.

as a Jeremiad. While serving in a quasi-regulatory capacity leading the PCBE, Kass, like Callahan many years before, left behind anti-technology theorists such as Jacques Ellul and Louis Mumford,²¹⁷ and in doing so implicitly identified himself as operating within the practice of mainstream bioethics.²¹⁸

For similar reasons, prophetic bioethics, although sometimes highly critical of aspects of the field, remains distinct from much of the parallel discourse within STS and critical theory of technology. Although there is much insightful and relevant work by theorists outside of bioethics, there are good reasons why prophetic bioethics, even in its most critical moments, stands apart. Critiques of bioethics as merely an ethical rubber stamp that allows biomedicine to proceed unimpeded are not without merit—Callahan himself complained that bioethics had become a handmaiden of medical science and its ethical guidance often amounted to little more than “tell us what you want to do, and we’ll tell you how to do it ethically.”²¹⁹ But unlike the prophetic critique, scholars who look at bioethics from the outside often proceed by taking bioethics apart without putting it back together as a coherent set of overlapping and complementary practices.

²¹⁷ M. L. Tina Stevens, *Bioethics in America: Origins and Cultural Politics* (Baltimore: Johns Hopkins University Press, 2000), 70–71.

²¹⁸ An article written by Kass after leaving the PCBE shows a marked retreat from that position: Leon R. Kass, “Forbidding Science: Some Beginning Reflections,” *Science and Engineering Ethics* 15, no. 3 (2009): 271–282.

²¹⁹ The quote was apparently part of the original address that Callahan’s “Why America Accepted Bioethics” article was condensed from. See Stevens, *Bioethics in America*, 66.

IV. Closing Thoughts: The Varieties of Prophetic Speculation

The biblical prophets were not just the bearers of a critique of the here and now attempting to provoke society into redeeming itself; at times, they offered a vision of the eschaton—the inevitable period at the end of time when the world is redeemed by God alone. (In such visions God not only overcomes human evil in redeeming the world, He overcomes and transforms nature itself). Loosely, these two forms of prophecy—more than the simple utopian/dystopian dichotomy—correspond to two speculative streams within current bioethics. The first may invoke the future, but the intent is to understand and transform the present. The latter, seeing the future as inevitable and out of our hands, places it outside of history and beyond human agency; the job for bioethics—like that of the millenarian—is only to prepare for its coming. Taken to its extreme, such is the effect of reifying the possible technological future. Doubtless it is a vision of the future, but it is one that, without quite realizing it, has severed the present from the future, while allowing an image of the future to dictate the terms of the discussion.

Common to all the explicit depictions of prophetic bioethics I have explored is the understanding that regardless of whether one is engaging in speculative explorations, the ultimate goal is always to understand and reflect on the present, not to grab hold of the future before it arrives. When regulatory bioethics veers into the speculative, it goes wrong in several ways. In the genetic justice example I looked at, its methods and assumptions no longer make sense and it therefore does not contribute to our understanding of the future or offer guidance for the present. At the same time, it presents us with a vision of the future as inevitable. When the future is set and offers solutions to current problems, then by dint of its inevitability it prejudices where society ought to devote resources and takes priority over alternatives—even those that address immediate

needs much more directly. It is one thing to argue for a particular vision of the future as a means of achieving better and more fulfilling lives or a more just society, but those are not the kind of arguments made explicit in most regulatory explorations of the possible future.

So long as we cannot accurately predict the future, the claim or implication of technological inevitability will remain a normative claim hidden in a descriptive shell. Most authors understand that they ought not play the caricatured role of the technological futurist, to the extent that they usually include enough hedges and caveats to wiggle out of any imputation that they are gullible transmitters of technological imaginaries. However, it is in the very activity of responding to the challenges that may arise in the future as problems that need to be addressed now—much more than any explicit prediction—that shortcuts the discussion.

The exploration of future technologies as the potential source of moral concern or social problems (or solutions) seldom amounts to a purely hypothetical ‘if, then’ proposition. The prediction or vision itself is contained within and emerges from the present.²²⁰ Approached from a prophetic standpoint, this image can become the locus of constructive reflection. But when it is treated as the actual future begging for advance regulatory guidance, the resulting analysis will in all likelihood prove to be so inadequate, overly general, and off the mark as to be useless in the future. More problematically, treating the imagined future as a neutral given reinforces the value goals implicit in its construction. These goals are precisely what bioethics should strive to make explicit and open up to discussion.

Does regulatory bioethics have nothing constructive to say about the future? Intuitively,

²²⁰ Nordmann, “A Forensics of Wishing,” 13.

predictions that are believed to be highly accurate in the near-term appear as worthwhile subjects for future-oriented research and regulatory guidance. As appealing as this seems, I contend in the next chapter that the benefits are not nearly as obvious or as far-reaching as one might think.

CHAPTER FIVE – THE FUTURE IS WHAT WE MAKE OF IT:

ANTICIPATORY ETHICS AND PUBLIC POLICY

Trial and error cannot substitute for theoretical prediction. Theory is impotent and we cannot learn from experience and experiments. Consequently, political choices are made under conditions of radical cognitive indeterminacy.

– Jon Elster, *Solomonic Judgements* (1989)

I. Introduction: Carts and Horses

Bioethical discussions are often driven by what Howard Brody has lightheartedly called the ‘Hastings Mantra’: the imperative that bioethicists explore the future before science and technology gets us there, so that the ‘cart’ of adopting some looming technology does not precede the ‘horse’ of due ethical consideration.²²¹ This sounds like an arrangement one would expect to work well; new technologies are perpetually just around the corner, and it would be prudent to get a grip on the ethical issues they engender in the hope of fostering a well-informed public discourse and producing regulatory policies informed by moral deliberation. We can surely point to technologies that we wish had never been pursued at all, or at least better regulated from the start. Why then be merely reactive when we have the ability to take on the future proactively?

In this chapter, I step back from the prophetic/regulatory distinction and take up the claim that there is a clear benefit gained from engaging in speculative bioethics generally. What are these potential benefits and what is the likelihood that speculative bioethics could actually provide

²²¹ Brody, *The Future of Bioethics*, 193. Brody avers—and I certainly concur—that this should not be taken as a description of the attitudes at the Hastings Center today.

them? Undoubtedly there is an intuitive attraction to taking up speculative questions in bioethics, but it remains to be shown that doing so is beneficial or could plausibly be claimed to achieve any well-defined goals. However, my focus in this chapter is not exclusively centered on highly speculative future technologies. I broaden the scope to include discussions of new technologies that we have good reason to expect to be in use in the near-term. If we have trouble identifying the value in bioethical investigations of soon-to-be-available technologies, *a fortiori* we should have misgivings when the discussions become more speculative. I begin with the case of the largest single bioethics funding initiative in history to see whether this investment of money and intellectual capital can be shown to have produced tangible social benefits.

a. The Human Genome Project and the ELSI Program

As a test case where we would expect to see a significant benefit from future-oriented bioethics we can look to the National Human Genome Research Institute's (NHGRI) Ethical, Legal and Social Implications (ELSI) research program.²²² Begun in 1990, supposedly as the sole initiative of James Watson,²²³ this funding initiative was part of the Human Genome Project (HGP) nearly from its inception, directing three to five percent of the HGP's annual budget toward ELSI research,

²²² The Human Genome Project was jointly funded by the United States Department of Energy (DOE) and the National Institutes of Health (NIH). The project was run by NIH's National Center for Human Genome Research (NCHGR). The name of the center was changed in 1997 to NHGRI. The HGP was completed in 2003 but genomics and ELSI research continued to be funded by NHGRI.

²²³ Robert Cook-Deegan, *The Gene Wars: Science, Politics, and the Human Genome* (New York: Norton, 1994), 237.

amounting to about 162 million dollars between 1991 and 2003.²²⁴ The ELSI program provided an unprecedented source of funding for bioethics research on the implications of expected developments stemming from rapid advances in genetics and genomics.²²⁵ As described at the project's outset by its director, Eric Juengst, the purpose of the initiative was to "anticipate the social consequences of the project's research and to develop policies to guide the use of the knowledge it produces."²²⁶

Juengst's description of the project's goals specified three areas of inquiry: "integration of new genetic tests into medical practice", "educating and counseling individuals about genetic test results", and "access to, and use of, genetic test results by third parties, including insurance providers, researchers, and employers."²²⁷ ELSI's goals were rethought somewhat, as can be seen in the description given eight years later by Francis S. Collins, the director of NHGRI: ELSI "focused on four high-priority areas: the use and interpretation of genetic information, clinical integration of genetic technology, issues surrounding genetics research, and public and professional education about these issues."²²⁸ What is stressed in this later description is that aside from policy research the ELSI program was supposed to aid the public in understanding the

²²⁴ Bennett and Sarewitz, "Too Little, Too Late?," 317.

²²⁵ What it did not do, unsurprisingly, is explore whether the HGP was a good idea at all, or establish mechanisms by which the products of ELSI research would influence the direction of the HGP and its subsidiary endeavors. See *ibid.*, 319.

²²⁶ Eric T. Juengst, "The Human Genome Project and Bioethics," *Kennedy Institute of Ethics Journal* 1, no. 1 (1991): 71.

²²⁷ *Ibid.*, 72-73.

²²⁸ Francis S. Collins, "Medical and Societal Consequences of the Human Genome Project," *New England Journal of Medicine* 341, no. 1 (1999): 28-37.

nature of the HGP and the variety of ethical, legal, and social issues it would generate. In other words, explaining the anticipated ‘ELSI’ of the HGP to the public became part of the mission of ELSI itself. If we add this educational component to Juengst’s description then the program, if successful, would have accomplished the following: (a) accurately predicting the technological developments made possible by the HGP; (b) anticipating the clinical and social consequences of these technologies; (c) developing regulatory policies to mediate these social effects; and (d) adequately educating the public regarding the technologies and social consequences. To these, we could add that achieving this last goal hopefully would have promoted a more fruitful public discourse that would in turn inform discussions of public policy, but there is little indication that the ELSI program incorporated any mechanisms by which this kind of interaction between the larger public and policy-makers would have been facilitated.²²⁹

b. Was the ELSI Program Successful?

Did the ELSI program accomplish these goals? One way to answer this question is simply to look at the accuracy of the predictions made by ELSI researchers, the policies they developed (and whether they were implemented), and the degree to which the public was well-informed about the HGP and its likely consequences. Evaluated in this manner, ELSI’s successes are mixed at best. Many prominent figures predicted that completing the HGP would significantly enhance

²²⁹ Notably absent from these goals was the idea that the ELSI program should influence the direction of the technologies developed via the HGP. As is often the case in regulatory bioethics, the course of technological development is thought of as an autonomous given that is beyond the reach of the bioethical discourse itself.

healthcare within a decade.²³⁰ The public was not only under the impression that genomic medicine was around the corner, but that firm genetic bases would be found for everything from heart disease to intelligence and sexual orientation.²³¹ As far as policy development, only a few federal policies emerged directly from ELSI's work. It was not until 2008 that federal legislation addressed some of the privacy concerns raised by the collection and use of genetic information. The Genetic Information Nondiscrimination Act was signed into law fifteen years after the 1993 completion of the ELSI report on Privacy and Insurance,²³² and thirteen years after three notable bioethicists, funded by ELSI, completed work on draft legislation.²³³ In a paper commissioned for NBAC's report on cloning, Robert Cook-Deegan noted that "The Ethical, Legal and Social Implications Working Group of the NIH and DOE was successful in helping launch a research program, but had minimal success in its policy forays—with scant publication and no systematic information gathering, report writing, document review, or other features associated with credible policy analysis."²³⁴ Still, it is possible that the public was better informed than it would have been

²³⁰ Collins, "Medical and Societal Consequences of the Human Genome Project."

²³¹ Nelkin and Lindee, *The DNA Mystique*, 199–205; Alan Stockdale and Sharon F. Terry, "Advocacy Groups and the New Genetics," in *The Double-Edged Helix: Social Implications of Genetics in a Diverse Society*, ed. Joseph S. Alper et al. (Baltimore: Johns Hopkins University Press, 2002), 80–101.

²³² NIH-DOE ELSI Working Group, *Task Force Report on Genetic Information and Insurance* Accessed April 14, 2013.

<http://www.genome.gov/Pages/ELSI/TaskForceReportGeneticInfo1993.pdf>.

²³³ George J. Annas, Leonard H. Glantz, and Patricia Roche, *Genetic Privacy Act and Commentary* (Boston, February 28, 1995).

²³⁴ Robert Cook-Deegan, *Cloning Human Beings: Do Research Moratoria Work?* (Rockville, MD: National Bioethics Advisory Commission, June 1997).

sans the ELSI program, and ELSI research surely contributed to the development of public policies, even if the path from research to legislation was undeniably long and circuitous.²³⁵

However, rather than focusing on particular goals and accomplishments of the ELSI program, perhaps we can evaluate its overall effectiveness more broadly via a simple thought experiment. Suppose that the HGP, instead of the being a very public endeavor with a small slice of its massive budget going to ELSI research, had been a secretive government project. Then, in 2000, with little forewarning, the head of the NIH held a press conference and shocked the world with the announcement that the first draft of the human genome had been completed. What would have been the result? It would have been all over the news. Talking heads would have opined about privacy concerns and unlocking the secrets of creation. Well-known bioethicists would have appeared on various media outlets every day. Medical scientists would have predicted that they would soon be able to cure a vastly greater number of diseases, with many other breakthroughs on the horizon. Along with the great excitement there would surely have been a good deal of public misunderstanding about what it all meant. Meanwhile, the admittedly smaller number of bioethicists who were already writing about genetic testing and screening, privacy and determinism, and various regulatory issues would have raise their hands and said, “wait, don’t panic, we’ve already thought this stuff through.”

How does this counterfactual history differ from what actually occurred? On the one hand much insightful ELSI research was not conducted, and fewer bioethicists had paying jobs. On the

²³⁵ By 1993 criticism was already mounting that ELSI was ineffectual due to a profound lack of regulatory clout; Leslie Roberts, “Capital Report: Whither the ELSI Program?,” *The Hastings Center Report* 23, no. 6 (1993): 5. I discuss this problem in section III below.

other hand, ten years of public misunderstanding and inflated expectations might have been compressed into two or three. Or things might have been much worse and the sudden announcement might have triggered an unprecedented public frenzy leading to an increased mistrust of science, and unwise knee-jerk policy decisions. Either way, the point of this exercise is to show that in the realm of future-oriented bioethics, even when looking at the development and adoption of biotechnologies expected in the near term, it is difficult retrospectively (let alone prospectively) to identify clearly the indispensable benefits of this kind of research agenda—even when talking about the largest single source of funding for bioethics research in history.

Perhaps a forward-looking bioethical discourse cannot prove its utility when the standard demanded is too rigorous. Demonstrating the efficacy of something like the ELSI program by way of the counterfactual I offered is simply not possible. But even when described more modestly, the practical goals of a forward-looking bioethical policy discourse may be unattainable and the benefits may be offset by the downsides inherent to the project.

c. Direct-to-Consumer Genotyping: A Test Case

Take for example a very basic and accurate near-term prediction that was the focus of much ELSI work: research and technological developments directly and indirectly resulting from the HGP were to soon make it possible and increasingly affordable to obtain a large amount of genetic information about an individual. Aside from targeted diagnostic uses, given the low cost, healthy individuals might also seek to be genotyped. Some of this information might be useful for learning about one's genealogy and ethnic origins. Occasionally, the information might very clearly indicate a medical condition that is still asymptomatic but could be treated early or prophylactically. Most

often, however, the information would only indicate weak risk factors for developing various diseases in the future (and not necessarily only the genetic contribution to the overall risk, as correlative research is not always able to isolate genetic from ubiquitous environmental factors). Among the primary concerns explored in ELSI research about obtaining such information is that it does not constitute a firm basis for any kind of health intervention and therefore needlessly worries patients.²³⁶

This prediction has now come to fruition: DNA microarray technologies can very quickly and at low cost provide a snapshot of an individual's genotype based on thousands of allelic variants. Given the amount of anticipatory bioethical discussions over the past twenty years, one might think that policies for regulating the uses of such technologies are in place—or at least on the shelf ready to be implemented—to deal with this eventuality. But this is not the case. Despite the fact that a considerable amount of ELSI research looked at the advisability of obtaining genetic information that was predictive but offered little immediate therapeutic potential, only once companies began to offer direct-to-consumer genotyping did this issue take the form of a very pressing practical question which demanded a regulatory response. Searching the bioethics literature shows that there was very little discussion of the direct-to-consumer (DTC) potential before companies started marketing such tests in 2007. With the benefit of hindsight, this appears as a blatant oversight, given that DTC genetic testing was a fairly direct application of the

²³⁶ A related and potentially more problematic use of the technology is in preimplantation or prenatal screening, but such applications are still relatively rare.

technologies and data generated by the HGP, and related projects such as HapMap.²³⁷

Nonetheless, the ELSI program did not lead the United States federal government to develop policies to regulate DTC testing proactively,²³⁸ and even today the applicability of existing policies remains unclear.²³⁹

The lesson from this seeming regulatory failure is that even when a truly novel technology exists in an early form and there is a clear path to developing it further, there will inevitably be significant gaps between anticipatory discussions of regulatory policies and those that address actual current applications once the technology has matured to the point of widespread usage. These gaps can render the former significantly less useful than was originally supposed. Although the failure to regulate DTC testing preemptively can always be attributed to bureaucratic dithering, this in itself was not happenstance; it reflects a limitation intrinsic to speculative public regulatory bioethics in particular and predictive discussions of new technology more generally.

In order to see why this is the case, we need to understand the putative goals driving the anticipatory discourse forward. The assumption that appears to be shared by bioethicists is that speculative bioethics is not intended merely as a theoretical exercise of no practical import—but

²³⁷ “The International HapMap Project is a multi-country effort to identify and catalog genetic similarities and differences in human beings. Using the information in the HapMap, researchers will be able to find genes that affect health, disease, and individual responses to medications and environmental factors.” National Institutes of Health, “About the HapMap.” Accessed March 13, 2013. <http://hapmap.ncbi.nlm.nih.gov/thehapmap.html.en>.

²³⁸ I give a brief history of government oversight efforts below (n.245).

²³⁹ Dan Vorhaus, Daniel MacArthur, and Luke Jostins, “DTC Genetic Testing and the FDA: Is There an End in Sight to the Regulatory Uncertainty?,” *Genomes Unzipped*. Accessed March 13, 2013. <http://www.genomesunzipped.org/2011/06/dtc-genetic-testing-and-the-fda-is-there-an-end-in-sight-to-the-regulatory-uncertainty.php>.

this leaves open a range of possible practical benefits. I therefore proceed stepwise from more ambitious goals for forward-looking explorations of bioethical issues to more modest ones. In so doing, I hope to identify the benefits that we can realistically expect from speculative bioethics.

II. Plausible Goals and Putative Benefits

a. Controlling the Future

In the regulatory mode, the benefits of bioethical discourses concerning new and emerging technologies are noticeable when they take the form of an ongoing exploration of technologies and practices as they are developed and deployed. In so doing, regulatory bioethics could be said, at least in principle, to be exerting control over the uses of existing technologies. This might be done directly by governmental and institutional regulatory bodies, or indirectly by way of the diffuse effects of the discourse itself. If control is legitimately within the purview of regulatory bioethics, then focusing solely on the present or near-term might be seen as inadequate. New biotechnologies more distant on the horizon have the potential to change society profoundly, so we ought to be concerned about those changes and proactively try to anticipate and control them. Writing about the need for “Better Ethics for Emerging Technologies” James H. Moor warns that:

At the very least we need to do more to be more proactive and less reactive in doing ethics. We need to learn about the technology as it is developing and to project and assess possible consequences of its various applications. Only if we see the potential revolutions coming, will we be motivated and prepared to decide which technologies to adopt and how to use them. Otherwise, we leave ourselves

vulnerable to a tsunami of technological change.²⁴⁰

How frightful. If we merely react to the effects of new technologies when they occur, then the degree of control possible—along with ability to forestall the most problematic social consequences—will be significantly lessened. Is control not therefore a legitimate and beneficial goal for at least some aspects of speculative bioethics? Particularly when the alternative is facing the deluge of technological change unprepared?

Unfortunately the desire to exert this kind of control, however understandable, is in all likelihood a foundational pipe-dream of the anticipatory regulatory ethics of emerging technologies. As formulated, it exceeds our ability to accurately predict the very kinds of social changes we would like to keep under control. This is the central problem of the field of technology assessment (TA), known as the Collingridge dilemma:

The social consequences of a technology cannot be predicted early in the life of the technology. By the time undesirable consequences are discovered, however, the technology is often so much part of the whole economics and social fabric that its control is extremely difficult. This is the dilemma of control. When change is easy, the need for it cannot be foreseen; when the need for change is apparent, change has become expensive, difficult and time consuming.”²⁴¹

Collingridge’s eponymous dilemma explains why we ought not be surprised that bioethics cannot point to any big saves where it prevented the development of a technology we would be better off without, or where it identified a significant pitfall with a technology under development that was

²⁴⁰ James Moor, “Why We Need Better Ethics for Emerging Technologies,” *Ethics and Information Technology* 7, no. 3 (2005): 119. Exactly why Moor thinks that we needed to be *more* proactive given the overall state of the discourse on genomic technologies and then nanotechnology is utterly beyond me. But my guess is that bravely calling for “better ethics” is an attempt at sagaciousness in what is really quite an insipid article.

²⁴¹ David Collingridge, *The Social Control of Technology* (New York: St. Martin’s Press, 1980), 11.

thereby avoided.²⁴² And this is true not only for distant technological developments that are themselves nearly impossible to accurately foretell, but even for those technologies that we can be relatively confident of achieving.²⁴³

Although not as potentially disruptive as something like human genetic engineering, DTC genetic testing appears to be a case where the context in which genotyping would first become pervasive was unanticipated—or simply set to the side because it seemed so obvious that we would never allow unmediated access to advanced genomic technologies. Most of the ELSI research addressed the issue of genomic information arising in a clinical setting; the mandate for the ELSI Working Group’s Task Force on Genetic Testing established in 1995 was to “to ensure the smooth integration of genetic testing into *medical practice*.”²⁴⁴ This initial orientation determined the scope of negative consequences and regulatory responses under consideration. Much of the discussion was also informed by empirical research and experience with the limited kinds of genetic tests then available, including carrier screening for targeted populations, prenatal testing for a handful of chromosomal anomalies, and genetic tests for specific inherited conditions such as Huntington’s disease, early-onset Alzheimer’s, and predisposition to types of breast cancer. No one

²⁴² Similarly, Howard Brody asks rhetorically of the consequences of ignoring the ‘Hastings Mantra’: “or else what?” Brody, *The Future of Bioethics*, 193.

²⁴³ There are a number of responses to Collingridge’s dilemma (including his own approach) that attempt to create a framework for technology assessment that explicitly takes into account these limitations on knowledge and power (See Nordmann, “A Forensics of Wishing”; Wolfgang Liebert and Jan C. Schmidt, “Collingridge’s Dilemma and Technoscience,” *Poiesis & Praxis* 7, no. 1–2 (March 24, 2010): 55–71; Cynthia Selin, “Negotiating Plausibility: Intervening in the Future of Nanotechnology,” *Science and Engineering Ethics* 17, no. 4 (2011): 723–737.

²⁴⁴ My emphasis; NIH-DOE ELSI Working Group, “Genetic Testing Task Force.”

at the time was offering the massively-parallel ‘fishing expedition’ genotyping now available as a low-cost DTC service. To the extent that it was being done, it was rather expensive and limited to well-funded research studies. In many cases, the human subject protection protocols called for genetic risk information not to be disclosed to participants except in rare cases where a serious condition with clinical significance was discovered. In short, DTC genotyping was scarcely on the radar.²⁴⁵

²⁴⁵ The final report of the ELSI Working Group’s Genetic Testing Task Force “Promoting Safe and Effective Genetic Testing in the United States” (<http://www.genome.gov/10001733>), issued in 1997, barely touches on DTC advertising and marketing. It discourages “*advertising or marketing* of predictive genetic tests to the public” (my emphasis) just as nearly every bioethics body has discouraged the direct advertising and marketing of pharmaceuticals to the public. But the report is essentially blind to the possibility that companies would sell testing services and provide results to the public in manner that would altogether bypass the mediation of health care professionals.

The primary direct result of the task force was the establishment, by its recommendation, of the (health and human services) Secretary’s Advisory Committee on Genetic Testing (SACGT). SACGT’s charter expired in 2002, several years before DTC testing became a problem and was succeeded by the Secretary’s Advisory Committee on Genetics, Health, and Society (SACGHS) from 2002-2011. SACGHS issued letters regarding DTC testing to the secretary of HHS in 2004 and 2006 and a report in 2010. None of this (along with reports by the Government Accountability Office and Federal Trade Commission) resulted in decisive regulatory action.* Without a standing advisory committee devoted to genetic testing, the issue of DTC testing fell under the auspices of the FDA’s Medical and Clinical Genetics Panel of the Medical Devices Advisory Committee. The panel held its first meeting on DTC testing in March 2011 and the second is (apparently) scheduled for September 2013. This is markedly fewer than the thirteen meetings held by SACGT between June 1999 and May 2002 alone.

*On Nov. 22, 2013, the FDA finally sent a letter to 23andMe (among other DTC genetics companies) warning them that they were marketing medical tests without clearance or approval (<http://www.fda.gov/ICECI/EnforcementActions/WarningLetters/2013/ucm376296.htm>). Considering that hundreds of thousands of individuals have already been genotyped, the future of DTC testing remains both clear (it is not going away) and murky (a regulatory path appropriate for DTC testing has yet to be put forth by the FDA).

Had it been anticipated that high-tech startup-type companies, piggybacking on billions of dollars of publicly-funded research, would jump the gun and introduce this kind of product before it was even in widespread clinical use, it might have been fairly simple for the FDA to restrict it preemptively with few objections and limited complications. This would have made it more difficult for companies developing at-home tests to attract capital, considerably delaying the introduction of DTC genotyping. That period, now past, would have been the early stage during which regulatory efforts are relatively easy. Now that the technology is widely available and inexpensive (until it suspended new testing after an FDA warning, 23andMe.com was offering its genotyping service for ninety-nine dollars) regulation has become significantly more difficult, and we are not even close to the stage at which DTC genotyping has become “part of the whole economics and social fabric.”

If DTC genetic testing is not yet at that stage, then why is it nonetheless so hard to regulate? Leaving aside simple bureaucratic inertia, there are a number of relevant factors. First let’s return to the Collingridge dilemma, here restated in slightly different terms:

Attempting to control a technology is difficult, and not rarely impossible, because during its early stages, when it can be controlled, not enough can be known about its harmful social consequences to warrant controlling its development; but by the time these consequences are apparent, control has become costly and slow.²⁴⁶

Even before a technology such as DTC genotyping has become an embedded part of the social world, it can be slow and costly to regulate. First, there is obviously considerable resistance from those parties who have a financial interest in allowing DTC testing to flourish unimpeded, giving

²⁴⁶ Collingridge, *The Social Control of Technology*, 19.

regulatory agencies less of a free hand to impose restrictions. But there is a more fundamental challenge to justifying regulation: once a technology is in use and is not demonstrably harmful, the threshold that must be cleared in order to justify imposing restrictive regulations is much higher compared to what it would have been when the technology was being evaluated prospectively.

Once a technology is in use, we usually want to see evidence that there really are significant undesirable effects. These effects will in turn not become clear until the technology has been in wide use. In the case of DTC genotyping, the larger social consequences and potential undesirable effects of this extra-clinical application of genomic technologies are largely unknown. Even when the effects become better understood, it is quite conceivable that what is now thought of as problematic and undesirable (e.g., learning one's genetic risk profile for late-onset conditions without being able to do much about it) will have become an everyday expected part of life akin to knowing one's blood pressure and cholesterol levels.

So why can a forward-looking regulatory agency not simply devise and implement regulations of the kind that ELSI research contributed to? Although prior to deployment one can justify restricting a technology based on any number of projected potential negative outcomes—even those which could hardly be considered outright harms to individuals (and surely swabbing one's cheek is in itself not harmful) at this stage translating these considerations into enactable policies will be difficult. When the regulation is controversial, the main impediment will be an inability to form a regulatory consensus—why turn pragmatic in an attempt to find a workable middle-ground when there is no pressing need to? Even if the regulation is relatively uncontroversial, there is often a lack of political will. Absent the kind of public spectacle that drives much of what could be described as bioethics in the public eye, why go through the trouble

of enacting a law or putting a policy into place that has little or no current application?²⁴⁷ It seems that, at least in regard to DTC genotyping, an ongoing interplay between the technology's social uptake, corporate and professional interests, various regulatory bodies, and public discussions (including many under the heading of bioethics)—not prospective ELSI research—will ultimately determine the regulatory landscape.²⁴⁸

To the extent that control of the future is the motivation driving speculative bioethics, it has applied itself to a task at which it is mostly incapable of succeeding. However, perhaps this is uncharitable toward forward-looking regulatory bioethics, for even if control is impossible it offers other benefits.

b. Preparing for the Future

If the direct control of a future technology's social impact is not possible, perhaps speculative bioethics can accomplish some of the same ends in an indirect manner. For example, raising the public's consciousness regarding specific ethical issues before some particular technology is adopted might noticeably change the course of its social reception and impact in a beneficial way—so that at least “when an issue reaches the public marketplace, it won't be greeted with hysteria.”²⁴⁹ We cannot control the future, but perhaps we can prepare for it. This appears to be a modest, reasonable goal for a speculative discourse. In an otherwise highly critical article,

²⁴⁷ See the discussion of cloning in the next section.

²⁴⁸ See, e.g., James P. Evans and Robert C. Green, “Direct to Consumer Genetic Testing: Avoiding a Culture War,” *Genetics in Medicine* 11, no. 8 (2009): 568–569.

²⁴⁹ Willard Gaylin quoted in Gene I Maeroff, “The Hastings Center—a Cool Look at Hot Issues,” *Change* 11, no. 1 (February 1979): 12–13; cited in Stevens, *Bioethics in America*, 71.

sociologist Adam Hedgecoe describes this type of advance preparation as a legitimate function of bioethics:

The first role for bioethics concerns what we might call ethical ‘horizon- scanning’: the identification and elucidation of possible ethical issues associated with new technologies. As Magrit Sutrop notes in a guest editorial for the journal *Bioethics*, “ethicists have an important job in identifying potential problems before they will actually emerge in reality.” The aim here is to prepare society for newly developed and developing technologies and the challenges they bring. This slightly speculative aspect to bioethics has a long tradition, evolving out of bioethics’ origins in concerns raised by new technologies in the 1960s.²⁵⁰

After noting some objections to speculative bioethics, Hedgecoe opines that “despite these cautions, a key role for bioethics remains the identification and exploration of the ethical problems raised by new and emerging technologies, such as human cloning, stem cell research and nanotechnology.”²⁵¹

Although he implies that this ‘key role’ offers some benefits, Hedgecoe does not explain what they are—presumably because being prepared for the future is self-evidently sensible. And it does seem to make sense that exploring the oft described ‘promises and perils’ of future technologies and thinking things through in advance is a good idea. Yet even if that were true, it does not sufficiently explain why bioethics as a field of study and professional discipline needs to be involved. Bioethics is not creating the discourse on future technologies. Without the involvement of bioethics, the technological expectations that drive biomedical research would still be the subject of articles in the popular media, inspire speculative fiction and cinema, and garner

²⁵⁰ Adam Hedgecoe, “Bioethics and the Reinforcement of Socio-Technical Expectations,” *Social Studies of Science* 40, no. 2 (2010): 165.

²⁵¹ Ibid.

the attention of sociologists, philosophers, pundits, and assorted cranks. I am asking, more specifically, why bioethicists who have contributed considerably to the literature on end-of-life care, public health, the patient-clinician relationship, genetic screening, etc., think they are doing something of commensurate value when they turn their attention to future technologies. There is an unexamined elision between research in the regulatory mode that prepares for a mass pandemic or calculates the potential harm versus benefits of researchers genetically modifying viruses to simulate a highly virulent new wild strain, and regulatory bioethics that supposedly ‘prepares’ us for an era in which we can choose to have children who are stronger, smarter, and live much longer lives.

I previously cited human reproductive cloning as an example of an issue where earlier speculative discussions within bioethics made no appreciable difference in the public reaction to the news of successful mammalian cloning. It is worth revisiting cloning because many of the bioethicists who put a good deal of stock in the importance of speculative discussions see it as an example of bioethics not having adequately prepared the public. The commonsense idea, that it is important to prepare for future technologies by resolving ethical issues in advance, results in the bioethics folk wisdom that the human cloning controversy was a public failure it could have avoided. But this simply does not hold up to scrutiny. Not only was the issue discussed in speculative bioethics at its very earliest stages, human cloning had already been the subject of various regulatory interventions.

Paradoxically, despite the enormous global outcry that followed the announcement of the birth of Dolly, neither research in cloning nor its regulation was anything new. Dolly’s emergence was the result of several decades of research that, unlike her appearance, raised little media interest. Similarly, in many countries human cloning was already prohibited and several international institutions, such as the European

Parliament, the Council of Europe and the World Health Organization (WHO), had made statements against human cloning dating back to the middle of the 1980s.²⁵²

Agar's puzzling claim that if "prior to 1997 there had been a wide debate about human cloning, with contributions from representatives of many different moral traditions," things might have turned out differently simply does not match the historical record, and only makes sense if one interprets "wide debate" to mean one that garnered a huge amount of attention even among the general public, and reads "prior to 1997" to mean rather shortly before that time. But even the claim that had cloning been a central topic of bioethics and wide public attention shortly before the announcement of Dolly's existence the public would have been spared from unnecessary frenzy and moral consternation is dubious given how unlikely it is that such consensus is possible regarding a technological possibility that has not become a reality.

The DTC testing example shows that raising public consciousness in some abstract manner in order to effect the smooth adoption of future technology is often difficult if not futile. Aside from funding research, the ELSI project devoted considerable resources to projects intended to help educate the public about the meaning and significance of the coming genetic revolution. However, this was attempted during a period when very few people had access to genetic information of any kind. It is hard enough to engage the public about actual issues of pressing concern, and doubly so when the issue is projected to arise in the future, but is currently of little personal significance. Without the ability to access one's genetic profile, there is rarely any real-life

²⁵² Erling Jelsø et al., "Moving the Goalposts in Bioethics," in *Genomics and Society: Legal, Ethical, and Social Dimensions*, ed. George Gaskell and Martin W. Bauer, Science in Society Series (London; Sterling, VA: Earthscan, 2006), 45.

significance for the average person in research that finds associations between particular alleles and pathogenic conditions. Without an impetus for sustained cognitive and emotional investment in understanding genetics, findings of correlations regularly reported in the media are of only passing interest and educational initiatives are unlikely to find a wide receptive audience.

The very fact that much of the current concern over DTC testing surrounds the lay-person's presumed inability to understand what these predictive results mean implies that the future-oriented public outreach components of the ELSI program, as well as many formal and informal parallel efforts, were (predictably) largely ineffective. Worse, discussing the possible future and responsibly engaging the public are somewhat mutually exclusive goals given the difficulty of explaining the gaps between what is available now, what is imminent, what is expected, and what is merely possible. The more one tries to do the former, the less one tends to succeed at the latter, and vice versa. The goal of fostering public understanding and critical engagement with medical science and technology should therefore orient bioethics towards an ongoing explication, analysis, and critique of current biotechnology as it moves forward, not ethical concern about issues that may arise in future decades.

Bioethicists might bemoan the inability to get ahead of the curve of public conversation under the assumption that bioethics driven by public debate or media-fueled spectacle will inevitably become mired in politics and will not live up to the standards of reasoned discourse favored in academia; however, they should remember that a robust participatory public bioethics

discourse is not generated by technology per se, but by technology as it enters society.²⁵³ As such, bioethicists would be wise to accept that one of the existential features of public bioethics is that it is driven by, and thrives on, actual public events—if not outright spectacle.

Despite years of research efforts and legal provisions against cloning in many countries, the debate and controversy did not come until the news about the successful cloning of a mammal became known. This has been a recurrent feature of the debates throughout the 30-year history of modern biotechnology. Debates are created not by reports about activities in research laboratories but as a result of the announcement of concrete new products or inventions. This was the case in relation to cloning and genetically modified crop plants in the late 1990s, just as it had been in 1980, when the debates about embryo research started in the wake of the birth of the first test tube baby.²⁵⁴

This does not mean that bioethics cannot attempt to be forward-thinking, only that it should do so while recognizing that its ability to shape the course of public discussions of and responses to future technological change proactively is quite limited. A far more modest description of the preparatory function of speculative bioethics was offered by LeRoy Walters: “Perhaps what we will need to do is commit ourselves to *procedures* and *modes of deliberation* that allow us to be prepared for such possibilities when they become actual.”²⁵⁵ It is the kinds of discourses fostered by bioethics, not the anticipatory content or resultant guidelines, that will be most important whatever future possibilities materialize.

In contrast, Agar maintains that, “It is better to have principles covering situations that

²⁵³ The HGP, was an instance of technological expectations, not a technology itself entering society. As I have tried to argue throughout, expectations are rightly the subject of prophetic, not regulatory, bioethics.

²⁵⁴ Jelsø et al., “Moving the Goalposts in Bioethics,” 56.

²⁵⁵ Walters, “Human Genetic Intervention: Past, Present, and Future,” 382. Emphasis in original.

turn out to be impossible than to have no principles for situations in which we suddenly find ourselves.”²⁵⁶ Perhaps; but notice how limited the application of this rule of thumb is. First, it is better only in relation to having “no principles.” Would we really find ourselves starved for principles in the future? Was it the lack of principles that sensationalized the cloning controversy? Were terrible decisions made as a result? Moreover, is it *better* if bioethicists spend time developing principles and theories that will not fit the reality in which future biotechnologies may come to exist? Second, it supposes that we would suddenly find ourselves in possession of powerful enhancement technologies. In reality, they would be (and are) developed incrementally, first as therapies targeting well-understood single gene disorders, then perhaps moving to more complex disorders with polygenic etiologies. And then *perhaps* complex traits will be targeted for therapy and then enhancement. All along, society will be having conversations about these technologies and about increasingly common and increasingly problematic application of genotyping for use in PGD and prenatal diagnosis for selective termination.

If bioethics does well when dealing with the now and very near-term, and if its contributions are difficult to pick out in its more speculative and future-oriented mode, then why do bioethicists spend so much time exploring the future? Clearly there is an underlying cultural fascination with the next big thing, so speculative bioethics does not strike most people as self-evidently odd. But if bioethics is a serious applied discourse that contributes materially to the social good, then justification is warranted. The bulk of ELSI research, if not a gross waste of effort and money, has not been all that useful and will likely prove to be much less useful than was

²⁵⁶ Agar, *Liberal Eugenics*, 34.

anticipated at the time.²⁵⁷

What is true for ELSI research that was focused on the relatively near-term applications of genomic research is, *a fortiori*, even more problematic for bioethics work concerned with technologies expected in the far more distant future. Not only are the social consequences unpredictable, the technologies themselves are akin to black boxes to which various capabilities are ascribed. The nature of these technologies, their limitations, and how they may end up being used are all unknowns that compound the inability to predict, prepare for, or control their consequences.

c. The Unverifiable Putative Benefit

If directly controlling the future is practically impossible given our limited foreknowledge at the emergent stages of a new technology, and it is doubtful that future-oriented bioethics discourse (at least in its current form) benefits the public by preparing for coming technological changes, then what remains? Perhaps the consequences that we are most worried about when pursuing research in the speculative mode are not those that come about through gross regulatory lapses, but the effects that occur gradually, often without eliciting immediate alarm,²⁵⁸ and especially those which result from discursive elements constitutive of particular technological systems and are not mere

²⁵⁷ I assume that even those bioethicists who suddenly became interested in genetics when a large pot of money appeared with 'ELSI' engraved on the side nonetheless believe that they were doing useful, productive work for the benefit of society.

²⁵⁸ Gaylin offers a similar justification for discussing radical future technologies to highlight ongoing technological changes that incrementally appear benign and do not attract public attention. See n.158 above.

side effects.²⁵⁹ By exploring various visions of the future, examining why they are appealing or unattractive, thinking through the narratives of how we might get there, and imagining alternatives, speculative bioethics benefits society in a more diffuse manner by sustaining a discourse that helps to ‘keep things on the right track.’

How is this so? First, by ‘scanning’ future scenarios for undesirable consequences that might arise, we can be more alert to them if they (or similar effects) do crop up.²⁶⁰ Perhaps more importantly, thinking about possible futures with our attention focused on the expectations that drive current research agendas can influence current practices by giving us a better grasp on the values that are at stake and the impositions that new technologies may place on our lives. Decisions regarding research priorities, appropriate forms of oversight, and allocating limited resources all can benefit from reflecting on the images of potential futures that are generated in the present. Let us call this project the unverifiable putative benefit of speculative bioethics (UPB).²⁶¹

²⁵⁹ I explain this idea in greater detail in the next chapter (III.c)

²⁶⁰ A partial justification for keeping speculative discourses within bioethics in particular lies in the possibility that bioethicists who individually may be involved in aspects of clinical ethics, regulatory policy, or related research in the social sciences will collectively, as participants in an interdisciplinary and collaborative field, be in the best position to notice if problems raised in speculative explorations begin to appear in practice.

²⁶¹ My description of the UPB is in some ways similar to the goals described by STS scholars working on more self-aware methods of technology assessment such as ‘vision assessment’ and ‘constructive visions assessment’ (in other words, not focusing on the future, but on present visions and discourses) perhaps contributing to forms of anticipatory governance. See e.g., Arie Rip and Haico te Kulve, “Constructive Technology Assessment and Socio-Technical Scenarios,” in *The Yearbook of Nanotechnology in Society, Volume I: Presenting Futures*, ed. Erik Fisher, Cynthia Selin, and Jameson M. Wetmore, *The Yearbook of Nanotechnology in Society, Volume I: Presenting Futures* 1 (Dordrecht: Springer, 2008), 49–70.

The UPB is not an attempt to regulate or prepare for the future in the predictive sense; it emerges from a reflective/critical mode of prophetic bioethics. Speculative bioethics discusses the possible future, but it is a discourse of and about the present, and therefore must reflect present concerns. Perhaps the greatest pitfall of speculative bioethics is that it reverses this prioritization and allows the projected future to encroach on the present. The UPB represents a legitimate goal of speculative bioethics, but its benefit in shaping the eventual consequences of new technologies is, for the most part, inherently unverifiable, as it is impossible to show conclusively when speculative bioethical discourses materially influence the way things turn out. Nonetheless, to the extent that bioethics informs discussions taking place within a range of formal and informal public deliberative processes, we (i.e., those situated within the field) can hope that its speculative aspects, like other social inputs, have some degree of efficacy. Since the biotechnologies that feed into the human enhancement discourse are not only top-down innovation moving from research programs into clinical application, but are also commercial products that depend heavily on perceived consumer demand and widespread uptake, speculative bioethics may have reason to be hopeful that engaging the public in discourse regarding substantive questions can influence social outcomes far beyond the narrow range of criteria that warrant activating the instruments of state regulation.

III. The Nature and Scope of Regulatory Bioethics

After arguing that there are few clear benefits in attempts to lay out regulatory approaches for

future technologies,²⁶² I now seek to delimit the overall scope of public regulatory bioethics by understanding its proper role and by characterizing the methods suited for fulfilling its function.

a. Strategic Planning vs. Muddling Through

1. Why ELSI was misconceived

Before moving to the conclusion of this chapter, it bears asking where ELSI went wrong. I suggested that at a very basic level the Collingridge dilemma shows the futility of prospectively controlling the social effects of a future technology. Juengst's description of ELSI's goal to "anticipate the social consequences of the project's research and to develop policies to guide the use of the knowledge it produces" was—however modest it sounded—unrealistically ambitious. Still, the explanation for why it could not work does not fully explain why the project was conceived in these terms. In order to avoid repeating this kind of error, which results in both a misallocation of regulatory attention and a misapplication of regulatory modes of bioethics to increasingly distant possibilities (recall that *From Chance to Choice* was underwritten with ELSI funding), it is necessary to ask why ELSI adopted an unworkable goal.

Let me begin with an earlier contention: regulatory bioethics does well when dealing with the now and very near-term and gets progressively less effective as it forges farther into the future. Why is this so? A number of reasons have come up, such as not knowing *a priori* where to direct ethical foresight (the patient in the clinic versus the at-home consumer), increased uncertainty in

²⁶² Note that I do not include policies that govern the ongoing development of such technologies or general policies that have wide applicability.

forecasting, and decreased interest and political will. To this we can add the very features which allow regulatory bioethics to function effectively as a consensus-oriented enterprise: substantive theoretical commitments are set aside; mid-level ethical constraints are adopted in their place; and limited but well-defined ends are already embedded in the regulatory goals (e.g., to increase organ donation rates, create policies for research on human subjects, establish guidelines for use of embryonic stem-cells, etc.). If we set aside the presumption that there is anything distinctive about the ethical apparatus informing regulatory bioethics, it begins to look like any other form of policy analysis and governance. Some have taken this to indicate that there are no particularly good reasons for ethicists to serve on policymaking bodies,²⁶³ but even if we accept that ethicists may well make important contributions,²⁶⁴ the regulatory questions taken up by bioethics still reduce, more or less, to a form of governance—and this warrants taking a better look at what has been learned about policymaking in the field of public administration.

2. Regulatory bioethics: the art and science of muddling through

Charles E. Lindblom's classic article on public policy decision making²⁶⁵ has been invoked both

²⁶³ Will Kymlicka, "Moral Philosophy and Public Policy: The Case of NRTs," *Bioethics* 7, no. 1 (1993): 1-26.

²⁶⁴ Hallvard Lillehammer, "Who Needs Bioethicists?," *Studies in History and Philosophy of Science Part C: Studies in History and Philosophy of Biological and Biomedical Sciences* 35, no. 1 (March 2004): 131-144.

²⁶⁵ Charles E. Lindblom, "The Science of 'Muddling Through,'" *Public Administration Review* 19, no. 2 (1959): 79-88.

directly and indirectly in the context of bioethics.²⁶⁶ However, as far as I can tell, it has mostly been neglected, despite the fact that it anticipates much of what occurred in the formation of regulatory bioethics, and offers considerable insight into why regulatory bioethics works well in certain situations, with a circumscribed goal and a limited range of consensus-based determining values (such as the ‘four principles’). Lindblom points out that the idealized picture of rational means-ends decision-making, in which values are clarified first, and then the means to maximizing those values are considered and weighed, all before any action is undertaken, is virtually impossible due to a host of practical limitations. He contrast this strategic ‘root’ method with a ‘branch’ method that is incremental and does not require overarching values to be clarified and settled upon first. Although Lindblom spoke more toward the numerous mundane policy objectives that public administrators are tasked with achieving but attract limited public attention and input, his understanding of consensus-based policy formulation anticipates Rawls’s idea of overlapping consensus, which has become a cornerstone of regulatory bioethics.

²⁶⁶ John Mendeloff, “Politics and Bioethical Commissions: ‘Muddling Through’ and the ‘Slippery Slope,’” *Journal of Health Politics, Policy and Law* 10, no. 1 (1985): 81–92; John A. Robertson, “The Virtues of Muddling Through,” *The Hastings Center Report* 37, no. 4 (2007): 26–28.

| Rational-Comprehensive (Root) | Successive Limited Comparisons (Branch) |
|--|---|
| Clarification of values or objectives distinct from and usually prerequisite to empirical analysis of alternative policies. | Selection of value goals and empirical analysis of the needed action are not distinct from one another but are closely intertwined. |
| Policy-formulation is therefore approached through means-end analysis: First the ends are isolated, then the means to achieve them are sought. | Since means and ends are not distinct, means-end analysis is often inappropriate or limited. |
| The test of a “good” policy is that it can be shown to be the most appropriate means to desired ends. | The test of a “good” policy is typically that various analysts find themselves directly agreeing on a policy (without their agreeing that it is the most appropriate means to an agreed objective). |
| Analysis is comprehensive; every important relevant factor is taken into account. | Analysis is drastically limited: i) Important possible outcomes are neglected. ii) Important alternative potential policies are neglected. iii) Important affected values are neglected. |
| Theory is often heavily relied upon. | A succession of comparisons greatly reduces or eliminates reliance on theory. |

Table 2: Methods of Policy Analysis²⁶⁷

For instance, if we apply these two models to formulating national health policy, then in the root method we might begin with a comprehensive theory of justice to formulate the ends we wish to pursue, out of which the very need for a distributive national health policy may emerge. From there, we would clarify the goals we would like to pursue via health policy, such as securing fair equality of opportunity. We would then formulate the policies that maximize this goal given various constraints—perhaps a centralized national insurance program in which all policies are formulated to prioritize the promotion of equality of opportunity. Continually assessing the effectiveness of the program would require measuring whether it is in fact increasing equality of opportunity.

²⁶⁷ Adapted from Lindblom, “The Science of ‘Muddling Through,’” 81.

The branch method reflects what we actually do. The need for a national health policy emerges from empirical data on the comparative wellbeing of those who have access to healthcare via insurance plans and those who do not. From here, we formulate the goal of having everyone insured, by which “one simultaneously chooses a policy to attain certain objectives and chooses the objectives themselves.”²⁶⁸ In formulating policy, some options will already be off the table even if they are potentially the most effective (e.g., nationalized universal health insurance). The actual policies chosen to achieve the goal of everyone being insured are arrived at by comparing options based on their relative efficacy, practicality, and political feasibility. Ethical considerations are also factored in, but because many important values cannot be taken into full account, a reduced set of consensus values is adopted instead. Ethicists may question whether particular policies do more harm than good, whether policies are too paternalistic and infringe on individual autonomy, and whether the system in general functions and allocates resources in a fair manner. Along the way there will be many incremental adjustments to policy as various political and practical pressures are brought to bear. In some cases, empirical data on public preferences may be gathered to inform the process, and in others, deliberative procedures can be introduced to arrive at policy decisions. As Len Fleck has pointed out, decisions regarding how to ration limited resources within a national insurance system are both crucial and among the most controversial.²⁶⁹ The method of deliberation he suggests, in which overarching value considerations are set aside in favor of preference formation via successive ranking, could usefully be described in these incrementalist

²⁶⁸ Ibid., 82.

²⁶⁹ Leonard M. Fleck, *Just Caring: Health Care Rationing and Democratic Deliberation* (Oxford; New York: Oxford University Press, 2009).

terms as well.²⁷⁰

Lindblom's point was not merely that qua *realpolitik* this is how public policy does get made; it is that it is the most defensible manner of policymaking. Agreement on many questions of value is simply impossible in a society with competing ideologies, so "agreement on policy thus becomes the only practicable test of the policy's correctness."²⁷¹ An additional rationale for preferring an incrementalist approach in which analysis is severely restricted is that the ideal comprehensive method would, practically speaking, require "intellectual capacities and sources of information that men simply do not possess."²⁷² (Not coincidentally, these are the very capacities and sources of information needed to formulate effective policies to regulate and control future technologies.) The process by which one overlooks some possibilities, focuses on others, and factors out indeterminacy is always going to be shaped by cognitive biases and epistemic limitations. Lindblom argues that making the same limiting moves by vastly constraining the scope of the analysis from the outset and eliminating options incrementally by working toward consensus is more justified.

It is not difficult to map public regulatory bioethics as a whole onto the incremental 'branch' method, and it is even simpler to do so when the subject is an actual regulatory or quasi-

²⁷⁰ Lindblom notes that "attempts to rank or order values in general and abstract terms so that they do not shift from decision to decision end up by ignoring the relevant marginal preferences. The significance of this third point thus goes very far. Even if all administrators had at hand an agreed set of values, objectives, and constraints, and an agreed ranking of these values, objectives, and constraints, their marginal values in actual choice situations would be impossible to formulate." Lindblom, "The Science of 'Muddling Through,'" 82.

²⁷¹ Ibid., 84.

²⁷² Ibid., 80.

regulatory body such as a national bioethics commission.²⁷³ Compare, for instance, both the process and outcome that Toulmin held up as a model for bioethical policy formation in his description of the functioning of the National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research: “In almost every case they came close to agreement even about quite detailed recommendations—at least for so long as their discussions proceeded taxonomically, taking one difficult class of cases at a time”; “They could agree; they could agree what they were agreeing about; but, apparently, they could not agree why they agreed about it.”²⁷⁴ The process which Toulmin describes as a revival of the grand casuist tradition could be described simply as an instance of the far less grand tradition of incrementalist consensus-oriented policymaking.

Callahan described the regulatory turn in bioethics somewhat whimsically: “regulation being the way we in the United States typically deal with controversial issues.”²⁷⁵ Arguably, it was even more mundane than that: bioethics, in a governance role, had merely adopted the general pragmatic norms of public policymaking. If we return to John Evans’s description of substantive versus formal rationality, the differences line up almost identically to Lindblom’s root and branch methods.²⁷⁶ The account that Evans offers is also roughly similar to this humdrum explanation of the regulatory turn, but he stresses that ethicists had been vying for jurisdiction and had seen the

²⁷³ Mendeloff, “Politics and Bioethical Commissions.”

²⁷⁴ Stephen Toulmin, “The Tyranny of Principles,” *Hastings Center Report* 11, no. 6 (1981): 31–32.

²⁷⁵ Callahan, “Why America Accepted Bioethics,” S8.

²⁷⁶ Evans, *Playing God?*, chap. 1. In particular compare the tables on pages 19 and 22 to Lindblom’s.

legitimacy offered via public commissions as the most effective means of obtaining jurisdictional control. To that end, they shifted the discourse to one that was formally rational. This casts things in rather mercenary terms—a characterization I believe to be superfluous, at least from a perspective situated within bioethics.

The limitations and problematic consequences of a reduced value-set principlist/consensus approach have already been mentioned. For now, I want to simply note its effectiveness—which in Callahan’s view is amply demonstrated by nothing less than America’s acceptance of bioethics. However, muddling through works when there are actual problems to solve and practical goals to achieve; it does not work when the issues that policies are meant to address are somewhere out there in the future or when substantive questions of value still need to be addressed. And so, aside from the Collingridge dilemma, ELSI, as a regulatory project (in the broad sense of the term) concerned with the future, simply could not draw on many of the resources normally embedded within public-policy bioethics.

3. Conflating strategic science policy with regulatory bioethics

We can now answer the question I posed earlier: Why did ELSI start with an unrealistic goal to begin with? Why did it not recognize that it would be better to muddle through future policy questions when they presented themselves? Was there not a sufficient store of disciplinary knowledge and experience acquired through bioethics’ long engagement with genetic testing and screening to deal with new questions should they arise?²⁷⁷ I believe the answer lies precisely in the

²⁷⁷ Jonsen contends as much in his account of ELSI; Jonsen, *The Birth of Bioethics*, 189.

fact that ELSI was conceived of as part of the HGP itself. Muddling through works for some kinds of policy decisions, but there are cases where careful strategic planning is necessary and unavoidable. Large-scale unprecedented initiatives like the HGP require extensive long-term planning and coordination.²⁷⁸ It is almost certain that a series of incremental decisions in setting research agendas and allocating funding could not have resulted in the completion of the sequencing of the human genome in anywhere near the time it took. But what was good for the HGP was not good for regulatory bioethics. Formulating large-scale science policy is one thing; dealing with social consequences is quite another.²⁷⁹

ELSI's long-term orientation had two consequences. First, the guidelines it developed that were aimed at the post-HGP future were destined to be rendered inadequate by missing important applications like DTC genotyping that lay outside existing regulatory paradigms. Second, because it was a future-oriented regulatory project, it was given no regulatory clout.²⁸⁰ Commissions and agencies are given political muscle when they have a clear and current goal to accomplish. Without such a task, ELSI had little political influence, and as a result even its policy recommendations regarding privacy and health insurance—which had contemporary relevance—were not implemented for well over a decade.

²⁷⁸ See Paul R. Schulman, *Large-Scale Policy Making* (New York; Oxford: Elsevier, 1980), chap. 7.

²⁷⁹ This should not be misinterpreted to mean that ethical considerations both large and small have no bearing on science policy. On the contrary, ethics should be part of the *process* of setting science policy from the start. The ELSI Program, as many have noted, was nothing of the sort. It was a parallel project with no bearing on the HGP itself.

²⁸⁰ Roberts, "Capital Report." Cook-Deegan's assessment of ELSI (quoted earlier) suggests this problem as well.

4. Strategic planning, plus consensus bioethics, equals regulatory approaches to speculative futures

If my only concern were to understand why ELSI was unsuccessful, I would not bother with such an elaborate analysis. However, its implications are far-reaching, offering insight into why we have reached the point where regulatory modes of bioethics are misapplied to increasingly distant possibilities. Consider the following: If we look at the prevailing consensus-oriented approaches to bioethics, then, in the context of public policy, it becomes almost self-evident that whether the theoretical basis lies in casuistry, reflective equilibrium, overlapping consensus, common morality, or elsewhere, they are all well-suited to function as a means of ‘muddling through’ when there is a current imperative to decide how we ought to proceed regarding a narrowly formulated policy question.

However, when we look beyond present concerns into the more distant future, ‘muddling through’ will not suffice—we need some form of ‘strategic planning.’ Bioethical inquiry oriented to the future proceeds by undertaking Lindblom’s first stage of strategic planning: “clarification of values or objectives.” In other words, it requires what I’ve been describing all along as a central feature of prophetic bioethics. If there is ethical work to be done in directing the course of biomedical research and science and technology policy more generally, it needs to occur at the point where the relationship between values and strategic goals are clarified so that goals reflect values. This is a much trickier feat to pull off than simply appointing advisory commissions staffed with experts of different stripes to oversee safety concerns. Exactly how this sort of upstream moral engagement should be carried out in a democratic context is beyond the current discussion, but given that it must deal with substantive questions that may resist consensus formation, the role of prophetic bioethics will consist in clarifying how particular technological goals may or may not

reflect values—beyond those which can be appealed to in the consensus methods. This is akin to the reflective inquiry that prophetic bioethics has pursued as downstream critique once technologies have been developed and deployed. The question is how to do so effectively when the focus turns upstream to potential future technologies.²⁸¹

5. The illusion of consensus and the obfuscation of justification

By and large, the phenomenon of bioethics' regulatory mode being misapplied to speculative futures is the result of taking what works well when muddling through is called for—without sufficiently considering why it works well there—and assuming it works equally well globally. It does not.²⁸² One cannot evaluate long-term societal goals, let alone visionary imaginings of the future, without some substantive conception of the ends. Doing so results in mere muddling—it leads nowhere and can only mirror the values implicit in the expectations that formed the technological projections in the first place.

Absent the critical evaluation of speculative futures possible within prophetic bioethics we are left with visions of the future replete with all manner of determinate technological features that appear capable of restructuring society and culture. Since these aspects of the predicted future are born of expectations embedded in various aspects of modern culture, no one is held accountable for invoking them—yet in truth, they require as much justification as any other goals society might

²⁸¹ The approaches I favor are explicated in Chapters Six (III) and Seven.

²⁸² Evans makes a similar point in asking why it was taken for granted that the principles of promoting wellbeing, autonomy and justice “developed in the context of a debate about experimentation on humans, are desirable when debating HGE [human genetic engineering].” Evans, *Playing God?*, 129.

wish to pursue. In the framework of overlapping consensus, consensus is justified when it follows from a fair deliberative process—yet no deliberative process was ever employed in arriving at these value-laden visions of the future. They appear to derive their legitimacy strictly from their ubiquity. If this were a good way to discover the ends for society to pursue then we would not need any substantive discussions; we could simply turn on the TV and quite easily figure out what we all value: sex, snack foods, and soft toilet paper. When we come to the end of CtC and find that the authors portend that some imagined future consensus may move society along a path toward eugenic policies, we ought to understand that they have long stopped exploring the expected future as if it were a neutral possibility and have begun the process of manufacturing the consensus needed to underwrite that future *ex-ante*.

Similarly, one finds authors who appear to think that ‘if’ enhancement technologies just so happen to be developed, ‘then’ they are offering guidance which will be useful.²⁸³ And that ‘if’ researchers develop these technologies and we don’t develop a bioethical framework for their use ‘then’ society will be unprepared. Yet only rarely does one find a clear-cut statement to the effect that these ostensibly conditional arguments and principles effectively warrant pursuing these technologies *now*. In what should be a thorough ethical analysis, the normative force of these technological goals gets an undeserved free pass.

²⁸³ E.g., Agar, *Liberal Eugenics*.

b. Indeterminacy and the Limits of Regulatory Processes²⁸⁴

1. Prediction, speculation, and risk

My contention that proactive regulatory strategies to control or prepare for the future are not properly within the province of speculative bioethics should not be misunderstood as a claim that bioethics does not need to worry about the future consequences of emerging technologies. Far from it. My point is that while speculative bioethics can certainly be concerned with potential futures in which new technologies bring about social transformations, it cannot effectively translate such concerns in the manner that regulatory bioethics usually proceeds—namely, by developing policy frameworks—until it faces the existence of the technology and the first intimations of the social effects that call for a regulatory intervention. This is not to be confused with situations where we must contend with the *predicted* effects of a technology in order to mitigate tangible downsides, but this activity is appropriate to the practice of regulatory bioethics, which is not the correct framework for thinking about *speculative* future scenarios.

How can speculation be divorced from prediction if regulating current research and development requires speculating about the future and anticipating all the potentially good and bad things that could come from the development and implementation of new technologies? The answer lies in understanding that speculation—even when grounded in projections based on present trends—and prediction are distinct activities, although the boundary between them can be

²⁸⁴ Much of this section was motivated and informed by Jean-Pierre Dupuy, “Some Pitfalls in the Philosophical Foundations of Nanoethics,” *Journal of Medicine and Philosophy* 32, no. 3 (2007): 237–261.

fuzzy. Prediction, especially when it can be quantified, is the optimal foundation for dealing with the risk of *tangible harms* that, at least in theory, could be assigned economic value or units of utility. In contrast, speculation is what concerns us when we have reached the limits of quantifiable prediction and/or seek to evaluate less tangible potential consequences (changes in social structures, conceptions of the self, etc.). We therefore fall back to speculation as a qualitative framework for thinking through possible futures.

No matter how limited our knowledge, we necessarily project the potential consequences of all current decisions and practices into the future. Despite this, we cannot conflate evaluating concrete risks via prediction—the domain of prudence—with reflective moral inquiry that uses future speculation to think through the socio-ethical significance of technological change on individuals, families, and societies.²⁸⁵ The analysis and management of risk has clearly identifiable normative aspects,²⁸⁶ and we often use the language of risk in reflective moral discussion (e.g., the ‘risk’ of commodifying reproduction). It is also essential to the work that regulatory bioethics contributes to developing mechanisms for governing biomedical research and development. Although it proceeds from a normative basis, the primary *methodology* of risk analysis does not lie in the domain of moral inquiry, but in a consequentialist calculus of cost-benefit analysis.²⁸⁷ It attempts to assess the probability of future negative outcomes versus upsides, and to develop

²⁸⁵ Ibid., 239–241.

²⁸⁶ Lotte Asveld and Sabine Roeser, eds., *The Ethics of Technological Risk* (London; Sterling, VA: Earthscan, 2009).

²⁸⁷ Sven Ove Hansson, “Philosophical Problems in Cost–Benefit Analysis,” *Economics and Philosophy* 23, no. 02 (2007): 163–183.

safeguards that balance the mitigation of risks with the diminishment of potential benefits.

Future-oriented risk analysis within regulatory bioethics is distinct from reflective moral inquiry via speculation in several important respects: (1) as was mentioned, it preferably deals with quantifiable prediction in which outcomes can be assigned probabilities; (2) it focuses on concrete harms and benefits that, should they come to pass, would at some point be manifest to those experiencing the consequences as actual harms (or at least tangible downsides) or benefits, and can therefore factor into a cost-benefit analysis; (3) its efficacy is tied to the accuracy of its predictions and its ability to identify, and ideally quantify, harms and benefits.

Speculative bioethics properly pursued as a means of reflective moral inquiry differs: (1a) it looks at speculative scenarios that rest on indeterminacies and cannot be grounded in prediction;²⁸⁸ (2a) it explores potential social consequences from the perspective of substantive ethical considerations and notions of value that cannot be resolved into costs and benefits—partly because it is likely that there are *both* costs and benefits which are not all quantifiable or commensurable, and partly because even if *we* could rank outcomes in relative terms, denizens of the future may regard whatever changes that do come to pass very differently from ourselves; and (3a) when it is done properly, its usefulness and importance stand independent of the tangible outcomes of future scenarios.

The point of overlap, and perhaps one of the reasons that regulatory bioethics has so often

²⁸⁸ There is plenty of pseudo-quantified projection in speculative scenarios, such as predicting what the human lifespan will be in another fifty years based on increases since the early 20th Century, or that ‘Moore’s Law’ (the doubling of processing power every eighteen months) guarantees the existence of artificial intelligence that exceeds the bounds of the algorithmic inputs originally used to program it. This is but naïve inductive projection.

turned to speculation, comes when we imagine potential tangible harms based primarily on what we know generally of the *unpredictability* of certain types of systems, but have no way to assess risk (e.g., Drexler's infamous 'grey goo' scenario caused by self-replicating nano-machines²⁸⁹ or the risk that IVF, PGD, or some future reproductive technology will introduce deleterious genetic or epigenetic changes undetectable until late adulthood).²⁹⁰ In such cases of *uncertainty* when facing the decision to pursue such technologies, risk cannot be assigned a value of zero, nor can it be properly quantified given inadequate information or relevant experience. All we know is that if we build complex powerful self-organizing systems like nano-replicators, they may have unpredictable emergent properties that we cannot predict, and if we take a complex, inadequately understood self-organizing system like a developing human embryo and intervene in its early stages there may be unpredictable consequences. As such, we are left with scenarios grounded in 'known unknowns' (to use the now-famous Rumsfeldism) *resembling* those explored in speculative bioethics. These scenarios generate unique questions in theory: the formulation and applicability of the precautionary principle;²⁹¹ the normative and heuristic value of imagined catastrophic scenarios; the weight of emotional responses to risk. They also provoke questions in practice: how to govern unpredictable technologies; how to engineer reversibility into technologies, etc.²⁹² but the potential harms considered are still very concrete, and the guiding (consequentialist) ethical

²⁸⁹ Bill Joy, "Why the Future Doesn't Need Us."

²⁹⁰ Guyer and Moreno, "Slouching Toward Policy," W15.

²⁹¹ Neil A. Manson, "Formulating the Precautionary Principle," *Environmental Ethics* 24, no. 3 (2008): 263–274.

²⁹² Each of these is addressed in various ways in Asveld and Roeser, *The Ethics of Technological Risk*.

principles—that we do our best not to harm ourselves, others, or future generations without imposing greater social costs in the process—are the same as those used in cost-benefit analyses applied within regulatory bioethics more generally.²⁹³ This is the nature of decision-making under extreme uncertainty, and the kind of speculation that emerges from it is far narrower than the scenarios born of visions of future technological possibilities. What distinguishes the speculative technological scenarios that are a mainstay of the enhancement discourse is that they do not rest on a foundation of extreme uncertainty, but on one of radical indeterminacy.

2. *Uncertainty and indeterminacy*

Fully unpacking the notion of indeterminacy—which has different meanings and uses in various areas of philosophy and many other fields of study—is not possible here, but for present purposes a somewhat non-technical distinction will suffice.²⁹⁴ In general, uncertainty describes the relationship between present decisions and a limited set of future outcomes to which we can reasonably ascribe stable values—in cases where a present lack of knowledge could in theory be resolved by undertaking the action that one is contemplating. For example, uncertainty in 1977 as

²⁹³ To be clear, I am not by any means claiming that regulatory bioethics is, or ought to be, confined to cost-benefit analysis. Rather, its role in *formulating policies* to deal with emerging but not-yet-extant technologies should be confined to what can be addressed under a broad conception of risk analysis. Other questions regarding speculative futures ought to be explored in the reflective kind of inquiry I subsume under prophetic bioethics.

²⁹⁴ This is my own formulation of the distinction, and I make no claim as to its applicability in other contexts. Some have analyzed uncertainty and indeterminacy as referring to epistemological and ontological states respectively—and this is usually the sense in which it is used in describing physical processes that do not appear to function as, or are too complex to model as, deterministic systems. The explanation I offer can map onto this distinction, but I believe that it alone does not suffice as an explanation.

to “whether the internal clocks of these individuals [conceived by IVF] would stop ticking early, or would tick on and on, or go completely cuckoo because of the eggs’ and sperms’ early hours outside bodies and inside centrifuges, test tubes, pipettes, and incubators,”²⁹⁵ was in theory always resolvable, even if there had been a worldwide ban on IVF that prevented it from ever being tried. In general, when doing X is theoretically sufficient for learning the very outcome Y that bears on the present decision, and the probability of Y cannot be quantified due to some characteristic of X (e.g., novelty, complexity, potential emergent properties), one is facing a decision whether to undertake X under uncertainty.

However, indeterminacy—or at least radical indeterminacy—describes a situation where the relationship between present decisions and future outcomes is itself unclear and irresolvable, as the lack of knowledge could not in theory be resolved simply by undertaking the decision to act.²⁹⁶ To take a simplified example, if, in 1990, I am concerned that the HGP will eventually result in the ability to genetically enhance humans, that concern could not theoretically be resolved by completing the HGP, because *ceteris paribus* completing the HGP is not sufficient for enhancing humans, and the set of further necessary conditions to do so may never exist.²⁹⁷

²⁹⁵ Guyer and Moreno, “Slouching Toward Policy,” W15.

²⁹⁶ After writing the sections on indeterminacy I came across a matching understanding of indeterminacy factoring into long-term decisions from Jon Elster: “it is not that the questions are inappropriate. Rather, it is that they cannot be answered, even if their presuppositions should happen to be satisfied.” Elster, *Solomonic Judgements*, 183. The epigraph to this chapter reflects Elster’s overall assessment of the effect of radical indeterminacy on policy decisions.

²⁹⁷ We can refer to this as technological indeterminacy. A second form of indeterminacy that is applicable in speculative bioethics is the indeterminacy of future values: we cannot assume a stability of values after radical technological change. A third related consideration comes up when we can assume a stability of values but whether some outcome is good or bad is indeterminate (*continues*)

3. *The limited purview of regulatory bioethics*

At this point one could wonder why this distinction ought to make any difference. In both cases, if it were possible to halt these research programs I could be sure that the outcomes I disvalue are avoided. Why should the case of IVF fall under regulatory bioethics but not the HGP/enhancement example? The answer I offer follows the understanding of regulatory bioethics as the constrained kind of ‘branch’ policymaking described in the previous section.

Regulatory bioethics functions as a process of oversight and control over policy decisions in which the goal to be pursued has already been set. These ends (in the narrower sense of the term) will often be formulated in a manner abstracted from the technical means—“helping infertile couples have children” as opposed to “succeeding at human IVF”—so the regulatory question concerns the means to that pre-set goal. Public regulatory bioethics can coherently address the question “is IVF a sufficiently safe means to achieve the goal of helping to overcome infertility?” even if it cannot know the answer antecedently. This leads to a very narrow conception of public regulatory bioethics as a process appropriate only when the scope of policy questions both is delimited by pre-set goals and excludes indeterminate futures.

The upshot of characterizing the appropriate application of regulatory bioethics in such narrow terms is that it locates many problems and concerns as topics that need to be addressed

because it implicates incommensurable values or conflicting interpretations of a vague moral term. A fourth form of indeterminacy resides in the fact that we have—at least to my knowledge—no theories up to the task of predicting the large-scale, long-term social effects of disruptive technologies. The basic idea linking all is that undertaking X is in all cases insufficient for resolving the question one wishes to answer (will Y occur; or, if Y occurs will we be in a better or worse off position than had we not undertaken X).

outside of the regulatory context, but often have been treated as if they could. These include all questions concerning long-term planning for potentially disruptive biotechnologies, all questions concerning substantive values themselves; all questions regarding the very appropriateness of the goals that the regulatory process is meant to facilitate and control. This is not an arbitrary list; it simply reflects the limitations of a consensus-oriented regulatory process understood as policymaking by muddling through.

4. Indeterminate futures in prophetic discourses

Stretching the function of regulatory bioethics past its narrow role is problematic and unproductive, but so is limiting the scope of bioethical inquiry to that which regulatory bioethics can address. For this reason we have prophetic bioethics—along with many other discursive practices and democratic processes—where substantive questions bearing on the long-term ends we are pursuing come to the fore. Let us now consider why indeterminacy is not a barrier for prophetic bioethics.

Returning to our simplified example, “will the HGP result in human genetic enhancement?” appears to remain as unanswerable as ever—so how could it ever be viewed as a salient concern bearing on present decisions? The question only remains irrelevant so long as it is understood in the following manner: “will the HGP, as an ends unto itself (qua scientific goal) or as a means to some other good ends (beneficial therapies) result in something extrinsic to those ends—namely human enhancement?” Here the question is still framed in predictive terms as a regulatory concern—but now it extends past the regulatory frame of reference into indeterminacy. From a regulatory perspective, it has no bearing on current decisions.

In order to make sense within prophetic bioethics, such questions need to be framed in terms of the inherent discursive/expressive aspects of the technology in question, not as questions regarding the extrinsic unintentional side-effects of a particular technique such as IVF.²⁹⁸ In very schematic terms, “does undertaking X (the specific means-goals under consideration such as human genetic engineering) express a value preference for Y (a potential long term outcome or implicit goal)?” If it does, then recognizing that Y is implicitly endorsed could lead us to revise our understanding of X itself or other projects building off of the achievement of X, given the higher-order, ultimate, or inviolable ends we most value.²⁹⁹ Or it could simply provide some reflective insight that contributes to the UPB more generally. What is important is that the force of this kind of consideration is independent of predicting that X will eventually result in Y. We are not trying to predict whether in *achieving* Y we would compromise very important values; we are trying to understand whether *undertaking* X (or believing that X would be desirable) is truly in line with our deepest values. This at least provides a general outline of the types of questions that a prophetic discourse on speculative future technologies can constructively take on.

Several things happen when prophetic concerns of this sort are inappropriately raised in a regulatory framework. Concerns expressed in terms of future possibilities are translated into the

²⁹⁸ Dupuy, “Some Pitfalls in the Philosophical Foundations of Nanoethics,” 241. This approach is described in more detail at the close of the next chapter.

²⁹⁹ In one sense, the question is whether a particular means is consistent with ends (in terms of values or substantive conceptions of the good) beyond the immediate goals the means are undertaken to achieve (see Evans, *Playing God?*, 15.) What I am trying to explain is how this line of inquiry benefits from the invocation of a possible future. Why do we look to a possible future to question the present if we can simply ask whether means are consistent with ends?

language of prediction, and since they involve indeterminacy, the predictions are easy to dismiss. Alternately, even if the question is understood as asking whether X endorses Y, the answer may simply be that it could indeed be understood in those terms, but we have plenty of other reasons for undertaking X, and therefore endorsing Y is insufficient for abandoning X. This is how regulatory bioethics is *supposed* to function in its public oversight role, once society has decided to proceed after a legitimate political or deliberative process. Problems arise chiefly when regulatory approaches transgress their proper bounds and create a public discourse rife with cross-talk. Although there are many aspects of bioethics where prophetic and regulatory modes can operate side-by-side without generating this level of confusion, it is precisely when the discussion ventures into emerging technologies and speculative futures that we require lines to be drawn delimiting proper roles for each. When the speculative future is in question, it is in the interest of both regulatory and prophetic bioethics to be understood as distinct practices.

c. Keeping Regulatory and Prophetic Questions Apart

1. The benefits of separation: IVF as a test case

It may appear somewhat demoralizing that bioethics cannot shoehorn every discussion into regulatory approaches that work so well for certain purposes. But the alternative is one that we know too well: regulatory bioethics is applied far too broadly and overshadows other aspects of bioethical discourse. At the same time, substantive questions are interpreted as regulatory concerns. This is not just a problem for bioethical discussions of technologies that are still in the future—its muddying effects are evident in cases of technologies that need oversight already.

The case of IVF in the United States is illustrative of the two sides of the problem. As

human IVF was being developed, two types of questions were raised about its advisability: was it safe—particularly for the children conceived, and did it refashion human procreation into a dehumanized process of manufacture? The first question, as I explained, concerns a decision under uncertainty and is properly a regulatory question to be taken up via the usual constellation of ethical policy analysis, advisory committees, and regulatory bodies. The latter is clearly a prophetic-type question in that it raises issues rife with indeterminate outcomes (see n.297), and raises substantive questions of values.

Guyer and Moreno claim—and I am partly inclined to agree—that an excessive focus on the latter question detracted necessary attention from the question of risk: “How many of the commentators who claimed to be reflecting thoughtfully on assisted reproduction gave adequate time and consideration to this basic ontogenetic question?”³⁰⁰ Looking back at the bioethics literature on IVF of the late 1970s two things become clear: first, there was plenty of discussion of risk by the same ethicists who spoke of manufacture; however, it was all thrown together into one bioethical stew. The very title of Paul Ramsey’s commentary in the *Hastings Center Report* following the birth of Louise Brown (the first person born following IVF), “Manufacturing Our Offspring: Weighing the Risks,” indicates how entangled the two had become.³⁰¹ As far as risk, Ramsey

³⁰⁰ Guyer and Moreno, “Slouching Toward Policy,” W15. As it happens, around the time that this article was published the PCBE did issue a report that called for systematic information gathering on the long-term effects of ARTs: President’s Council on Bioethics, *Reproduction and Responsibility: The Regulation of New Biotechnologies* (Washington, DC, 2004).

³⁰¹ Paul Ramsey, “Manufacturing Our Offspring: Weighing the Risks,” *Hastings Center Report* 8, no. 5 (1978): 7–9.

argued that success does not *ex post facto* change the fact that it was morally wrong.³⁰² The rest of the article is essentially a prophetic reflection on IVF, artificial wombs, and the genetic manipulation of embryos.

But did *this* result in too little attention being paid to long-term risk? If it did, it was only one small factor contributing to a lack of a regulatory discourse and oversight. Toulmin's response took the strict regulatory approach to an extreme, giving little weight to the long-term interests of the child, while John Robertson's non-identity approach went even farther.³⁰³ Far more significant than these exchanges in the bioethics literature was the confluence of political events that resulted in all IVF research being confined to the private sector and left in a regulatory vacuum that was never filled.³⁰⁴ Still, if the bioethics community had projected a more exclusive and unified focus on long-term risk as an issue that was not fully resolved simply by successful births after IVF, the regulatory landscape might have looked somewhat different. Similarly, perhaps in drawing too much attention to the specter of *Brave New World*, the prophetic bioethicists relegated *all* long-term concerns to the margins when a normal, average baby—followed by many more—emerged from a mother's womb and not a hatchery.

³⁰² Apparently disagreeing with Bernard Williams, *Moral Luck: Philosophical Papers, 1973-1980* (Cambridge; New York: Cambridge University Press, 1981).

³⁰³ Stephen Toulmin, "In Vitro Fertilization: Answering the Ethical Objections," *The Hastings Center Report* 8, no. 5 (1978): 9-11; John A. Robertson, "In Vitro Conception and Harm to the Unborn," *The Hastings Center Report* 8, no. 5 (1978): 13-14.

³⁰⁴ Karen F. Greif and Jon F. Merz, "Manufacturing Children: Assisted Reproductive Technologies and Self-Regulation by Scientists and Clinicians," in *Current Controversies in the Biological Sciences: Case Studies of Policy Challenges from New Technologies*, Basic Bioethics (Cambridge, MA: MIT Press, 2007), 77-99.

If we turn the issue around and consider whether mixing regulatory and prophetic concerns had a depressing effect on the reflective aspects of the issue, the answer is that many open questions of the sort that can be raised within prophetic critiques appear to have been marginalized as issues for ongoing public attention and discussion. Combining talk of risk qua health and ‘risk’ qua social upheaval, unprecedented cultural change, and large-scale dehumanization of reproduction indiscriminately casts everything in predictive terms. When the predicted harms to health did not materialize, the predicted social effects instantly began to look silly and overblown, and bioethics lost the legitimacy necessary for maintaining a long-term sustained public engagement with IVF as a transformative technology. Some of the most vocal opponents of IVF moved on in search of the next looming catastrophe.

In the longer-term, IVF produced real social consequences and health outcomes that require attention, but were never systematically addressed in the regulatory vacuum. These included the effects of induced hyper-ovulation on women’s long-term health; increasing use of multiple implantation protocols coupled with selective fetal reduction to increase IVF success rates (a practice that was conspicuously dialed back on a ‘voluntary’ basis after the public ‘octomom’ spectacle); the use of IVF by parents well past their natural childbearing years; the social and developmental issues arising from IVF in late parenthood;³⁰⁵ the long-term storage of frozen embryos;³⁰⁶ and a host of subsidiary issues involving burgeoning national and international

³⁰⁵ Among the most recent see Judith Shulevitz, “The Grayest Generation,” *New Republic* 243, no. 19 (December 20, 2012): 8–13.

³⁰⁶ Liza Mundy, “Souls on Ice: America’s Human Embryo Glut and the Unbearable Lightness of Almost Being,” *Mother Jones*, August 2006.

markets in gametes and gestational surrogacy (the real of manifestation the problem of ‘manufacture’ was commodification). By the time the aggregation of biological and larger social consequences resulting from myriad individual decisions became noticeable to bioethicists (among others) interested in the impact of new technologies on cultural values, not only was the oversight apparatus necessary to examine them effectively not in place, but a de facto position had emerged in the United States to leave assisted reproductive technologies un/self-regulated.³⁰⁷

The confluence of factors leading to this situation included many that were far outside of the influence of bioethics proper, but there are lessons to be learned for both prophetic and regulatory bioethics—particularly when we contrast what happened in the U.S. with the regulation of IVF in Britain. There, a lack of initial outcry over IVF did not lead to a lack of regulation. On the contrary, once the technology was in use, it began to attract increased scrutiny, leading to the establishment of a regulatory panel (and perhaps the institutionalization of bioethics in the U.K. more generally) and eventually the passage into law of regulatory policies.³⁰⁸ My brief account of the history of IVF in the U.S. coupled with a condensed historical comparison is hardly dispositive, but it highlights some of the points I have made already: Regulatory bioethics is appropriate and works best when (a) there is an existing technology/practice, (b) it has a clear, preset, practical, and realistic task—like ensuring that IVF is used properly, (c) there is public demand for oversight, (d) neither the technology nor its lack of regulation have reached the degree of entrenchment where regulation becomes very difficult.

³⁰⁷ Greif and Merz, “Manufacturing Children: Assisted Reproductive Technologies and Self-Regulation by Scientists and Clinicians.”

³⁰⁸ Wilson, “Creating the ‘Ethics Industry.’”

2. Regulatory commissions and reflective discourse: separation may be more equal

At first glance the succession of national bioethics commissions appears to challenge my contention that it is best to keep things apart. They appear capable of hearing from a variety of philosophical and theological perspectives and then drawing up reasoned regulatory responses. Diverse voices and reasoned responses—what more could we want in a public commission? A more detailed history than can be given here would be very instructive, but if we look briefly at two such commissions it is clear that in issuing their policy recommendations, the operative considerations were—as they should have been—entirely regulatory. Yet the exploration of reflective and theologically-motivated considerations in the deliberative phases made it appear that they ultimately carried no weight in the realm of public policy formation.

The 1982 report *Splicing Life*, on the use of recombinant DNA technologies on humans was spurred by a letter sent to the Carter administration by religious leaders. Consequently it discussed many philosophical and theological perspectives on human genetic engineering—though perhaps in a somewhat constrained fashion.³⁰⁹ The report's recommendations were ultimately based on safety issues. The 1997 report *Cloning Human Beings* resulted from the frenzy after the birth of Dolly the Cloned Sheep, followed by an inquiry initiated by then President Bill Clinton in which he described the potential for human reproductive cloning as a matter of “morality and spirituality.”³¹⁰ In this case, the commission engaged with substantive questions regarding the meaning of human procreation, and many religious leaders and thinkers were asked to testify

³⁰⁹ President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research, *Splicing Life*.

³¹⁰ National Bioethics Advisory Commission (USA), *Cloning Human Beings* (Rockville, MD, 1997).

before the commission. The resulting report showed due concern for substantive issues, but once again the recommendations were based solely on safety factors.³¹¹

This was not, as Campbell suggests, the result of shrewd political strategy, but the fact that the commission had to think about the issue in two different ways using two sets of tools. There is no consensus regarding the best venue and process for deliberating the ethics of new technologies. However, it should not be taken up by commissions tasked with giving specific policy recommendations that will almost inevitably end up reflecting questions of safety. Much preferred would be a two-tiered system consisting of a bioethics commission charged with clarifying the issues and enhancing public deliberation and a safety review board in the tradition of the original National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research.

Robert Cook-Deegan offered a similar recommendation in a commissioned paper appended to the *Cloning Human Beings* report:

The temptation to blend functions of national deliberation and analysis with review of complex research protocols that raise difficult issues should be resisted... We have examples of successful public policy deliberation about topics in bioethics, and relatively successful review processes for protocol review for human subjects protections and for gene therapy; but models for doing both are not promising.³¹²

By construing the scope of regulatory bioethics narrowly, substantive issues resist being subsumed into regulatory processes. When discussing the leading edge of emerging technologies, society needs to protect the deliberative space in which to engage in the “moral politics of

³¹¹ Parens offers a clear-eyed explanation of why this was not necessarily a bad thing; Erik Parens, “Tools from and for Democratic Deliberations,” *Hastings Center Report* 27, no. 5 (1997): 20–22.

³¹² Cook-Deegan, *Cloning Human Beings: Do Research Moratoria Work?*, H-24.

technologies”³¹³ long after reports are finalized, recommendations are submitted, and charters expire.

Instead of viewing contentious issues resistant to consensus formation as irrational outliers, we should consider that the goal and expectation of achieving consensus may itself distort the nature of public moral deliberation.

Like other institutions, morality evolves in haphazard fashion, and moral disagreement inevitably emerges in response to broader societal changes. In fact, disagreement is so much a part of our notion of morality that we should reflect for a moment on what else we would lose if moral disagreement were to disappear. The result would bear little resemblance to what, at least in the West, we call morality.³¹⁴

In open-ended deliberative processes where consensus is unlikely—and forming a consensus regarding controversial just-emerging and future technologies is even more so—it is counterproductive to measure success by the extent to which we agree but disagree as to why we agree—as Toulmin described—and more constructive to disagree but understand what we disagree about and why. This does not rule-out finding common ground—on the contrary, it means that if we find areas of agreement we can hand these off to regulatory processes to iron out the details via consensus-oriented approaches and leave the rest of the issues to the ongoing discourses on the moral politics of biotechnology.

3. Speculation without prediction

In part, my purpose in this section has been to argue that whatever the function of risk analysis

³¹³ Leigh Turner, “Politics, Bioethics, and Science Policy,” *HEC Forum* 20, no. 1 (2008): 40.

³¹⁴ Carl Elliott, “Where Ethics Comes from and What to Do about It,” *The Hastings Center Report* 22, no. 4 (July 1, 1992): 35.

specifically, and cost/benefit analysis generally, within regulatory bioethics, they constitute the proper venue for applying the language and method of prediction—not speculation. As a corollary, since discussions of speculative futures are not the place for the application of regulatory approaches, speculative bioethics is not the place for the language or method of prediction. Once prediction enters prophetic-speculative bioethics, one can always raise the charge that indeterminacy makes predictive concerns moot so far as current decisions go. This rhetorical move is so prevalent that it verges on the law-like: in virtually every instance where a prophetic approach offers an assessment of an emerging technology that appears to hinge on a predicted effect of the technology it will be interpreted as a prediction and attacked on the grounds of empirical inadequacy.

This generates an ineluctable question: how does one talk about possible futures fashioned from the pervasive expectations that we have for progress in biomedical science without speaking in predictive terms? There are two possibilities: (1) Confine the discussion to a critical engagement with technological discourses themselves. In so doing, we talk about predicted futures only inasmuch as they reflect present goals for and expectations of science and technology—and the values embedded therein. This is exceedingly valuable but it can be limiting. Sometimes we really do want to discuss the nitty-gritty of a possible future and work through potential consequences to better understand the path that society may be taking by embarking on a given project. More fundamentally, we are story-telling creatures who make sense of the present as part of a larger narrative extending into the future. Yet, avoiding the language of prediction and the tendency to reify the possible future can be quite difficult when we subject these present-to-future narratives to serious moral inquiry. The solution lies in the second possibility, which is in no way exclusive of

the first. (2) Adopt a methodology in which the future is treated as a theoretical construct within a thought experiment or as a fictive narrative amenable to critical reading. These approaches are taken up in the next chapters.

IV: Closing Thoughts

If the unverifiable putative benefit of speculative bioethics aspires in some sense to influence the future, then how is it less problematic than the goals I critiqued earlier? After all, even if speculative bioethics cannot be a means of controlling the future or particularly useful in preparing society for it, it may nonetheless have some effect on the way things turn out. All forms of speculative bioethics should therefore be able to lay claim to the UPB regardless of its purported goal or methodology. However, the UPB relies on the possibility of those participating in a form of moral inquiry and discourse to consciously see themselves as playing an active part in the formation of the future—however indirectly—by sustaining discourses in the present—not by envisioning *the* future and responding to it in advance of its appearance. In other words, the UPB is most achievable when speculative bioethics is undertaken in the prophetic/reflective mode I described earlier.

However, even in its ideal form, we should not confuse the possibility of prophetic bioethics having a salutary effect on the direction of biomedicine or its social consequences with the idea that it serves as a *mechanism* for dealing with *the future*. This simply recasts prophetic-speculative bioethics as regulatory bioethics—but of the sort that we apply to the future—and

reintroduces Collingridge's problem of control.³¹⁵ The danger here is several-fold: First, it risks pushing bioethics toward speculation out of a sense that it cannot ignore *the future*. Instead, I would urge that bioethics engage in speculation only to the extent that imagined futures reflect and influence *the present*. If not for this fact then, assuming we have not lost our 'moral competence,' we could safely deal with these more distant futures when they arrive. Second, it risks (or I should say, I risk) giving the impression that, like regulatory bioethics, the prophetic mode 'works' with a particular set of methodological and procedural assumptions. My methodological considerations should be understood only as approaches to future-oriented and speculative discussions useful for identifying and avoiding common problems. Beyond that, I make no claims as to how prophetic, reflective, reflexive, cultural bioethics, or bioethics generally, should be pursued.

³¹⁵ See Nordmann, "A Forensics of Wishing."

CHAPTER SIX – THE FUTURE IS WHAT IT MAKES OF US: EXPECTATION,
REIFICATION, AND MORAL FUTURISM IN SPECULATIVE BIOETHICS

Scientific and poetic or imaginative accounts of the world are not distinguishable in their origins.

– P.D. Medawar, *The Hope of Progress* (1972)

I have argued that a crucial distinction between regulatory and prophetic forms of speculative bioethics lies in their approaches to the futures they explore. In the prophetic mode, bioethicists turn to future scenarios because they reveal potentialities and values embedded in the present. The possible future can therefore serve as a means for reflecting on current circumstances and clarifying the meaning and implications of present-day practices, goals, or beliefs about the future. Regulatory approaches to speculative bioethics discuss future scenarios because they are taken to represent the future. Whether explicitly, by predicting *the* future that must be dealt with today, or implicitly, by simply treating future scenarios as such, the future-oriented regulatory discourse can be described as ‘reifying the possible future’—taking an abstract, hypothetical construct and approaching it as if it were an objective feature of the world.³¹⁶ Farrelly’s article on distributive justice is a typical example of this type of reification. In claiming that: “the genetic revolution raises many fundamental questions of distributive justice” he takes a possible future and imposes questions that may have to be dealt with in the future onto the present as if they were questions of pressing concern today.³¹⁷

³¹⁶ Nordmann, “If and Then,” 33 n. 3.

³¹⁷ Farrelly, “The Genetic Difference Principle,” W21.

In historiography, ‘presentism’ describes an anachronistic reading of history in light of the present, and in the philosophy of time, it is the view that only the present is ontologically real. Reification in speculative bioethics offers an inversion of presentism in the historical sense—the future is anachronistically projected into the present—and clearly rejects it in the philosophical sense. I term the reification and imposition of technological futures into ethical inquiry ‘moral futurism.’

In this chapter, I seek to understand and critique the propensity toward moral futurism within speculative bioethics as a product of the immense sway that technological visions of the future have on discourses on science and technology more generally. As expectations of powerful future technologies become embedded in public discourses and take on the air of inevitability, we lose the ability to imagine things being otherwise and tend to forget that the *pursuit* of certain technologies—and not only their eventual uses—are value-laden, driven by various interests, and potentially transformative. If bioethics truly wishes to promote a serious, reflective discourse regarding emerging technologies, then it needs to cultivate a critical stance toward the futures it explores and the meanings that such futures have for the present. Ethicists cannot simply pay lip service to the difference between the actual present and the possible, but entirely expected, future, and pepper their writing with caveats. De-reifying speculative bioethics necessitates a reframing of questions about the future as questions of and for the present and a stripping away of the mythic view of biomedical science that saturates discussions of future biotechnologies.

I. Problematizing Speculative Bioethics

a. A Restatement of the Problem

The critique I have pursued thus far points to a problematic trend within bioethics that has only accelerated since the completion of the HGP, in that speculative explorations have become the subject of regulatory discourses. Before proceeding, I will briefly restate the problem as it stands. Within public bioethics, there are two forms of moral discourse that I have called—building on earlier work in the field—the prophetic and regulatory approaches. The two differ in numerous ways. Prophetic bioethics is an open-ended reflective ethical inquiry that situates biomedicine in the broad context of human culture and substantive moral values and asks how current practices and future developments may shape society. It discusses visions of the future emerging from biomedical research and biomedical hype as reflections of values and potentialities embedded in the present. Years before there were any genetic technologies in use, it asked about the relationship between genetics, the human condition, and the desire to direct the future of humanity by altering the genetic makeup of future people. Its concerns are global and it interrogates medical technologies and practices to understand their meaning in social and symbolic terms. It tends to draw upon symbolic imagery, sometimes of a theological or mythological nature. It is not concerned with tangible harms, but on the transformation or erosion of human values constituted by constellations of social practices, symbolic representations, and the vicissitudes of human life.

Regulatory bioethics emerged later, within a public policy framework, and was therefore oriented toward consensus-formation and practical goals, such as the production of policy guidelines and ongoing oversight. It has a narrow focus on limited local questions and evaluates

existing and soon-to-be implemented practices and technologies within an ethical matrix of harms and benefits, impersonal rights and obligations, and personal autonomy balanced against a conception of justice that reflects the principles that tend to underlie the distributive policies of the liberal welfare state. Regulatory bioethics first entered discussions of genetic technologies when genetic testing and screening were introduced, and then again later when recombinant DNA technologies were poised to enter the early phases of human subject research.

A confluence of factors has evolved the discussion of human genetic engineering into a far-ranging discourse on human biomedical enhancement. Although some currently available biotechnologies have enhancement uses, they are very limited. The powerful biotechnologies that constitute the substrate upon which contentious discussions of human enhancement proceed do not yet exist, and we do not know whether they will ever exist in the form upon which these speculative explorations are predicated. These include the ability to enhance complex behavioral traits via genetic engineering, such as would be needed to improve cognitive or empathic capabilities, or to greatly improve sensory and motor function and physical health. To these possibilities we can add a host of imagined non-genetic technologies ranging from powerful human-machine neural interfaces to nano-scale medical devices.

In addition to the very limited capabilities of what could be termed current enhancement technologies, there are the genotyping technologies that can be used to select among embryos based on genetic criteria (PGD) or, at a later stage, to selectively terminate pregnancies. Under the umbrella of enhancement, regulatory approaches have increasingly turned to analyzing current limited enhancements and selective technologies along with possible future technologies as presenting a unified area of ethical concern that needs to be addressed now—both to answer

current questions and to prepare us for the future. In Buchanan's terms, society is already poised to undertake the enhancement enterprise.³¹⁸ When possible technological futures are presented as posing questions that need to be answered today, they are imbued with an aura of inevitability and the future is reified. No longer a mere theoretical construct, the reified future imposes demands on current policy decisions, and the future itself is now seen as a domain requiring regulatory preparation.

Prophetic explorations have engaged in reification of the future as well, beginning with ascriptions of inevitability and then proceeding to moral futurism.³¹⁹ In the reified future, substantive concerns are treated as predictions, misgivings and reservations are translated into the idiom of regulatory bioethics, and the meanings coaxed symbolically from the practices described in visions of the imagined future are concretized into firm moral judgments regarding future people and societies. In a strange inversion, the burden of proof has been shifted to justifying the present in the face of the in-fact unknowable, but now reified, future. Yet the future, now real and

³¹⁸ Buchanan, *Beyond Humanity?*, chap. 1.

³¹⁹ For example, the following is taken from the introductory chapter to an edited collection on enhancement. It begins with inevitability and ends with the conflation of current and potential future issues:

The effects of genetic enhancement, like the consequences of atomic fission, will last far into the future and will not be limited to localities or even large regions. Dealing with this sobering fact has recently taken on a new sense of urgency, since the distinction between somatic and germ line therapies has become increasingly difficult to maintain in light of a variety of new techniques as simple as preimplantation genetic diagnosis that blur the demarcation of what is presently permissible in genetic research and application.

Harold W. Baillie and Timothy K. Casey, eds., *Is Human Nature Obsolete?: Genetics, Bioengineering, and the Future of the Human Condition* (Cambridge, MA: MIT Press, 2004), 3.

inevitable in terms of its technological capabilities, is simultaneously construed as having social contours that remain indistinct and malleable. These technologies will change us, but with the right regulatory responses justice will be preserved—perhaps even ‘enhanced.’ So long as we prioritize individual wellbeing and make sure that no one does anything catastrophically risky to endanger the lot of us, humans (or whatever may come after) will do fine. Or, alternately, this is the path to the destruction of all we hold dear and we need to start regulating the future today to keep us from it.

Is this kind of speculation really a problem for bioethics? Perhaps I have taken it somewhat for granted that it is indeed a serious problem, and a handful of authors have offered critiques, but why is there not a more vocal opposition? In truth, the extent to which one sees it as a fundamental problem rather than a mere misallocation of attention, a waste of money, or a matter of dropping the ‘practical’ from practical ethics depends on how one understands bioethics—and to a large extent that may depend on how one views biomedical science.

b. The Purpose of Bioethics and the Mythic View of Biomedicine

If one begins with the mythic view of science—a view with undeniably deep and substantial roots in the Enlightenment—as modern society’s ideal of reason and progress, then the goals it sets for itself are naturally understood to be aimed at progress. Perhaps not in the concrete sense of aiming for a technologically enabled utopia, but at least in an incremental sense of gradual open-ended epistemic gains, built one upon the other, coming ever-closer to truth. In that case, one might adopt, perhaps without noticing, a tendency to view critiques of biomedical goals as rejecting progress and favoring intellectual and social stagnation. One might further tend to conceive of

contemporary biomedicine and bioethics as constituting a unified progressive project with a division of labor between them, such that the real work of bioethics is for the most part regulatory. The reason bioethics looks at the future is because biomedical research itself looks to the future, but in general biomedicine proceeds relatively autonomously, with bioethics there to ensure that in that process—where there can be occasional overzealousness in the pursuit of progress—people are not mistreated, and that, at the end of the process, the goods of progress are distributed fairly. The future is of course not really inevitable or predetermined, but regulatory bioethics can be better prepared for it by paying close attention to the goals and projected achievements of biomedical research.

From such a perspective, the fact that bioethics is enmeshed with the aspirations and goals of the scientific enterprise is not only unproblematic, it is optimal.³²⁰ The fact that it has developed a highly procedural form of ethical discourse is likewise optimized to the socio-technical system it regulates. Prophetic bioethics is then somewhat beside the point; it is a form of moral and social philosophy that only happens to have an overlapping interest in biomedicine. Unless it distracts too much attention from the ‘real issues or,’ in the worst case, gets its reactionary hands

³²⁰ Examples of this kind of thinking are ubiquitous. To take one example, the ELSI Working Group’s Genetic Testing Task Force report “Promoting Safe and Effective Genetic Testing in the United States” states the following, highlighted in boldface type, in its executive summary:

The focus of the Task Force on potential problems in no way is intended to detract from the benefits of genetic testing. Its overriding goal is to recommend policies that will reduce the likelihood of damaging effects so the benefits of testing can be fully realized undiluted by harm.

NIH-DOE ELSI Working Group, “Genetic Testing Report-Executive Summary.” Accessed April 14, 2013. <http://www.genome.gov/10002393>.

on the regulatory levers, it can be ignored.

Viewing the state of speculative bioethics as truly problematic requires assuming a very different standpoint beginning with a rejection of the mythic view of biomedical science and adopting the outsider perspective that prophetic bioethics attempts to maintain. This is not the same as espousing a dystopian vision of technological change, nor does it ask science to free itself of its self-perception as a progress-driven enterprise. What it asks is merely that we attempt to see biomedical science for what it is—in the parlance of contemporary STS, a ‘technoscience.’

As opposed to the ‘sciences’ (as conceived, especially, by scientists and philosophers of the nineteenth and twentieth centuries), the ‘technosciences’ do not even attempt to distinguish between theoretical representation of the world and technical intervention into the world... A pharmacological laboratory is necessary to produce a chemical substance that will dilate arteries and increase the flow of blood. Though this chemical represents some general features of the world, it does so like any chair, table or other artefact. It would appear to be a moot exercise to take this pharmacological agent or to take the effected dilation of the arteries and carefully tease apart what is due to human intervention and what to features of nature. It is in this rather obvious sense that the technosciences do not distinguish between theoretical representation of the world and technical intervention into the world—because it is neither necessary nor possible to achieve this kind of purity.³²¹

This tells us that biomedical science is not self-evidently progressive by achieving an ever more precise representation of the world. If it is progressive, it is only because we deem a particular increase in control or type of intervention to be an instance of progress. However, in the pursuit of technoscience, the production of technology piggybacks on the image of science as progress. Harro van Lente, refers to this as the ‘ideograph’ of technology: it taps into the scientific mythos to produce the idea that the very nature of technology is one of continuous supersession. What is

³²¹ Nordmann, “A Forensics of Wishing,” 7.

actually a normative claim—technologies ought to progress—appears as a mere description of the nature of things.³²² This ideograph is used to justify the necessary obsolescence of current technologies and the continual investment in developing successors.

Understanding biomedical research as a technoscience offers several advantages. For one thing, critiquing technoscience is not a critique of science itself. If we would like to preserve a mythic ideal of a pure science that ushered in the Enlightenment—abstracted from the pursuit of technology or the pursuit of funding and peer recognition—and remains the search for knowledge of the physical world for its own sake, then we can set pure science to the side. Further, arguments about where technoscience should or should not be embraced are not battles over science or the value of science itself.³²³ More importantly, by peeling away the mythic façade we can pay closer attention to the variety of social factors that shape its production.

The importance of rejecting the mythic view lies in recognizing that techno-science is a social endeavor that is inseparable from social dynamics and enterprises. The particular knowledge produced by even the most basic research is a result of decisions made about what sorts of knowledge to pursue. These broad decisions are made by people and institutions—researchers and research communities; universities, companies, and non-profit research institutes; philanthropic, government, and venture funders. Neither the agendas, the methods, nor the products of science stand above the social world. The practitioners and funders of scientific research have interests, affiliations, and values. The outputs of scientific research transform the way many people are born and live, work, and die. They create winners and losers, and enable some people to make decisions that will

³²² Harro van Lente, “Forceful Futures: From Promise to Requirement,” in *Contested Futures: A Sociology of Prospective Science and Technology*, ed. Nik Brown, Brian Rappert, and Andrew Webster (Aldershot, UK: Ashgate, 2000), 43–63.

³²³ Marcy Darnovsky, “Biopolitics, Mythic Science, and Progressive Values,” in *Progress in Bioethics: Science, Policy, and Politics*, ed. Jonathan D. Moreno and Sam Berger (Cambridge, MA: MIT Press, 2010), 189–215.

shape the lives and life chances of others, perhaps on the other side of the world or in future generations.³²⁴

Viewed in this light, a prophetic bioethics is necessary because it does not simply look narrowly at what technoscience produces and how it is used. Rather, it discusses substantive values because research agendas are not value free, and it inquires as to ultimate ends because the ends pursued by various actors may not reflect a sufficient concern for human flourishing. Its interests are global in keeping with the scale and long-term implications of large-scale research programs; it draws on narrative and symbolic resources because expectations of future technologies are themselves rendered into symbolic and narrative forms. If bioethics' ability to engage in a critical and self-aware discussion of biomedicine is compromised by the uncritical acceptance of mythic science and technological expectations, and further distorted by the intrusion of imagined futures, then we do in fact have a serious problem.³²⁵

Although some bioethicists clearly do have a mythic view of science,³²⁶ regulatory explorations of futures constituted by particular technological expectations implicitly contribute to

³²⁴ Ibid., 195.

³²⁵ A somewhat analogous assessment of bioethics can be found in Susan E. Kelly, "Toward an Epistemological Luddism of Bioethics," *Science Studies* 19 (2006): 69–82. However, though we generally frame aspects of the problem similarly, I do not see bioethics, overall, as having to adopt the hermeneutic of suspicion that STS tends toward. See my discussion in section II.b below.

³²⁶ Ronald Green is my favored example: "All this can happen if we permit scientists to follow their dreams... excellent science is a delicate flower that does not easily survive abrupt legal moratoria on research, onerous and unreasonable regulations, or a hostile cultural environment that drives away young researchers or investors." Ronald M. Green, "Bioethics and Human Betterment: Have We Lost Our Ability to Dream?," in *Biotechnology: Our Future As Human Beings and Citizens*, ed. Sean D. Sutton (Albany: SUNY Press, 2009), 63. See my discussion of Green in II.c below.

this mythification by construing technoscience as a largely autonomous and cybernated process with determinate future achievements. By viewing the imagined future as the source of ethical dilemmas that demand our attention, these regulatory discussions reinforce and inflate the expectations surrounding research agendas.³²⁷ Bioethics applying itself to a coming technological revolution becomes an active and largely unaware participant in constructing and reinforcing particular visions of the future. This, I believe, is irresponsible in the extreme. It not only gives a moral imprimatur and warrant to visions of the future that are neither neutral, nor inevitable, nor the product of our considered judgments; it allows a reified future to intrude into our understanding of the present.

Yet it would be hasty to simply dismiss the expectations propelling speculative bioethics as a symptom of the field losing any sense of proportion and buying into scientific hype. Expectations are crucial for the coordinated functioning of research communities in the sciences as well as in bioethics. The question is whether bioethics can critically engage the speculative futures constituted by technological expectations without reinforcing them, and without succumbing to moral futurism by allowing the demands of a reified future to colonize the present. To address this question, I first examine the relationship between bioethics and technoscientific expectations in light of the approaches found in STS and in relation to bioethics' institutional history.

³²⁷ Hedgecoe, "Bioethics and the Reinforcement of Socio-Technical Expectations"; Caragh Brosnan, "The Sociology of Neuroethics: Expectational Discourses and the Rise of a New Discipline," *Sociology Compass* 5, no. 4 (2011): 287–297.

II. Expectations in Science, Technology, and Bioethics

a. Technological Expectations

1. *Expectations and speech acts*

Over the last decade and a half, understanding the role of expectations in coordinating and propelling technoscientific enterprises has become an important area of research within STS.³²⁸

While expectations in their general form can be defined as the state of looking forward (from Latin, *expectatio*, looking, waiting for), technological expectations can more specifically be described as real-time representations of future technological situations and capabilities. Similar terms, which are commonly used, like technological ‘promises’ and ‘visions’ are largely overlapping with ‘expectations’ but emphasize to a higher degree their enacting and subjectively normative character. They stress that expectations are wishful enactments of a desired future. By performing such futures, they are made real and in this sense expectations can be understood as performative. Along with positive promises and hopes of future capabilities, fears and concerns about future risks are parallel features of these kinds of dynamics. Both positive expectations and fears of risk—though different in character and having different dynamics—can be seen to have considerable influence on the discussion technological change.³²⁹

As is evident, discussions of technological expectations draw loosely on speech act theory, so it may be helpful to briefly clarify this picture in a more philosophical idiom.³³⁰

³²⁸ Nik Brown, Brian Rappert, and Andrew Webster, eds., *Contested Futures: A Sociology of Prospective Science and Technology* (Aldershot, UK: Ashgate, 2000); Nik Brown and Mike Michael, “A Sociology of Expectations: Retrospecting Prospects and Prospecting Retrospects,” *Technology Analysis & Strategic Management* 15, no. 1 (2003): 3–18; Mads Borup et al., “The Sociology of Expectations in Science and Technology,” *Technology Analysis & Strategic Management* 18, no. 3–4 (2006): 285–298.

³²⁹ Borup et al., “The Sociology of Expectations in Science and Technology,” 286.

³³⁰ This discussion follows John R. Searle, “A Taxonomy of Illocutionary Acts,” in *Expression and Meaning* (Cambridge University Press, 1979).

When expectations qua mental states are expressed,³³¹ the speaker has an illocutionary point; that is, he intends to do something by speaking. Certain illocutions are characteristically perlocutionary—they are usually meant to bring about an effect in the listener. Expectations expressed with the indexical ‘you’ are characteristically perlocutionary because the intent is to enjoin the speaker to act: “I expect that you will be on time tomorrow.” Other expectations are purely assertive. “I expect it will rain tomorrow” may simply report a belief about the future—what we generally call a prediction. Searle compares these illocutionary variants to Anscombe’s metaphor of direction-of-fit, often used to highlight a key difference between beliefs and desires. A characteristically perlocutionary speech act has a ‘world to word’ direction of fit; the intent is to have the listener conform to the words that convey what the speaker wishes. Others, like simple predictions, have a ‘word to world’ direction of fit; they intend to describe the (future) world and if they fail to do so, the failure is with the speaker.

However, assertions themselves can have an illocutionary point beyond reporting beliefs; they may be attempts to convince someone to share the speaker’s beliefs and to act on those beliefs. “The building’s on fire!” paradigmatically has these features. Since this assertion has two illocutionary points with both directions of fit it can succeed and fail at the same time. If there was no fire but the listener ran out, or if there was a fire but the listener did not leave the building, then it has succeeded and failed. Even when the direction of fit is only world to word the

³³¹ Here I discuss expectations as expressed in spoken and written speech. An equally useful philosophical perspective seeks to understand expectations as mental states and understand their role within a theory of intentional action. Paprzycka, for example, distinguishes between normative and predictive expectations—roughly correlated with desires and beliefs; “Normative Expectations, Intentions, and Beliefs,” *The Southern Journal of Philosophy* 37, no. 4 (1999): 629–652.

conditions of satisfaction of an expectation do not always lay in the fulfillment of its explicit content. A parent might say, “I expect you to get an ‘A’ on your next exam,” but the intent is only that the child should try harder. The expectation can therefore be satisfied (the perlocutionary effect brought about) even without fulfilling the propositional content of the assertion.

The purpose of this brief digression is to highlight the degree to which expressing an expectation concerning the technological future can have multiple meanings, purposes, and effects. It can express a belief in what the future will hold, a desire for what it should hold, or an aspiration that magnifies its true conditions of fulfillment. The intent may be to elicit similar beliefs and desires in others, to convince them that something is possible, that it is desirable, that it should be taken seriously, or that it should be pursued. Expressing expectations for technological futures can have important secondary, perhaps unintentional, perlocutionary effects as well, such as changing the listener’s perception of the present. Furthermore, I would argue that the hedges one often finds appended to expectations in speculative bioethics—‘may,’ ‘might,’ ‘could,’ ‘possible,’ ‘potential,’ etc.—are highly equivocal . It is unclear whether the intent is to alter the illocutionary force—such as by conveying a lesser degree of belief regarding one’s expectation—or the illocutionary point of the speaker—to describe the future, offer a hypothetical situation, or otherwise. For instance, take this typical equivocal hedging found in an introduction to an issue of *Medicine and Philosophy* devoted to transhumanism:

The development of emerging biotechnologies is on the verge of redesigning the boundaries of human existence. Brain-Computer Interfaces (BCIs), radical life extension, neuroenhancements, and bionic limbs constitute only few instances of technologies that could potentially allow transcending human biological

limitations.³³²

In the first sentence we are already “*on the verge of* redesigning the boundaries of human existence”; in the next we read that future technologies “*could potentially* allow transcending human biological limitations.” In sum, the reason why it is crucial to identify the social function of technological expectations in bioethics is precisely because the meaning of these expectations is usually underdetermined by the intention of the speaker/author and overdetermined by the meaning and force these expectations carry within the larger social-technical context. Although I generally point to examples where authors express a high degree of belief that a technological expectation will be fulfilled, the problem of reinforcement and reification extends to cases where an author may not have intended to do so. We now have a better sense of why expectations can be important but problematic catalysts and coordinators of technological development and bioethical discourse.

2. *The function of technological expectations*

Expectations of future technologies play a variety of constructive roles in ongoing technoscientific research. Shared expectations and a belief in the progressive nature of science are necessary for the coordination of the vast web of social and economic resources that contribute to scientific discoveries and technological development.

Expectations are ‘constitutive’ or ‘performative’ in attracting the interest of necessary allies (various actors in innovation networks, investors, regulatory actors, users, etc.) and in defining roles and in building mutually binding obligations and agendas. At the most general level we can understand expectations to be central in brokering relationships between different actors and groups. Indeed, it would be hard to picture the formation of technology developments and innovation without

³³² Fabrice Jotterand, “At the Roots of Transhumanism: From the Enlightenment to a Post-Human Future,” *Journal of Medicine and Philosophy* 35, no. 6 (2010): 618.

some kind of shared, though flexibly interpreted, cluster of guiding visions.³³³

This is particularly true for large-scale projects, such as the attempt to usher in a new era of genomic medicine and biotechnology via the Human Genome Project.

High expectations are required to mobilize the large number of actors and considerable resources needed to bring new therapies, diagnostics, clinical practices, industries, and governance regimes into being, given the long lead times and major social, cultural, organizational, political, and cultural transformations that may be required.³³⁴

The crucial insight for bioethics is the recognition that expectations of the future are not mere reflections of extant scientific goals but are active in the shaping those goals, garnering support for them, and carving out roles for dealing with the consequences.

Expectations can be seen to be fundamentally ‘generative’, they guide activities, provide structure and legitimation, attract interest and foster investment. They give definition to roles, clarify duties, offer some shared shape of what to expect and how to prepare for opportunities and risks.³³⁵

In the previous chapter I described the design of the ELSI program as a product of the HGP’s large-scale strategic planning. More precisely, it was generated from the same expectational discourse that generated the HGP—which in turn was magnified by the project itself. Bioethical discussions of future technologies that build upon these expectations are therefore never neutral. They stabilize a vision of the future built on powerful transformative technologies within an ethical frame and thereby lend support and legitimacy to these expectations, fleshing out the social world

³³³ Borup et al., “The Sociology of Expectations in Science and Technology,” 289.

³³⁴ Adam M. Hedgecoe and Paul A. Martin, “Genomics, STS, and the Making of Sociotechnical Futures,” in *The Handbook of Science and Technology Studies*, ed. Edward J. Hackett, 3rd ed (Cambridge, MA: MIT Press, 2008), 819.

³³⁵ Borup et al., “The Sociology of Expectations in Science and Technology,” 285–286.

that the technologies are believed to be capable of producing.³³⁶ When bioethics turns its attention to a future technological scenario that reflects the expectations underwriting a scientific undertaking, it plays an active role in reinforcing those expectations and granting them a significant degree of legitimacy. This shapes not only the bioethical discourse, but the broader public perception of what research projects like the HGP are trying to do and whether they should be endorsed.

3. STS: constructive critique and an alternative model

Two recent sociological analyses have pointed to the ways in which bioethics draws from and contributes to technological expectations.³³⁷ Drawing on this work raises questions regarding the role of the social sciences in critiquing bioethics (or at least shining some light its function within a larger social context) and bioethics' ability to respond constructively.³³⁸ In some cases, there will be an ineluctable and unbridgeable difference in viewing one's role from within as constructive and beneficial, compared to an outside view in which one is cast as a cog in a larger structure of production and control. At other times, one can most effectively achieve a greater degree of reflexivity by drawing from an outside perspective. At present, I take this latter approach, though as I have stated, my analysis proceeds primarily from within bioethics. As such, in the next section

³³⁶ Brosnan, "The Sociology of Neuroethics."

³³⁷ Hedgcock, "Bioethics and the Reinforcement of Socio-Technical Expectations"; Brosnan, "The Sociology of Neuroethics."

³³⁸ Callahan, "The Social Sciences and the Task of Bioethics"; Jonsen, "Beating up Bioethics"; Adam M. Hedgcock, "Critical Bioethics: Beyond the Social Science Critique of Applied Ethics," *Bioethics* 18, no. 2 (2004): 120–143; Turner, "Anthropological and Sociological Critiques of Bioethics."

I move away from the outside literature and look for explanations and critiques within bioethics itself.

Rather than turning to the social sciences as a source of critique of bioethics, it may be more productive to look to them as a model. When we turn to explorations of future technologies and their relation to technoscientific expectations STS has opened up a critical perspective sorely lacking within bioethics. STS, via its overlap with emerging technology assessment and ‘future studies,’ has a long history of mostly unsuccessful attempts to predict and deal with the future proactively. More recently it has abandoned quantitative approaches to large-scale future assessment in favor of qualitative approaches such as ‘scenario construction’ and ‘foresight exercises.’ At the same time, STS, “recognizing the capacity of such instruments to shape science and innovation policy, has begun to develop an analytical vocabulary for understanding these complex interactions between tools of prediction, discourses of the future and the shaping of the present.”³³⁹ In the nanoethics literature, there is a dialectic between efforts in the field that attempt to formulate policy mechanisms and systems of governance responsive to the promises and uncertainties that surround emerging technologies,³⁴⁰ and those devoted to investigating the function of visionary discourses on future technologies in shaping research agendas, setting priorities, and securing public support.³⁴¹ Hovering above this dialectic is an ongoing

³³⁹ Brown and Michael, “A Sociology of Expectations,” 6.

³⁴⁰ Risto Karinen and David H. Guston, “Toward Anticipatory Governance: The Experience with Nanotechnology,” in *Governing Future Technologies*, ed. Mario Kaiser et al., *Sociology of the Sciences Yearbook* 27 (Dordrecht: Springer, 2010), 217–232.

³⁴¹ Schummer, “From Nano-Convergence to NBIC-Convergence.”

philosophical meta-critique of the entire project.³⁴²

The greater appreciation for the crucial role that expectation play in mobilizing necessary attention and resources for large-scale technoscientific projects has also led authors to ask what notions of responsibility and accountability can be applied to the pronouncement and reinforcement of expectations.³⁴³ Bioethics has undoubtedly played a part in the development of various “expectational discourses,”³⁴⁴ yet, as much as some bioethicists express their dismay at the field’s overgenerous interest in new and future technologies, the result is simply that some scholars retreat from speculative ethics and eschew discussions of possible technologies, while others persist. This has left the development of a de-reified language and critical methodology with which to talk about the imagined future as a long-standing but seldom recognized desideratum for bioethics.

b. The Nature and Function of Bioethical Expectations

1. Coordination within bioethics

It is not surprising that bioethicists partake in technoscientific expectations, both as members of the general culture and as specialists whose expectations are often formed by working with

³⁴² Alfred Nordmann, “No Future for Nanotechnology? Historical Development vs. Global Expansion,” in *Emerging Conceptual, Ethical and Policy Issues in Bionanotechnology*, ed. Fabrice Jotterand, Philosophy and Medicine 101 (Dordrecht: Springer, 2008), 43–63.

³⁴³ Nik Brown, “Hope against Hype: Accountability in Biopasts, Presents and Futures,” *Science Studies* 16, no. 2 (2003): 3–21; M. Ellen Mitchell, “Scientific Promise: Reflections on Nano-Hype,” in *Nanoscale: Issues and Perspectives for the Nano Century*, ed. Nigel M. de S. Cameron and M. Ellen Mitchell (Hoboken: John Wiley & Sons, 2007), 43–60.

³⁴⁴ Brosnan, “The Sociology of Neuroethics.”

scientists and medical professionals, and in institutional arrangements that place them within biomedical research organizations, or as beneficiaries of funding aligned with the interests of scientific projects. Expectations for particular technoscientific projects such as genomics are themselves intertwined with general expectations that technoscientific progress will provide significant benefits for humanity; or alternatively, that some technologies may be dangerous and change our lives for the worse. There are distinctly bioethical expectations as well, such as the belief that technological developments generate novel and difficult ethical dilemmas.³⁴⁵

By envisioning futures filled with technologically-driven moral conundrums bioethicists effectively write themselves a role to play in the future whether or not it comes to pass as predicted.³⁴⁶ Yet for all the novelty appearing on the horizon, there is also the expectation within bioethics that every future technology nonetheless *raises* a standard set of ethical questions relating to harm, personal autonomy, informed consent and just distribution. Taken together, these expectations drive and coordinate the enhancement discourse within bioethics.

Speculative bioethics relies on shared technoscientific and bioethical expectations as a means of establishing a coherent research program. Without a basic consensus as to what technologies are in the cards and the kinds of questions they generate, authors from diverse backgrounds writing in different venues would barely be able to have a conversation. If different bioethicists either saw the future as holding radically divergent technological possibilities or identified very different ethical questions, then there would be little, if any, shared conversation

³⁴⁵ Richard Ashcroft, "The Ethics and Governance of Medical Research: What Does Regulation Have to Do with Morality?," *New Review of Bioethics* 1, no. 1 (November 2003): 41–58.

³⁴⁶ Brosnan, "The Sociology of Neuroethics."

between them. Instead of sounding like ethicists arguing over norms, they would begin to sound like futurists arguing over their predictions. The fact that authors who take completely opposing views on the desirability of human enhancement (the so-called ‘bio-conservatives’ on one side and ‘techno-progressives’ on the other) nonetheless agree regarding the capabilities that will surely result from technoscientific progress indicates the degree to which shared expectations are embedded in the enhancement discourse.³⁴⁷ These expectations sustain a mutually-reinforcing discursive project within bioethics that systemically excludes the voices of bioethicists who reject these technological visions. Critiques such as those offered by Guyer and Moreno, Jones, and Rosoff begin at the margins and remain there.

2. Coordination with biomedical research

The saturation of bioethics with technological expectations is not accidental or merely the result of bioethics coincidentally emerging just as certain speculative futures began to look increasingly imminent. It stems rather directly from the early history of bioethics and what later became the enhancement debate. The early bioethical literature to which speculative bioethics traces its lineage reveals that from the outset, bioethics attempted to introduce itself into discussions of future genetic technologies carried out primarily among scientists.³⁴⁸ Public bioethics attempted to take

³⁴⁷ As Carl Elliot notes regarding one opposing pair, “Hughes and Fukuyama are not as different from one another as they think... Neither of them are scientists, and both vastly overestimate the power of science.” Elliott, “Adventure! Comedy! Tragedy! Robots!,” 22.

³⁴⁸ Such is the description of events leading up to the first bioethics conference on the new genetics. Peter G. Condcliffe and Daniel Callahan, “Preface,” in Hilton et al., *Ethical Issues in Human Genetics*, ix–xi. Jonsen’s retrospective account is similar; Jonsen, *The Birth of Bioethics*, chap. 6.

the discussions that scientists and policy-makers were having about the ethical and policy import of their work and turn it into a discussion between them and the general public mediated by the newly created discipline of bioethics, much as clinical bioethics emerged to mediate the relationship between doctors and patients.³⁴⁹

From the beginning, it was therefore scientific visions of future possibilities that shaped the bioethical imagination. 1971's *Ethical Issues in Human Genetics* is the proceedings of what was probably the first conference on genetic technologies where many of the organizers and participants were (or would soon become known as) professional bioethicists. The preface, written by two of the organizers, Daniel Callahan of the Hastings Center (then the Institute of Society, Ethics and the Life Sciences) and Peter Condliffe of the NIH's Fogarty Center expresses virtual certainty in the future course of biotechnology:

As Monod points out, we now understand biology sufficiently to construct a coherent theory about it.³⁵⁰ This enables us to predict the probable lines of technological development in biology and medicine even though much experimental detail must be filled in. We are indeed in a situation analogous to that of the physicists following the discovery of nuclear fission by Hahn and Meitner, after which it was certain that the atomic bomb could be constructed if sufficient effort was made. Nirenberg has pointed out the inevitability of technological developments such as cloning, construction of synthetic genes, and other phenomena. Much of this future development is discussed in these

³⁴⁹ David Rothman, *Strangers at the Bedside: A History of How Law and Bioethics Transformed Medical Decision-Making* (New York: Basic Books, 1991).

³⁵⁰ The reference is to Nobel laureate Jacques Monod's *Chance and Necessity*, which brought up themes and questions that have long been occupying prophetic bioethics. See Kass, "Forbidding Science."

proceedings by Sinsheimer.³⁵¹

This passage demonstrates that rather than being something that happened over the course of time or as the result of increasing hype surrounding particular projects, the adoption within bioethics of particular visions predicated on the “inevitability of technological developments” as a proper space for ethical analysis was foundational.³⁵² It is also, somewhat paradoxically, tied to the way that bioethics has historically seen itself as thriving on a well-informed grasp of the scientific facts bearing on issues ranging from brain death to chemical addiction. A candidate for Hastings Center’s unofficial motto would be “good science begets good ethics.”³⁵³ By extension, since good science means sitting down and listening to scientists and clinicians expound in their areas of expertise, then if we wish to know what the technological future holds, we ought to listen to scientists as well.

On some accounts, if bioethicists collaborated more with scientists, it would provide a needed reality check and prevent future speculation from getting out of hand and intruding on how they view current issues.³⁵⁴ In some cases it might, but this fails to take into account that

³⁵¹ Hilton et al., *Ethical Issues in Human Genetics*, x. The referenced article from the collection is by the biologist Robert Sinsheimer, who went on to become the chancellor of UC Santa Cruz and one of the key initiators of the HGP (by which time his enthusiasm for enhancement had waned considerably). It touches on a number of transhumanist themes, suggesting that the emergence of transhumanism in bioethics some three decades later in the midst of the HGP should not have come as a total surprise.

Also notable is the linking of inevitability, atomic technology, and genetic engineering. The exact same thematic trifecta is found more than thirty years later in the passage I cited earlier from Baillie and Casey, n. 319.

³⁵² Its more distal foundation in speculative fiction is described in the next chapter (section V).

³⁵³ Heard from Tom Murray on several occasions.

³⁵⁴ Guyer and Moreno, “Slouching Toward Policy.”

technoscientific enterprises are themselves driven by the selfsame constellations of expectations about what is ultimately achievable given enough time and effort. A scientist might mention the unanticipated difficulties that have been encountered in the pursuit of genetic interventions or some other goal, but the pursuit remains. Even if some techniques are abandoned, timeframes extended, and goals modified in the face of setbacks or newfound knowledge, researchers generally do not drop projects until they have exhausted their options or their funding. Furthermore, experimental scientists do not generally go around talking about what has not panned-out in their research; negative results are not published, do not secure funding, or advance one's reputation. Researchers often project confidence to outsiders that may not reflect their own realistic and reserved perspective on the state of their projects. But it is the projected confidence, systemic optimism, and the aspects of the scientific imagination that necessarily leap ahead of experience that inform the range of issues that bioethicists believe they are justified in pursuing. Unsurprisingly, when scientists decry inflated expectations, it is often only after such expectations have helped to secure funding and have begun to generate moral consternation or concerns that exceed the more modest goals of the research program.

3. Establishing bioethics' relevance to biomedicine

The founders of contemporary bioethics were not frivolous or credulous people. It is therefore worth asking why bioethics did not cultivate a less believing posture toward technological futures. The answer lies partly in the historical milieu in which bioethics arose, which included the discovery of the structure of DNA and its first uses in clinical medicine, the debates over recombinant DNA technology, and the successes of human IVF. These, along with a host of other

rapid biomedical advances, certainly gave the impression that ethicists could be confident in the trajectory that science itself projected. However, this is only half an explanation, and for the rest, we need to look at the process by which bioethics solidified itself as a social resource within the world of biomedicine. Callahan sums up the process in his lament of mainstream bioethics having turned ‘insider’:

Perhaps this was inevitable once bioethics entered the mainstream, becoming a respectable part of the biomedical establishment. Bioethics ceased being a cultural curiosity, or a neighborhood crank, and became an accommodating handmaiden. Its practitioners came in with the trappings of the culture around them...We courted legitimacy, sought money from the big foundations, tried to make it in the higher reaches of academia, and endlessly worked to persuade physicians and biomedical researchers that we should be seen as allies and not opponents. That was not a pose. We felt that way and worked to convey that feeling. We succeeded.³⁵⁵

This process of cultural assimilation produced the close relationship between bioethics and biomedicine that I described earlier, and this translated into the assumption of a mythic view of biomedical science and confidence in its expectations. The irony of Callahan’s lament is that it is a fulfillment of the vision statement he proffered for bioethics more than twenty years earlier in the first issue of the *Hastings Center Report*:

My contention is that the discipline of bioethics should be so designed, and its practitioners so trained, that it will directly—at whatever cost to disciplinary elegance—serve those physicians and biologists whose position demands that they make the practical decisions. This requires, ideally, a number of ingredients as part of the training—which can only be life-long—of the bioethicist: sociological understanding of the medical and biological communities; psychological understanding of the kinds of needs felt by researchers and clinicians, patients and

³⁵⁵ Daniel Callahan, “Bioethics, Our Crowd, and Ideology,” *The Hastings Center Report* 26, no. 6 (1996): 3.

physicians, and the varieties of pressures to which they are subject; historical understanding of the sources of regnant value theories and common practices; requisite scientific training; awareness of and facility with the usual methods of ethical analysis as understood in the philosophical and theological communities—and no less a full awareness of the limitations of those methods when applied to actual cases; and, finally, personal exposure to the kinds of ethical problems which arise in medicine and biology.³⁵⁶

The level of attunement Callahan imagined borders on the fanciful. Nonetheless, it is easy to understand how the welcome reception that bioethicists received from researchers would encourage a naive belief in the good that would come from such close collaboration. The preface to the proceedings of the “Ethical Issues in Human Genetics” conference discussed earlier describes its genesis in a prior conference on scientific and ethical issues regarding prenatal testing for genetic abnormalities.³⁵⁷ There, it was noted that, aside from one lawyer, all the speakers had been clinicians or researchers. It was therefore decided to organize a second conference devoted solely to ethical aspects, “at which ethicists, lawyers, philosophers, and theologians, and other scholars would be invited to participate more fully.”³⁵⁸ The conference opened with remarks by Tracy Sonneborn, a geneticist:

I realize that I am probably a fool to rush into the ethical domain where angels—the philosophers, ethicists, theologians and lawyers—do not fear to tread. But these ethical problems concern us all, and not the least among us, the geneticists. I submit that after we listen carefully to what the professional theologians, ethicists, and philosophers have to say, as many of us have, then we, too may speak up and tell of our own attempts to see our way through the difficult problems that beset us.

³⁵⁶ Callahan, “Bioethics as a Discipline,” 73.

³⁵⁷ The proceedings of that conference were published as Maureen Harris, ed., *Early Diagnosis of Human Genetic Defects: Scientific and Ethical Considerations* (Washington, DC: Government Printing Office, 1972).

³⁵⁸ Hilton et al., *Ethical Issues in Human Genetics*, ix.

This dialogue has now been going on with increasing frequency during the last eight years, and some of my fellow scientists have written very thoughtfully on the subject... I assume that the purpose of this conference is to encourage further communication between physicians and geneticists on the one hand, and philosophers, theologians, ethicists, and lawyers on the other.³⁵⁹

With that mix of hope and collaborative spirit, it is understandable why bioethicists accepted the narrative of future scientific progress and technological prowess—even if they were not always thrilled with the prospect.

What strikes me in reading the papers offered in 1971 is that the scientists are all people of serious conscience, some are even quite eloquent, and they had been reflecting on the ethical import of their work for some time, yet they seemed to sense the need for mediation between themselves and the public. The era of the scientist as a trustworthy public intellectual who could expound on evolutionary theory and quote Milton had either come to an end in America or had simply never existed. Prominent biologists like P.D. Medawar were succeeded by a new generation epitomized by James Watson's public persona as an ambitious maverick. The time was ripe for intercession.³⁶⁰

4. Mediating between researchers and the public

The conscious effort to attune bioethics to the needs of the biomedical community resulted in a constellation of bioethical expectations which could coordinate bioethical research at various levels. This persists even in the absence of explicit institutional arrangements, but funding

³⁵⁹ Ibid., 1.

³⁶⁰ This is just an impressionistic picture of why bioethics emerged as a mediator between big science and the public. All the histories of bioethics offer far more detailed accounts and explanation. See for instance the first chapters of Fox and Swazey, *Observing Bioethics*.

programs like ELSI certainly boost the level of coordination by offering a set of shared expectations to guide scientific and bioethical research and to secure public support.

Expectations frequently serve to bridge or mediate across different boundaries and otherwise distinct (though overlapping) dimensions and levels. Expectations are foundational in the coordination of different actor communities and groups (horizontal co-ordination) and also mediate between different scales or levels of organization (micro, meso, and macro—vertical co-ordination). They also change over time in response and adaptation to new conditions or emergent problems (temporal coordination). Likewise, expectations link technical and social issues, because expectations and visions refer to images of the future, where technical and social aspects are tightly intertwined. Finally, expectations constitute ‘the missing link’ between the inner and outer worlds of techno-scientific knowledge communities and fields.³⁶¹

The coordinating and mediating functions of expectations explain why they continue to be so much a part of bioethics. They horizontally coordinate research programs within bioethics and between ethicists and scientific communities by providing ideas of what future technologies will exist in a manner that closely links their technical and social—and hence ethical—aspects. Further, if expectations bridge inner worlds of technoscientific research—usually tedious and too abstruse to interest lay communities—with the outer worlds of practical applications and larger goals, then bioethics itself functions as something of a normalizing bridge. It mediates between this inner world of technoscientific research and the general public by addressing itself to the expectations of what science has in store for us.

The following scenario, based on an actual case, does not involve the hype and spectacle that often invites the public involvement of bioethics; it offers but a small-scale example of how

³⁶¹ Borup et al., “The Sociology of Expectations in Science and Technology,” 286.

bioethics mediates at the level of expectations. A scientific paper is published showing a link between certain genetic sequence variants and autism spectrum disorder (ASD). The majority of the details of the study are not of interest to the public, so even if no practical application had been mentioned in the original research study, articles in the popular media nonetheless present the findings in an applied context as part of the effort to understand the causes and find treatments for ASD. This reflects the coordinating *technological expectation* that cures for disorders can and will be found eventually. Perhaps due in part to the diffusion of the *bioethical expectation* that new technologies generate ethical dilemmas, the article raises questions as to whether this information will be used to screen prenatally (or in PGD) for the risk of developing ASD, to selectively abort fetuses at risk, or merely to alert parents and clinicians so that earlier interventions will be possible. Is it an attempt to cure ASD or to prevent the existence of children who are not neurotypical? The responsible journalistic tendency is now to pose these questions within the purview of a field that deals with these very issues. By including quotes from bioethicists, or even merely by using terms like ‘bioethical dilemmas’ or ‘medical ethics,’ the public is reassured that a larger ongoing ethical discourse ensures that these questions are given due scrutiny.³⁶²

5. Accountability for expectations

Technoscientific expectations are deeply embedded within bioethics because bioethics has been

³⁶² This hypothetical is adapted from an incident in the British press. It was notable for the fact that the principal investigator—among the most preeminent in his field—objected publicly to his research being portrayed as a means for prenatal screening instead of pure research into the etiology of the disorder. Sarah Boseley, “Is Autism Screening close to Reality?,” *The Guardian*, January 12, 2009, sec. Society; Simon Baron Cohen, “Our Research Was Not about Prenatal Screening for Autism,” *The Guardian*, January 20, 2009, sec. Comment is free.

and continues to be an enterprise that is closely coordinated with biomedical research. This is a blessing, a curse, and a challenge. It is a blessing in that it uniquely positions bioethics to mediate and foster public conversations about the present and future of biomedicine; it is a curse because it is all too easy to unreflectively reinforce technoscientific expectations—whether in pursuit of funding, public exposure, or simply by applying the analytical toolkit at one’s disposal when it is not up to the task. But public bioethics cannot simply dispense with expectations—they allow it to facilitate public engagement with the long-term goals of biomedical science. Bioethicists who participate in public conversations face the challenge of maintaining a careful course between the Scylla of reinforcement and reification on the one side, and the Charybdis of losing the ability to coordinate research communities, policymakers, and the public in joint conversations, on the other. What is often lacking in bioethics is not merely the tools to navigate in such a manner, but a sense of accountability that would give ethicists pause before they go on to analyze a future technology as presented rather than first questioning the need for it, its desirability, its feasibility, and how realistic it is. The requisite tamping down of hype now *de rigueur* when ethicists directly engage with the media is not sufficient.

The failure to interrogate or attempt to justify expectations for future technologies is a direct function of how widely shared such expectations are.

Pronouncing an expectation does not necessarily create accountability, but does prompt responses and the expectation that the enunciator should justify their future oriented claim. In the case of widely shared expectations, however, legitimation is hardly required. In contrast, shared expectations can be used to justify other statements and actions, even to such an extent that one should justify an action that deviates from what is commonly expected. Also in more concrete

situations, formulating an expectation, say about the usefulness of a tool or a procedure, can be read as an implied warrant to others that they should use that tool or the procedure.³⁶³

This echoes more general findings in social psychology about shared beliefs: the more widely shared a belief, the less it needs to be justified.³⁶⁴ Although this sounds obvious now, what Festinger et al. noted in their famous study of a messianic cult is that the failure of an expectation to be fulfilled does not always result in its abandonment. The cognitive dissonance that results can be resolved with less perturbation by clinging more fervently to the belief, tinkering with it as little as possible, and trying to convince more people of its truth.

Unfortunately, this explains a good deal of what has taken place within the enhancement discourse. Antecedently, one would have thought that once a decade had passed after the completion of the HGP with no truly revolutionary changes to biomedicine and a much greater appreciation for the complexity and emergent properties of the genome, bioethics would have retreated from speculative discussions of enhancement. What happened instead is that the research community and the media were held to be somewhat accountable for inflated pronouncements regarding genomic medicine and some bioethicists complained about gene-hype and the effects of the ELSI program,³⁶⁵ but the enhancement discourse kept growing. All that was required was for participants to convince themselves and their colleagues that the genetic technologies that now appeared increasingly distant were merely convenient examples of

³⁶³ Borup et al., “The Sociology of Expectations in Science and Technology,” 289.

³⁶⁴ Leon Festinger, *When Prophecy Fails* (Minneapolis: University of Minnesota Press, 1956).

³⁶⁵ Evans et al., “Deflating the Genomic Bubble.” It is telling that at least two of the four authors of this piece are bioethicists, but there is no mention of bioethics as contributing to the inflation of the bubble.

enhancements, and enhancements *had already arrived*. However, they would likely achieve their more powerful capabilities later. Prophecies do not fail, they are simply reinterpreted.

As such, Rosoff may be entirely correct in his assessment of the prospect for enhancing complex traits, but it is of little consequence.³⁶⁶ Judging by the expansion of the enhancement discourse, it may no longer be tied to mainstream expectations coordinating current biomedical R&D.³⁶⁷ It has managed to achieve a critical mass of participants who share a common set of expectations—either for the technology, for the relevance of the discourse, or that one must address the same constellation of topics as one’s colleagues to be taken seriously—and this immunizes the discussants from having to offer justification. In such a climate, accountability is unlikely to emerge.

Here, bioethics has much more to learn from science than the other way around: when a research program such as the HGP ends up subverting the paradigm on which it was founded it celebrates this as an accomplishment and adjusts.³⁶⁸ That is the beauty of the progressive self-conception of science. It expects—wants—its understanding of the world and imagining of the future to be superseded. François Jacob sees this as a reflection of the human condition itself—one that bioethics would do well to consider.

Our imagination displays before us the ever changing picture of the possible. It is with this picture that we incessantly confront what we fear and what we hope. It is

³⁶⁶ Rosoff, “The Myth of Genetic Enhancement.”

³⁶⁷ Hedgecoe has similarly observed in his review of literature on pharmacogenomics that bioethicists’ expectations for the technology exceeded that of the pharmaceutical industry; “Bioethics and the Reinforcement of Socio-Technical Expectations,” 174.

³⁶⁸ Mike Fortun, “For an Ethics of Promising, or: A Few Kind Words about James Watson,” *New Genetics and Society* 24, no. 2 (2005): 157–173.

to this possible that we adjust our wishes and our loathings. Yet, while it is part of our nature to produce a future, the system is geared in such a way that our predictions have to remain dubious. We cannot think of ourselves without a following instant, but we cannot know what this instant will be like. What we can guess today will not be realized. Change is bound to occur anyway, but the future will be different from what we believe. This is especially true in science. The search for knowledge is an endless process and one can never tell how it is going to turn out. Unpredictability is the nature of the scientific enterprise.³⁶⁹

Bioethics needs to develop what Fortun has called “an ethics of promising” that is open to the unknown much in the same way that science is.³⁷⁰ For the scientist, the fulfillment of expectations lies in their unfolding and revealing new possibilities—not in their coming true just as anticipated. The same is not true for technology. Technologies that do not deliver on their promises or work as designed are failures. (When your phone’s speech recognition system calls your doctor instead of your lawyer it does not result in serendipitous ‘aha’ moment in which you suddenly are delighted to remember to schedule a colonoscopy). The enhancement discourse has not actually aligned itself with science; it has tied itself to a mast carved from technological promises and for more than a decade has plugged its ears. Among the ironies of *Beyond Humanity* is the invocation of Ulysses’s self-binding.³⁷¹ It fittingly describes the speculative-regulatory project.

c. Babies by Design: Managing Expectations in the Realm of Mythic Science

Outside of the cadre of card-carrying transhumanist bioethicists, Ronald Green offers perhaps the most explicit self-identification as a bioethicist possessing a mythic view of science as a direct

³⁶⁹ François Jacob, *The Possible and the Actual* (New York: Pantheon, 1982), 67.

³⁷⁰ Fortun, “For an Ethics of Promising.”

³⁷¹ Buchanan, *Beyond Humanity?*, 91.

extension of his institutional affiliations and professional roles. After commenting on the ascendance of socially conservative bioethicists who stood in the way of federal funding for some areas of embryonic stem-cell research,³⁷² Green proclaims that:

I, too, am a bioethicist... I am deeply committed to progress in biomedical, reproductive, and genetic research. Over a career as a university-based scholar, National Institutes of Health (NIH) administrator, and advisor to private-sector biotechnology researchers, I have dedicated myself to supporting the development of new technologies... I also believe that we should begin considering deliberate interventions into our own children's genetic makeup—to both prevent disease and enhance human life.

In this period of retreat, I want to draw attention to the impending revolution in genetic technology that will allow us to select or modify our children's genetic inheritance. I believe that the issue of gene selection and modification will dominate bioethics in the decades to come and emerge as a major focus of debate, dividing those opposed to biomedical advances from those committed to them.³⁷³

Unpacking just this brief passage could occupy the next several pages; instead, I would like to highlight several points which tie in to the discussion of expectations. First, Green makes explicit the notion that bioethics, at least for him, is intertwined with the biomedical research community both in supporting its efforts and in arguing for the pursuit of specific goals such as human enhancement. Second, he evinces the parallel expectations of technological change and attendant bioethical debate going hand-in-hand. Finally, this excerpt demonstrates how inevitability coupled with the mythic view of technology as progress is brought to bear as a rhetorical cudgel. Presenting the genetic revolution as inevitable and impending allows him to frame opposition to certain potential uses of those technologies as being against biomedical progress itself. The reification of

³⁷² Meaning Leon Kass and the PCBE; Green's *bête noire*. See, e.g., "The President's Council on Bioethics—Requiescat in Pace," *Journal of Religious Ethics* 38, no. 2 (2010): 197–218.

³⁷³ Green, *Babies by Design*, 4.

the future thereby casts current debates in Manichean terms.

Since Green focuses mainly on what are entirely future genetic technologies, he does not claim to be addressing pressing ethical questions. His book's purpose, more or less, is to prepare the public for the coming 'revolution' by divorcing expectations for the genetic technologies that emerge from the research community—which he fully accepts—from widespread (at least as he sees it) public expectations expressed in the popular media, bioethics literature, and speculative fiction that such technologies will have serious undesirable consequences—which he rejects. In their place, Green plays off of various works of speculative fiction to offer a competing vision of the futures in which genetic interventions solve not only medical conditions but a variety of social maladies more effectively and at far less cost than would be possible otherwise. *Babies by Design* is less concerned with ethical argumentation than with evaluating, managing, and shaping social expectations. This assessment is not intended entirely as critique; Green should be credited for taking speculative fiction seriously and for recognizing, at least implicitly, that expectations are part and parcel of any approach to future technologies and should be addressed directly. Unfortunately, his reading of science fiction literature proceeds from a mindset in which technological expectations are themselves taken for granted.³⁷⁴

My discussion of the role of shared expectations within bioethics explains why literature targeted within the field typically offers little if any justification for claims about coming genetic revolutions and the like. However, because Green's book is aimed outside of the professional enhancement discourse to a broader lay audience where such expectations are not as ingrained and

³⁷⁴ This reflects the 'science-fictional habits of mind' discussed in the next chapter (section V).

might even invite skepticism, he takes the unusual step of justifying its vision of the technological future. Green devotes the entire second chapter to detailing “how we’ll do it.” In a first-person journalistic style that is similar to Joel Garreau’s hyped portrayal of the impending enhancement future,³⁷⁵ Green takes us on a tour of research labs and talks with noted scientists. Moving from a discussion of PGD to the expectation that IVF will become the dominant mode of conception, and from there to genetically altering fertilized embryos, he concludes that the technologies he surveys are “not far from deployment,” and “move us directly into the world of gene enhancement.”³⁷⁶ Whether he is right or off the mark is not what interests me at the moment. It is possible that Green is an excellent prognosticator of biotechnology—though I have serious doubts given his readiness to quote out-and-out nonsense.³⁷⁷ Regardless, in devoting so much space to the claim that genetic selection technologies are impending, Green—like many others—

³⁷⁵ Joel Garreau, *Radical Evolution: The Promise and Peril of Enhancing Our Minds, Our Bodies-and What It Means to Be Human* (New York: Broadway Books, 2006). It is an indication of just how estranged speculative bioethics has become from its origins as a practical field that Garreau’s book was identified by a literary scholar of science fiction as part of the bioethics canon. (See the article by Jay Clayton discussed in Chapter Seven, section V.d).

³⁷⁶ Green, *Babies by Design*, 100.

³⁷⁷ For instance, he wholeheartedly endorses the idea, abandoned by genomics, that genes are just bits of information, and approvingly cites (p. 100) “science writer Matt Ridley,” who declares that “genes are just chunks of software that can run on any system.” Misleading metaphors like these contribute to the idea that the genome can be easily manipulated without taking into account the way the many self-organizing and regulating aspects of the genome/epigenome in vivo. For someone who identifies himself as having worked so closely with scientists, it is baffling that Green repeatedly draws on specious claims made by ‘science writers’ like Ridley and, elsewhere in the book (p. 3), Nicholas Wade, who has a similar fondness for distorting metaphors: “When genomes can be decoded for \$1,000, a baby may arrive home like a new computer, with its complete genetic operating instructions on a DVD.”

invests the conversation with a sense of urgency: we need to talk now because the means are being readied as we speak. Once the reader understands how actual and primed for use these technologies are, Green segues into discussions of speculative fiction in order to separate the core technological expectations—now shown to be real and inescapable—from the range of possible scenarios and moral dilemmas that may arise.

Had Green dispensed with the predictions and projections, and instead written a long meditation on being open to the possibilities that biomedicine might bring from the perspective of a bioethicist who is on very friendly terms with a number of life-scientists, we could all tip our hats and congratulate him for carrying on in Joseph Fletcher's prophetic tradition. Instead, *Babies by Design*, like much of the work in speculative bioethics, presents the future as simultaneously determined (technologically) and up for grabs (socially and ethically). Although the technologies are viewed as inevitable, the future can be presented as amenable to a range of possibilities that we can achieve if we just adopt the right regulatory schemes, moral principles, and social values. Authors who oppose allowing these technologies to be developed frequently invest the future with the same aura of technological inevitability; they simply see the social consequences in darker terms and call for more restrictive forms of regulation. What is entirely absent from the discussion is a critical stance toward the technological expectations themselves. This is crucial not merely because technologies that may never come to fruition are presented as certainties, but also because there are systemic prejudices and distortions that result from moral futurism. It is the ethical exploration of the technologically envisioned future, not the vision of the future itself, that reifies the possible future and renders speculative bioethics a fraught enterprise.

III: Toward a De-reified Speculative Bioethics

a. Technological Inevitability and the Dream of Anticipatory Agency

Speculative bioethics would not exist without a shared set of technoscientific expectations from which to proceed. Perforce, accepting that speculative ethics is a legitimate component of bioethics requires that we also accept the inescapability of pervasive shared ideas about what technologies are on the horizon. Critiques like Rosoff's are useful in better delimiting the legitimate scope of such expectations, but do not eliminate them altogether. Moreover, since, as I have argued, a forward looking bioethics cannot control the technological future, getting expectations into a more realistic frame is helpful, if secondary, to avoiding moral futurism. Even if we knew which technologies would exist in the next fifty years, it would be a mistake to think that we can usefully anticipate the nature of the moral questions, and an even bigger mistake to impose these questions on the present. So long as the future is reified, moral futurism would remain a problem even if we were to restrict bioethics to a far more sober and measured set of technological expectations. In this section I argue that moral futurism distorts bioethical discourse in two seemingly opposite ways: by disengaging the present from the future and by imposing the future on the present.

*1. The future disconnected from the present*³⁷⁸

A reader of Green's *Babies by Design* comes away with the impression that technologies for choosing genetic traits are inevitable if not already here; however, the profound changes that may

³⁷⁸ This section draws on ideas and themes from Nordmann, "No Future for Nanotechnology?"; Nordmann, "A Forensics of Wishing"; Dupuy, "Some Pitfalls in the Philosophical Foundations of Nanoethics."

occur when these technologies are adopted are still located somewhere in the unknown future. In the interim we can prepare ourselves to insure that things stay on track.³⁷⁹ The theme of technological inevitability serves to delimit where different bioethical approaches ought to be directed. The technology itself falls under the regulatory rubric, while its social ramifications will play out in the less determinate space of the future lives and societies and therefore are to be discussed in a prophetic mode. In Green's approach, it is here that our visions of social continuity or upheaval can be properly explored, and where the fictive universes of speculative fiction offer glimpses of various possibilities.

This rather misses the point of prophetic bioethics. It does not explore future possibilities because they are products of the technologically constituted future. The language of prediction and inevitability results in moral futurism that transforms speculative bioethics—whatever its mode—from a discussion of the present *in light of* envisioned possibilities into an exploration of *the future* itself. The result is that while on the surface it appears that everyone is talking about the same thing, e.g., genetically engineering offspring, some ethicists are talking about the present and some are talking about the future. But this is not just a question of miscommunication; it reflects a fundamental reconfiguration of collective moral agency.

If we start with the premise that the future is indeterminate both in terms of its

³⁷⁹ Technologies can be depicted as simultaneously inevitable and imperiled: Green has portrayed biomedical science as “a delicate flower” that will wither if starved for ‘air’ by over-regulation, and not ‘watered’ with federal funding (see n.326). Regarding nanoethics, Sparrow describes these and other contradictory narratives of nanotechnology; Robert Sparrow, “Revolutionary and Familiar, Inevitable and Precarious: Rhetorical Contradictions in Enthusiasm for Nanotechnology,” *NanoEthics* 1, no. 1 (2007): 57–68.

revolutionary or disruptive technological features and the consequent social ramifications, then since we cannot control that future we can regard it *as if* it was determined in the sense of being beyond our control. In reality, our decisions will certainly play out in the future, but so will a host of other dynamic processes that are not subject to direct decisional inputs, and we therefore effectively cannot know how our decisions ramify in the long-term. Recognizing this limitation, we can instead focus on present decisions and to the best of our ability try to act wisely. There is nothing wrong with this perspective. Recall that true predictive factors will certainly be taken into account in present decisions, even if in the long-run confounding circumstances may render these null; however, factors beyond the veil of indeterminacy will not come into play. Within such a perspective there is room for variation regarding what is controllable or not, or what is or is not worth attempting to control, but these will be differences of degree and attitude.

This resigned incrementalism does not obtain; modern industrial culture is saturated with technological expectations and visions of the future projected past the veil of indeterminacy.³⁸⁰

³⁸⁰ The following contextualization is useful:

Hyperbolic expectations of future promise and potential have become more significant or intense in late and advanced industrial modernity. This shift in intensity is probably connected with a number of tendencies in the contemporary character of science and technology. For example, technological and scientific investment has increasingly been tied into strategic rather than say serendipitous innovation. The last half century has seen a 'strategic turn' in science and technology visible in the development of explicit research and innovation policies in many countries and in changes in research and education systems and their funding structures. Technology development and scientific knowledge are considered of central importance for societal development, not least through economic growth and international competitiveness... scientists and researchers are increasingly expected to reach beyond the borders of their own specific fields of

(continues)

These visions are inescapable and intrude into the present such that we are unable to talk about current issues such as PGD or the widespread use of stimulants in academic settings without at some point talking about engineering biomedically enhanced children, and so on. Since we do need to talk about present technologies, and since many have become inexorably bound to visions of future technologies, the concreteness of the present reinforces the sense of inevitability ascribed to the future.

Once a given technological future is viewed as inevitable, it follows that our perceived degree of agency is constrained because although we cannot control today which technological future we end up with, we already seem to know roughly what it looks like. We therefore must limit ourselves to courses of action that actively accommodate or negate that vision. If current technological project X really leads inexorably to outcome Y, then we either accept X and Y, or try to curtail X to prevent Y. Yet no one wants to believe that we are constrained by our expectations to a binary ‘yes’ or ‘no,’ particularly if ‘no’ means we do not get to enjoy the benefits of X. The response found in speculative bioethics is to invent a new form of agency transposed into the

expertise and establish relationships with wide and heterogeneous networks of potential collaborators. Firms and policy makers are confronted, even bombarded, with technological promises (and their attendant risks) creating new decision-making demands based on the interpretation and analysis of the expectations environment.

Borup et al., “The Sociology of Expectations in Science and Technology,” 286–287.

future. This new form of agency is anticipatory and preparatory.³⁸¹ Unlike prophetic or regulatory bioethics of the present, preparatory speculative bioethics imagines itself as readying ourselves or our successors to make important decisions that will arise in the future by crafting regulations or by calibrating ourselves into a state of reflective equilibrium that is attuned to the exigencies of that future.

But this form of agency is illusory. Yes, in the future there will be significant decisions to be made, just as there are today, but given the radical indeterminacy of the future, the idea that we can regulate the future or reflect on particular future technologies today in a manner that will be useful in the future is a form of magical thinking. Yet speculative bioethics often tries to do just that: we stand in the present but imagine ourselves in the future, controlling the ramifications of future technologies. The wish for a means of control that extends instrumental reason far into the future is itself bound up with both the form and content of speculative bioethics, beginning with the germinal speculative vision of engineering future generations. The desire for a form of biological control coupled with a means of ethical guidance that both extend far beyond the usual horizon of temporal influence appear as two facets of the same dream.

This dream is built on twin paradoxes: the paradox of speculative bioethics is that the more the future is envisioned in technologically fixed terms, the more it is seen as something that we can

³⁸¹ This pattern is exemplified by Buchanan in *Beyond Humanity?*. Enhancement is not only inevitable, it is already happening. Being for or against it therefore makes no sense so we therefore move on to regulation. But if we deny the claim that it is already happening (something is happening, but whether it is the beginning of a grand project is indeterminate) and point to the Collingridge dilemma, then the conclusion that we begin regulating in light of what is to come is negated.

begin to approximate control over; the paradox of genetics is that the more we see ourselves as determined by our genes the more we seek to control ourselves through them.³⁸² In both cases we are in possession of a very limited and imperfect knowledge. We know what it is that we want to control (complex human traits/the future) and we have a general outline of causal structure that points to where to intervene (genes/ the present). In both cases we also reify that which we are seeking to control (a complex trait/ the possible future). The result is a drive to control that which is beyond our grasp.

In the meantime, speculative bioethics becomes an ethics of deferment, turning its attention away from the present and anticipating a time when it will offer the guidance needed to make the right choices. In reality there are unmet needs today and decisions within our grasp that could help to alleviate a good deal of suffering and prevent more in the future. Approaching these

³⁸² This reflects the much deeper Enlightenment dilemma of how to understand oneself as free in a mechanistic world. The mechanistic worldview is what makes nature manipulable, but it renders the self the subject of manipulation. One solution, which we might label Nietzschean, is to exercise forms of control that one conceives oneself not to be subject to or that subvert the mechanistic processes in nature. If I manipulate *myself*, I stand apart from *nature*, for nature does not manipulate itself. If I can control the genetic makeup of future generations, then I myself must be free, because the same manipulation has not been done to me. If this picture is correct, then transhumanism has an internal logic of progressive inevitability: each subsequent generation after the first that is manipulated genetically will seek to manipulate itself or the following generation to an even greater degree and so on.

The other options are either accepting a Kantian metaphysical conception of freedom—in either its constructivist (self-legislating) or ontic (noumenal) interpretations, or to see choosing itself as the essence of freedom, because the full consequences of my choices are unknown to me antecedently. Freedom is thus a gift of contingency and indeterminacy. This last view—associated with the ideas of narrative ethics I describe in the next chapter—underwrites much of the opposition to human enhancement on metaphysical grounds. Exploring these views in adequate detail is not possible presently.

issues with an eye toward moral development could be our greatest asset when we or our descendants eventually face whatever choices the future does hold. I am doubtful that preparatory simulations of moral thinking will be of similar value.

2. The future imposed on the present

In one sense, preparatory speculative bioethics detaches us from the future by locating agency in the future. However, the flipside of preparatory bioethics—moral futurism—imposes this future and its attendant moral demands on the present. If one looks at the discourse on human enhancement as it stands, bioethicists are often driven by the conviction that it is better to be open to the vast potential capabilities of genetic technologies, on the theory that in preparing ourselves for coming technological revolutions, it is better to be over-prepared. Agar makes this strategy explicit:

It is better to have principles covering situations that turn out to be impossible than to have no principles for situations in which we suddenly find ourselves. Acquiring moral insurance against the many different futures that enhancement technologies might make requires that we think beyond the limits of current science. We need principles for situations that might never eventuate, but whose possibility can not be ruled out given our current state of knowledge. Finding such principles requires what I will call a pragmatic optimism about cloning, genomics and genetic engineering. The pragmatic optimist considers a wide range of possibilities about the developmental trajectory and potential limits of enhancement technologies. Answers to questions about what would be right or wrong in these technologically ideal scenarios tell us about the ‘in principle’ obligations governing the technologies and about the ‘in principle’ liberties opened up by them.³⁸³

In the previous chapter, I pointed out how this is a rather dubious claim. It is also misleading.

These technological futures are not neutral ‘let’s just assume’ constructs; authors who provide

³⁸³ Agar, *Liberal Eugenics*, 34.

guiding principles for the use of possible future technologies do so because they have already decided that having technologies of this sort would, on balance, be a (really) good thing.³⁸⁴ If ethicists really believed that in general “we need principles for situations that might never eventuate, but whose possibility cannot be ruled out given our current state of knowledge,” then one would expect to see a robust discourse on how to ration food during a global famine, how to best relocate refugees from cities receding underwater, how to adjudicate regional wars fought over sources of fresh water, and all sorts of worst-case global ‘lifeboat ethics’ scenarios that certainly cannot be ruled out.³⁸⁵ Instead we find a very prominent and wide-ranging discourse on technologies that may be less probable than the alarming scenarios that could ensue from global climate change.³⁸⁶ That ethicists explore these scenarios because they are not only possible but desirable seems obvious, and even if they cannot really explain why these scenarios are so great, they could at least be open about finding them attractive. These oblique endorsements of technological visions make one pine for the candid enthusiasm of *Babies by Design*, and even the outright utopianism of the transhumanists.

If we turned back to bioethics’ early prophetic days, this was much less of a problem. As

³⁸⁴ In her defense of speculative ethics Roache points this out but does not notice how it serves to evade the need to justify the vision itself. Roache, “Ethics, Speculation, and Values,” 323–324.

³⁸⁵ I don’t mean to imply that these would be particularly useful either, as they similarly position agency in the future. The proper focus of climate change ethics is also the present in light of predictive models of complex but non-stochastic physical systems.

³⁸⁶ To be fair, Buchanan does mention global warming in *Beyond Humanity*. He asserts that it would be imprudent to block research on genetic engineering because we may need to enhance human thermal regulation to live on a hotter planet; *Beyond Humanity?*, 56. As the saying goes, when you’re a cyborg with a hammer-like appendage, the whole world looks like a nail.

much as theologian-ethicists like Paul Ramsey and Joseph Fletcher took these technological visions seriously, until the advent of IVF there was no current technology to be implicated in these speculative forays, and it was necessarily the vision of the future itself that was the subject of critical exploration.³⁸⁷ However, as bioethics extended its regulatory agenda to now practical questions regarding technologies like IVF and genetic screening, the imagined future possibilities (or inevitabilities) of genetic engineering were never far from ethicists' minds. As certain technologies began to appear closer, the future became the subject of the dominant regulatory discourse and was reified. The discourse—even in the prophetic mode—was no longer about a vision of the future; it was about the future itself viewed on a technological and decisional continuum with the present. We therefore notice that although Agar begins *Liberal Eugenics* with explicit hedging as to whether genetic engineering will ever be able to manipulate complex traits, by the end he juxtaposes genetic engineering with current practices like genetic testing and selective abortion, and genetic enhancement appears to be inevitable:

The enhancement technologies of the future will give prospective parents a wider range of choice than just between aborting and not aborting. Prospective parents will be empowered to modify their children's genomes.³⁸⁸

The process by which the future is reified in sophisticated bioethical inquiry is usually subtler than blithely adopting the naïve belief that what is possible or expected will come to be. Rather, bioethical questions regarding the uses of genomic technologies for PGD or selective

³⁸⁷ Paul Ramsey, *Fabricated Man: The Ethics of Genetic Control* (New Haven: Yale University Press, 1970); Joseph F. Fletcher, *The Ethics of Genetic Control: Ending Reproductive Roulette* (Garden City, NY: Anchor Press, 1974).

³⁸⁸ Agar, *Liberal Eugenics*, 150–151.

termination are presented on a continuum with future questions regarding enhancement technologies.³⁸⁹ By establishing a conceptual and evolutionary link between current and future technologies and moral dilemmas, authors perceive a mandate to address everything within a moral framework that offers a coherent perspective on the present and the future. As much as an author avers that an exercise in preparing for the future is neutral with regard to whether that future will come about, the very structure of the argumentation undermines this disclaimer.

In Agar's next book, he argues against 'radical enhancement,' the posthuman vision of human technological transformation.³⁹⁰ Tellingly, in that context he argues both that radical enhancements are very unwise *and* that they are highly unlikely. This implicitly recognizes the difference that one's belief in the likelihood of a future possibility—one's acceptance of a technological expectation—has on moral thinking and the structure of moral discourse. "It won't happen, but here's why it shouldn't" is a much more effective strategy than "those technologies are likely, but let's not let them develop." The latter argument—just as much as those contending that we ought to allow them to develop—has already accepted the future and now insists that it must be contended with in the present.

Buchanan makes a similar but even more audacious move by organizing the present and

³⁸⁹ Sarah Franklin has identified this as a widespread feature of bioethical discussions. They "depict PGD as a mixture of desire and design," "position PGD as a threshold technology or an interface to an improved or degraded future," and "express ambivalence, confusion and equivocation about the 'designer baby' technique in terms of its future consequences." Sarah Franklin, "Better by Design?," in *Better Humans? The Politics of Human Enhancement and Life Extension*, ed. Paul Miller and James Wilsdon (London: Demos, 2006), 90–91.

³⁹⁰ Agar, *Humanity's End*.

future around the broad concept of enhancement. The future then imposes itself on the present by demanding that we explain ourselves in light of its existence. Since the future is now as real as the present, we need principles and regulations that address both. And since it would be presumptuous to think that we know what is best for the denizens of the future, we cannot make decisions that close off their options, impose our values on them, or condescendingly think of our unenhanced lives as superior. We are now held hostage to the future and have to ask in effect, “what do these future people demand of us?” If it is biomedical enhancements that make their lives better or save them from environmental catastrophes then who are we to deprive them? This is a complete inversion of Rawls’s formulation of intergenerational justice in which each generation “must not only preserve the gains of culture and civilization, and maintain intact those just institutions that have been established, but must also put aside in each period of time a suitable amount of real capital accumulation.”³⁹¹ In other words, we take what *we* value and try to pass it on to the next generation while setting aside resources for further gains to be made. We do not owe future generations specific future technologies, or more generally, that which we do not value for ourselves.

b. An Ethics of Wishing

Why should any imagined future technology hold any sway over the present? If we want to proceed with a technology like genetic engineering to accomplish a particular goal then presumably nothing stops us from evaluating the goal on its own merits, and the technological means on its own merits

³⁹¹ Rawls, *A Theory of Justice*, 285.

by applying whatever moral considerations we believe to be important. Why then are we engaged in a discussion that is increasingly hostage to the indeterminate future? Can we just ignore these visions, these ‘horrible distractions,’ altogether and get on with the practical work of bioethics?

There are two reasons why this cannot happen, or, more precisely, one reason that I will look at from two angles. To begin with, expectations of the future will always intrude into the present. They are too much a part of how we collectively understand powerful technologies, how they are developed, and how we imagine future lives. So yes, in theory bioethics could chug along happily, not worrying about the indeterminate future, but for the fact that it continually encroaches on the present, commanding a great deal of attention. That is not to say that all, most, or even a sizeable minority of work in bioethics ought to be engaged in speculative inquiry, but that some technologies will always be closely linked with visions of the future and these *visions* invite a commensurate ethical response.

More fundamentally, although moral futurism distorts bioethical discourse, visions of the future do not intrude into the present from elsewhere; they are themselves aspects of the present. Once again, I offer Nordmann’s analysis:

The future is not something that comes towards us or that emanates from us, but is rather an intensification or amplification of the present, in the sense that wishes are conjured up and their fulfillment promised. Moreover, even though in most cases it takes time for a wish to be fulfilled, the fulfillment does not lie in the future as much as it lies in the wish. The wishes themselves are not just the products of technological development, but also its drivers. To the extent that they inform technological development, they are suitable subjects for TA—they hold the image of a technologically conceived future that is fully contained in the present.³⁹²

³⁹² Nordmann, “A Forensics of Wishing,” 13.

Nordmann suggests that the field of technology assessment stop trying to overcome the Collingridge dilemma by figuring out where to intervene to control future technologies. The Collingridge dilemma is actually not a dilemma at all; it is simply a description of human contingency—of the fact that our sphere of influence is limited to the present. TA that attempts to overcome the present essentially becomes an aspirational form of technoscience itself—akin to those technosciences which produce and are driven by images of human enhancement. What is true for TA is true for speculative bioethics: its attempt to anticipate and develop an ethics to shape the future—whether by approbation, regulation, reflection, or condemnation—reflects the dream of biotechnological control of human destiny.

In place of this, Nordmann suggests that TA engage in a ‘forensics of wishing’ that focuses on the present and does not engage in attempts to forecast and control the future. To understand this better, we must recall that Nordmann does not portray visions of the future as reifications in and of themselves—this occurs in certain framings of ethical questions. How then do we evaluate visions without reifying them? The answer lies in understanding that technoscientific images of the future are inherently ahistorical. They are not representations of the future, but depictions of the unfolding of potentialities contained in the present. Therefore, “if to posit a potential or to formulate a wish is the same as shaping the future, TA needs to be a forensics of wishing and can thus engage the future without going beyond the present.”³⁹³

What then would an *ethics* of wishing look like? I believe that it looks very much like a de-reified prophetic bioethics. It asks where these wishes come from, who produces them, and who

³⁹³ Ibid., 12.

benefits from the attempts to fulfill them. It asks what conceptions of the good, what substantive values, what notions of human flourishing these wishes embody. It reflects on the various stories into which these wishes are woven and what these stories tell us about ourselves. It looks beyond the allure of the vision and asks what human needs it addresses, and whether it offers a compelling solution compared to alternatives and in light of other, perhaps more pressing, concerns.

But an ethics of wishing is not an ethics for *the* future—that is, the actual future that becomes the present. Prophetic bioethics must always be careful to distinguish between interrogating visions of the future and asking questions of current technologies. Oftentimes the questions look very similar, but present technologies are real; they can offer useful capabilities and they can be used to ameliorate human problems. Assuming that they answer to some human need then even if they initially destabilize society, some sort of equilibrium will likely be reached and they will eventually become relatively stable facets of the world.

This does not mean that they are neutral tools that can be used equally for good or ill—technologies lend themselves to particular configurations of the social world and can change the meaning of fundamental concepts and understandings. But once they exist, the terms of the discourse change. Just as we can fault those who discuss possible human enhancement technologies as if they already exist for distorting how we understand the present, we can fault those who talk about present technologies as if they were nothing but fantastical projections of human arrogance. They may be just that *as unfulfilled wishes*, but once they enter the present, their meanings will necessarily unfold through actual historical processes, and, at that point, prophetic

and regulatory bioethics must be able to converse.³⁹⁴ When ethicists who have advanced a trenchant critique of a possible future technology move on to the next big ‘wish’ after the one they have been warning about is fulfilled, this too is an ethics of deferment.

c. Technology as Discourse

As I have noted, the technological future becomes reified in speculative ethics when it poses questions that we need to answer now. Yet it is only the technologies that are fixed; social outcomes are imagined to be largely a product of how we respond. Some authors contend that if we are careful and find the right balance between regulatory control and individual freedom, society will thrive with its new possibilities. Others think that these technologies are too dangerous and must be tightly controlled or even restricted. In either case, the technology stands apart from its social consequences mediated by ethical discourse and regulatory intervention. Notice that this way of framing the ethical questions of future technologies asks “how will they be used?” and proceeds from the idea that technologies consist of artifacts and techniques that stand apart from the uses to which they are put. Jean-Pierre Dupuy argues that this is obfuscates the discursive nature of the technology itself.

On what, then, should [ethical evaluation] be brought to bear? On technology! Modern English no longer seems to make a distinction between these two terms (any more than French does), and that is a loss. Technology is the discourse (logos) of and about the technique, which fits it into a system with other techniques or know-how, with symbolic or imaginary representations, with conceptions of the

³⁹⁴ Fortun describes an interdisciplinary bioethics project on race and genomic medicine that exemplifies this kind of approach: “For an Ethics of Promising,” 167–168.

world, but also with institutions, rules and norms.”³⁹⁵

For a technology that exists, it might be reasonable—though perhaps less revealing—for ethics to ask only how it will be used. But for an envisioned future technology, the expectational discourses that constitute it (and that it, in turn, furthers) are the proper locus for critical ethical engagement.

Drawing on Hannah Arendt’s *The Human Condition*, Dupuy locates the ethics of technological expectations (‘dreams of reason’) in their transformative effects on human lives.

Men dream science before doing it and that these dreams, which can take the form of science fiction, have a causal effect on the world and transform the human condition, whether they embody themselves in techniques or not. The object of ethical assessment must therefore be, not the technique alone, but this structure displaying a common cause:³⁹⁶

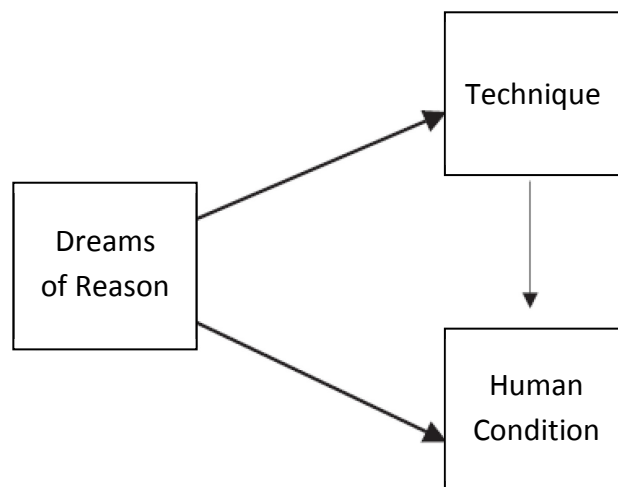


Figure 2: Causal Structure of Technological Discourses

Like Nordmann, Dupuy locates the ethics of technologies solely in the present.³⁹⁷ In the

³⁹⁵ Dupuy, “Some Pitfalls in the Philosophical Foundations of Nanoethics,” 241.

³⁹⁶ Ibid., 242. The figure follows the text and is adapted from the same source.

³⁹⁷ This picture echoes the quote from Medawar with which I opened the chapter: “Scientific and poetic or imaginative accounts of the world are not distinguishable in their origins.” As reflected in Dupuy’s schema, they both begin with “dreams of reason.”

‘dreams of reason’ box, he puts in the myriad aspirational dreams that describe possible future technologies, from technological expectations to science fiction to transhumanist visions. Into this box, we could of course add a good deal of speculative bio- and nano- ethics. The causal arrows indicate that in some cases visions become embodied in technique as processes or artifacts.³⁹⁸

When this occurs, we are prone to look at the technique as generating ethical concerns—whether in the regulatory sense as something that must be controlled, or in the prophetic sense when we look at how it changes the human condition.

The problem of speculative ethics is that it continues to focus on technique even when it only exists in the imagination. But if prophetic bioethics is broadly concerned with the human condition, then in its speculative explorations, it needs to look back at the visions themselves and consider how they are already affecting its formation. Moral inquiry into technological visions thereby proceeds by asking how the human condition is changing in response to very rapid destabilizations of formative concepts such as birth, death, the body, the natural and the artificial.³⁹⁹

There is no pressing need to recapitulate Dupuy’s various reflections; many parallel the

³⁹⁸ Borup et al. observe that “expectations and visions are often developed and reconstructed in material scientific activities and disseminated in obdurate and durable forms. In a sense, expectations are both the cause and consequence of material scientific and technological activity.” Dupuy’s diagram is thus simplified to highlight the focus of moral reflection. It leaves out the paths from technique back to vision. Borup et al., “The Sociology of Expectations in Science and Technology,” 286.

³⁹⁹ Exactly how these factor as ethical concerns will depend on one’s philosophical orientation. Dupuy is working from the phenomenological approach that understands ethics as rooted in subjectivity. This may matter less than the actual questions posed. I present some formulations of these kinds of questions in the next chapter (section III).

themes explored in prophetic and narrative bioethics.⁴⁰⁰ However, there are several elements that are worth noting as they avoid various traps that problematize speculative bioethics generally. First, it should now be apparent that his concerns are with the present, not the future. There are no predictions, projections of myriad effects, or the like, only an interest in how we are talking about future possibilities and how these ideas impinge on the present.⁴⁰¹ As a result, Dupuy is sensitive to some of the subtle conceptual reconfiguration occurring in expectational discourses. Second, Dupuy directs the conversation away from metaphysical discussions of human nature or the natural. 'Human nature' is dispensed with in favor of the socially constructed and temporally constituted 'human condition.' 'Nature' and the 'natural' are similarly defined as relational terms that have meaning in the realm of human experience. This does not render his arguments into decisive terms, but it does allow them to rest on their own merits without appealing to a question-begging metaphysics.⁴⁰²

This discursive approach is not unique to Dupuy and is found in the work of a number of authors within STS. Just as the embryonic stem-cell debates were heating up, sociologist Sarah Franklin offered the following reflection on one company's announcement of a project to develop stem cell lines that could reverse or prevent aging:

We must listen carefully to how Geron is offering to provide biological solutions to social concerns because by doing so they are suggesting a redefinition of the

⁴⁰⁰ I discuss a similar phenomenological perspective found in the work of Richard Zaner in the next chapter (section III.b).

⁴⁰¹ As I noted, the discussion of indeterminacy in the previous chapter was based on Dupuy's framing of the problem.

⁴⁰² That is not to say that he dispenses with metaphysics, only that it is a naturalized, constructivist metaphysics.

human, the social and the future. In other words, we need to look at these proposals very seriously simply because of their scale. We need to remember, in short, that one of the major questions we should be asking about the new genetics is not only the kind of genetic repair we might desire to have available to extend our lives, but why that question is inseparable from the issue of what kind of society we want to live in, on the basis of what kinds of cultural values, now and in the future.⁴⁰³

Franklin's comment is much more significant than the idea that expectations of the future *reflect* social values. Her point is that visions of the future, particularly those which involve human biotechnological enhancement, can alter stable social configurations that for most of human history have changed very slowly. Similarly, Nordmann point out that "Jean-Pierre Dupuy and Jürgen Habermas do not care whether certain events happen or do not happen in a remote future—as far as they are concerned, they are happening already in that our conceptions of the self are changing."⁴⁰⁴

Aside from offering a mode of ethical reflection that does not lead to reification, approaching technologies as discourses offers several other advantages. Applied to present

⁴⁰³ Sarah Franklin, "Culturing Biology: Cell Lines for the Second Millennium," *Health*: 5, no. 3 (2001): 349.

⁴⁰⁴ Nordmann, "If and Then," 45 n. 35. This quote may appear superfluous given that I have just been discussing Dupuy's view, but while Dupuy has to my knowledge not factored into many bioethical discussions, Habermas has. His short book on genetic engineering became something of a punching bag among American bioethicists and by now may be almost as much of a cliché as Sandel's *The Case Against Perfection* within the enhancement discourse. Unlike Sandel, however, Habermas may be the most systematic thinker in moral and political philosophy today, and does not to my knowledge regularly write on bioethical topics. The idea that he threw together a few careless thoughts on how bad it would be to genetically engineer children is absurd. Rather, he has a very tightly-integrated understanding of ethics, identity, and agency as discursively constituted and therefore he is sensitive to the possibility of biotechnology—as discourse, not as technique—to destabilize identity and agency. In Buchanan's view this amounts to "armchair psychology." I refute this charge in the next chapter (section III.e).

technologies, it may highlight issues that bioethics tends to miss by being too narrowly concerned with technique and with the most sophisticated and cutting-edge technologies. Paying closer attention to how biotechnologies are discussed and how they concretize certain norms and values and organize social relations can reveal “how less spectacular, more familiar technologies shape and reshape, perhaps transform social interactions, individual agency, and a sense of subjectivity or self.”⁴⁰⁵

This way of looking at technology is not entirely foreign to bioethics—nor should it be given its interdisciplinary base. For instance, Howard Brody approaches the discussion of new technologies by first looking back at the introduction of the clinical thermometer. He notes that although it changed the way that patients were monitored, it had little effect on treatment; instead, it changed the dynamic that existed between doctors and nurses. Brody concludes that “the most significant repercussions of a new technology might be its effect on social relationships and social networks. And this effect of a new technology might be especially difficult to predict.”⁴⁰⁶ However, Brody does not give up on efforts to predict these effects: “I do not want to insist that all attempts to front-load the ethical analysis will necessarily be futile... I do suggest, however, that whenever we have come to ethical conclusions in advance of the application of a new technology, we will almost certainly need later to revisit and often revise those conclusions.”⁴⁰⁷ He then revisits the IVF debate and argues that the ‘manufactured baby’ critique not only turned out to be

⁴⁰⁵ Ibid., 44.

⁴⁰⁶ Brody, *The Future of Bioethics*, 197.

⁴⁰⁷ Ibid., 198.

wrong as a prediction, but that trotting it out again when the cloning controversy arose twenty years later was silly.

What I believe Brody misses here is that it was the very fact that these concerns were couched in a language of prediction that limited them and rendered them silly when they did not come true. If we eliminate the predictive language to begin with, then what we are left with is, in fact, a discursive analysis of an emerging technology. This is significant, first, because it de-reifies the future and does not allow it to overwhelm the present, and second, because a discursive engagement with a coming technology does not suffer from a sudden loss of coherence when the technology arrives. If the discourse changes radically then ethical analysis will too, but more than likely there will be important continuities. In the case of IVF, it has indeed enabled arrangements that commercialize reproduction. In some cases, the commercialization mirrors the workings of global commerce, with rich countries outsourcing labor to where it can be bought for less. A couple who buys gametes and then hires a surrogate in a poor country while paying an agency to keep a close eye on her for the next nine months may have the best intentions, and everyone involved may be happy with the result, but claiming that this is nothing like manufacture clearly misses some of what is going on.

That is the ‘global’ view offered by prophetic bioethics—and it emerges as much from looking at the ‘big picture’ in terms of a larger sociopolitical context as it does from looking carefully at technologies themselves as constituted by discourses that begin as dreams long before they become tangible. In order to reasonably ascribe a putative benefit to speculative bioethics, we ought to be able to propose at least some understanding of how it might produce an effect that may help to keep things ‘on the right track.’ Dupuy’s box of ‘dreams of reason’ locates discursive

engagement with technological visions within a schema that may offer the best prospect for pursuing the UPB, as well as an important conceptual tool for bioethics more generally.

IV: Closing Thoughts

Bioethics became professionalized and institutionalized by becoming closely attuned to the introduction of new biotechnologies and expectations of a steady stream of increasingly powerful tools that would reshape biomedical science and perhaps society itself. Although technological expectations are part and parcel of biomedical research and play an important role in coordinating efforts across multiple research communities and within bioethics, it falls upon bioethics to approach these expectations very carefully and with a high degree of self-awareness. A failure to do so reinforces expectations and turns bioethics into the booster of all manner of technological futures.

Bioethics cannot fully disengage itself from biomedicine and the expectations it generates and feeds upon, but it can adopt a less mythic and more pragmatic view of its subject that translates into a better understanding of how technoscience is produced. This reveals a plethora of questions that bioethics could profitably take up regarding the long-term goals and shorter-term agendas that propel biomedical research. Bioethicists do not all need to vigilantly pursue an ethics born of suspicion, but they could at least adopt the suggestion that George Annas offered while he was himself involved with ELSI funded projects: “Never believe your own advertising.”⁴⁰⁸

If bioethics as a whole has, to its disadvantage, been somewhat credulous regarding the

⁴⁰⁸ Annas, “The Human Genome Project as Social Policy,” 127.

promises of future technologies, the lack of a critical stance is far more troubling when it generates the form of speculative bioethics that constitutes the bulk of the enhancement discourse.

Speculative bioethics has been heavily compromised by a failure to critically engage with technological expectations themselves. For a variety of reasons it has chosen to look past them and explore the futures they envision. As a consequence, it has developed a dubious anticipatory ethics that vainly tries to control the technologies it sees as inevitable, and engages in moral futurism, where a reified future distorts our understanding of current bioethical issues.

Speculative bioethics needs to be rethought from the ground up and reconstructed around modes of analysis that can address visions of the future as constitutive of the present. I believe that a prophetic mode of bioethics offers the tools to do so, but it can easily slip into the same moral futurism that plagues most discussions of enhancement. It must eliminate prediction from its vocabulary and develop a method of engagement that is open to the surprising turns that appear along the road, as society negotiates the transition from technological expectations to the emergence and diffusion of actual technologies in the world.

CHAPTER SEVEN – NARRATIVE COMPETENCE IN SPECULATIVE BIOETHICS

The powers of genetic manipulation, were they all at our disposal, would not provide the wisdom for using them. That must come from another kind of thinking, for which a technical civilization might have become incompetent through sheer lack of practice.

– William Barrett, *The Illusion of Technique* (1978)

I. Bioethics and the Uses of Socio-technical Scenarios

a. Beyond Moral Futurism

In the previous chapter, I laid groundwork for philosophical engagement with speculative technological futures that avoids moral futurism by focusing attention on future expectations, visions, and imaginings themselves. In that frame, speculative inquiry does not reify the future; it locates agency in the present, and it makes sense of the discussion of speculative technological futures within prophetic bioethics. To a degree this is all that is needed; it accommodates multiple approaches within bioethics so long as they correctly identify the object of their inquiry, their temporal focus, the scope of present moral agency, and they avoid reifying tendencies by eliminating the language of inevitability and prediction. Moral futurism enters speculative ethics when it sees itself as examining the future; however:

The situation changes and looks more favourable for ethics when the question “what will the future bring?” is replaced by “why should we now accept this or that promise of a technological future?” In light of this second question, technological programs are seen for the way in which they make claims on the present. While ethical discourse is still difficult and contentious, it is not deprived of its standpoint. Here, the contingency of the current situation offers an ineluctable, necessary, actually available startingpoint... Rather than adopt a believing attitude towards the future, an ethics beholden to present capabilities, needs, problems, and proposed solutions will begin with vision assessment. Envisioned technologies are

viewed as incursions on the present and will be judged as to their likelihood and merit: How credible are these claims, and do these technologies solve acknowledged problems? More generally: What do these visions tell us about the present, what is their implicit criticism of it, how and why do they require us to change?⁴⁰⁹

Nordmann's program covers most of the bases for how ethicists ought to approach technological expectations and discuss future technologies. And indeed there are a good number of authors—many of whom could reasonably be described as working within the tradition of prophetic bioethics—who either confine their discussions entirely to present technologies,⁴¹⁰ or see future possibilities as incursions into the present and analyze them as such.⁴¹¹ Others take a step back from the immediate debate and explore it thematically.⁴¹² All of these exemplify the virtue of avoiding moral futurism.

However, this picture is somewhat incomplete. When we survey the range of literature in speculative bioethics from the regulatory to the prophetic, we find that authors frequently invoke speculative visions that are not simple descriptions of future technological capabilities. At one end of the spectrum are the bare schematic descriptions of technological capabilities such as 'distributing genes,' somewhere in the middle, authors sketch brief scenario such as the 'previews

⁴⁰⁹ Nordmann, "If and Then," 40–41.

⁴¹⁰ For example, this approach was an explicit principle guiding the contributions to Joseph S. Alper et al., eds., *The Double-Edged Helix: Social Implications of Genetics in a Diverse Society* (Baltimore: Johns Hopkins University Press, 2002).

⁴¹¹ For example, Jean Bethke Elshtain, "To Clone or Not to Clone," in *Clones and Clones: Facts and Fantasies about Human Cloning*, ed. Martha C. Nussbaum and Cass R. Sunstein (New York: Norton, 1998), 181–189.

⁴¹² Erik Parens, "Toward a More Fruitful Debate about Enhancement," in *Human Enhancement*, ed. Julian Savulescu and Nick Bostrom (Oxford; New York: Oxford University Press, 2009), 181–197.

of perplexities' that opens *From Chance to Choice*, and at the far end, we find references to novels like *Brave New World* and *Frankenstein*, and movies like *Gattaca*. Although it is an unfair diminutive when applied to this last category, for convenience I refer to these collectively as 'socio-technical scenarios' to highlight that they begin with a technological possibility and proceed to imagine the social world that exists around it. In this chapter, I seek to develop a better understanding of how bioethics might approach and respond to these depictions of possible futures.

In one sense this is a search for an appropriate method for encountering the scenario-laden aspects of speculative bioethics. However, the term 'method' implies a highly structured top-down approach to well-defined topic, whereas socio-technical scenarios are ubiquitous, but vary considerably in how they are used and the shape they take. Rather than describing a method, I attempt via selective appropriation from various fields to offer examples of what different aspects of moral competence in speculative bioethics might look like. Since socio-technical scenarios are stories of one sort or another, this will be a form of narrative competence.⁴¹³ We encounter many

⁴¹³ 'Narrative competence' describes, among other things, a virtue of a medical practitioner in understanding and relating to patients that is cultivated through a reflective encounter with literature. The term has been used in clinical bioethics to describe approaches to moral thinking that include reasoning through telling and listening to stories, sensitivity to the perspectives of different actors in a clinical encounter, moral growth through literature, and applying literary analysis as a form of moral reasoning. It also conveys the idea of sensitivity to the narrative features of all moral thought even when applying standard principles. The literature in narrative bioethics is now rather vast. In attempting to illustrate aspects of narrative competence, I have drawn from the following articles and collections, as well as other works cited directly:

Hilde Lindemann Nelson, ed., *Stories and Their Limits: Narrative Approaches to Bioethics* (New York: Routledge, 1997); Tod Chambers, "The Fiction of Bioethics: A Précis," *The American Journal of Bioethics* 1, no. 1 (2001): 40–43; Rita Charon and Martha Montello, eds., *Stories Matter: The Role of Narrative in Medical Ethics* (New York: Routledge, 2002).

different stories in speculative bioethics. Stories about the future are the most obvious, but there are also stories about the present—both explicit and implied—and those which draw upon historical and mythological narratives. Narrative competence in speculative bioethics allows us to attend carefully to these stories before we find ourselves caught up in the now familiar ethical discourses that they sustain.

a. Bioethics and Narrative

The choice of narrative as a methodological framework reflects a preference for drawing on resources already established within bioethics. Although ‘narrative bioethics’ sounds familiar, it is too encompassing to pass off as a term of art without further explication. In his description of narrative discourse, Gustafson identified a commonality between theological and sociological approaches within bioethics, along with the genre of what might be termed ‘medical ethnography,’ as forms of narrative discourse.⁴¹⁴ The first approaches ethics from within a particular historical tradition and communal identity (its secularized form is recognizable in communitarian bioethics as well as anthropological/cultural approaches), the second contextualizes bioethical issues in a larger social, economic, historical, and cultural framework (we find this type of ‘global’ perspective in the work of authors like Carl Elliot and Susan Bordo, a localized version is seen in what has been called ‘naturalized’ bioethics), and the third illuminates bioethical issues by carefully attending to concrete encounters and experiences within healthcare settings. These examples do not exhaust the varieties of narrative approaches to bioethics, but they do offer a general idea of

⁴¹⁴ Gustafson, “Moral Discourse about Medicine.”

how a diverse set of approaches relate back to narrative. Beyond these three, at the intersection of communal and personal narrative, we can locate virtue ethics. Next, focusing more on the personal nature of the moral life, we find phenomenology and moral particularism generally. Finally, combining these with literature leads to a number of possibilities such as reading literature for insight into the moral life, and turning to it for a richer mode of expressing the meaning of living such a life.⁴¹⁵

Narrative and the notion of narrative competence have become prominent concepts in clinical ethics.⁴¹⁶ It is argued that attention to stories reveals the subjective meaning of illness in the lives of particular patients,⁴¹⁷ makes sense of and respects the choices faced by professionals and patients in the clinical encounter—particularly when they are members of marginalized groups, and uncovers the hidden power dynamics beneath the surface of interactions between physicians, nurses, patients and their families, even in the absence of open conflict.⁴¹⁸ Abstracted from any specific application, paying attention to narrative within ethics reflects the fact that for human

⁴¹⁵ Narrative “asks of experience not, Is it true? but, What does it mean? Whereas the organizing impulse of propositional discourse is to bring rational order to experience, narrative discourse is driven by the desire to discern meaning through metaphorical approximation and refinement.” Ronald A. Carson, “Sensibility and Rationality in Bioethics,” *The Hastings Center Report* 24, no. 3 (1994): 23.

⁴¹⁶ Hilde Lindemann Nelson, “Four Narrative Approaches to Bioethics,” in *Handbook of Bioethics: Taking Stock of the Field from a Philosophical Perspective*, ed. George Khushf, Philosophy and Medicine 78 (Dordrecht: Kluwer Academic Publishers, 2004), 163–181.

⁴¹⁷ Rita Charon, *Narrative Medicine: Honoring the Stories of Illness* (Oxford; New York: Oxford University Press, 2006).

⁴¹⁸ Howard Brody, “Who Gets to Tell the Story? Narrative in Postmodern Bioethics,” in *Stories and Their Limits: Narrative Approaches to Bioethics*, ed. Hilde Lindemann Nelson (New York: Routledge, 1997).

beings, meaning is always contextual, context is temporally extended, and therefore meaning is at least partly located in narrative. Narrative competence, at the very least, implies a degree of sensitivity to the way in which the meaning of actions, choices, and ideas are located within and constructed by stories, and an ability to understand a situation or choice by attending to its narrative composition.

c. Prophetic and Narrative Bioethics

‘Narrative’ is not a single approach to bioethics. Within the interdisciplinary practice of bioethics, narrative can be many things to many people, while holding out some hope of a common project. On the philosophical side, narrative is a potential meeting point between phenomenological and pragmatist ethics, contemporary virtue ethics, and moral particularism. It accommodates theological contributions and invites participation from a range of the humanities and the social sciences. Both descriptively and historically, it tends to overlap with what I have called prophetic bioethics. The term ‘prophetic,’ however, becomes associated with speculative explorations of biotechnology, discussions of public policy, and the effects of rapid biotechnological advances on society. The term ‘narrative’ has greater affinity with medical ethics and the medical humanities, the more intimate setting of the clinic, and questions of how medicine and culture interact. Nonetheless, commonalities are apparent, especially when we look at bioethics discourse prior to its regulatory turn. To illustrate, if we take Willard Gaylin’s prophetic article on organ harvesting (1974) discussed earlier with its vision of the near future, and compare it to William F. May’s anthropological discussion of organ harvesting (1973) which looks closely at the cultural and symbolic significance of the ‘newly dead,’ we find that their concerns, while expressed in rather

different terms, are similar—particularly in the reading of Gaylin I offered in Chapter Four.⁴¹⁹

Gaylin invites us to consider the present by telling us a story about the near future. May's article deftly moves between cultural anthropology, folktale, Greek tragedy, phenomenology, and theology. The glue holding these varied considerations together is the centrality of narrative to human experience.

Although prophetic and narrative bioethics have much in common and emerge from the theologically inflected early period of bioethics, prophetic speculative bioethics has allowed visions of technologically determined futures to structure its explorations of biotechnology. Mention of prophetic bioethics today brings to mind authors like Kass, Fukuyama, and their transhumanist interlocutors—and not the social and cultural concerns of Campbell and Anderlik. I therefore attempt in this chapter to bringing speculative bioethics more into the domain of a narrative (not visionary) prophetic bioethics. This raises another concern: although we find broad acceptance of narrative in clinical ethics, for various reasons, bioethics has not succeeded in bringing narrative approaches to the fore in public discussions of biotechnology. I therefore look to an alternate model of lay narrative ethics suited to public bioethics that advances a richer and more inclusive discussion of future technological possibilities.

⁴¹⁹ Gaylin, "Harvesting the Dead"; May, "Attitudes toward the Newly Dead."

II. Socio-technical Scenarios as Thought Experiments

a. Thought Experiments in Philosophy

Before proceeding to a narrative approach, we need to take a detour through more mainstream philosophical topography. If we think about the role that short vignettes and scenarios play in philosophical literature, the immediate association that comes to mind is with thought experiments. In moral philosophy we are familiar with various imaginary cases that range in the degree to which they depart from everyday reality. We encounter unconscious violinists, runaway trolley cars, doomed spelunkers, and drowning children. In the most general terms, “thought experiments are devices of the imagination used to investigate the nature of things”;⁴²⁰ for present purposes we can narrow this to: “thought experiments in ethics are devices of the imagination used to acquire moral knowledge.”

Treating speculative future scenarios as thought experiments is attractive. It eliminates the problem of reification and allows them to function as useful hypothetical constructs for discussing technological possibilities. Nordmann suggest that:

There is quite another and far more illuminating way to draw upon the idea of human enhancement technologies for purposes of reflection on technology and self, society, nature. Philosophers are notorious for using improbable scenarios in order to press an issue. Think of Descartes conjuring an evil demon who deceives us about our sense perceptions, think more recently of Thomas Nagel’s infamous brain in a vat. Philosophers take such scenarios seriously enough to generate insights from them and to discover values that might guide decisions regarding the future. But they do not take them seriously enough to believe them. Likewise,

⁴²⁰ James Robert Brown and Yiftach Fehige, “Thought Experiments,” ed. Edward N. Zalta, *The Stanford Encyclopedia of Philosophy*, 2011.

philosophical interest in the question of human nature provides a splendid context for a hypothetical consideration of enhanced individuals. Indeed, if we seek to understand ourselves, there is hardly a more telling question to ask than: “Suppose you were free to choose your body and mind, would you choose yourself more or less as you are?” ...Indeed, if science fiction scenarios lead to interesting philosophical questions, it is precisely because one suspends disbelief in the presence of fiction. Relieved of the pressure to determine what is true or false, what is likely to happen and what not, we can forge ahead and explore who we are, who we might wish to be, and how these wishes reflect on ourselves or our views of human nature.⁴²¹

Nordmann offers a particular application of enhancement scenarios in exploring the connections between our embodied nature and our self-conception, as well as a more general idea of gaining insights and discovering values that may aid in making decisions about emerging technologies. However, situating hypothetical scenarios in the future does not guarantee that exploring them will yield useful insights for guiding future decisions. A thought experiment in ethics located in the present could equally reveal important values that aid us in making decisions oriented to the future. Why would otherwise identical thought experiments generate different ‘results’ simply because one begins with “suppose you could do x” and the other begins with “suppose in the future scientists develop a technology that allows you to do x”? The modality of the case has not changed, yet situating a possibility in the future can nonetheless alter how we tend to think about it by transforming a counterfactual possibility into something like an expectation.

Future technological scenarios differ from hypotheticals used in philosophical thought experiments in other ways. Typically, philosophers draw up thought experiments to suit arguments or elicit particular intuitions. However, in speculative bioethics, the scenarios already exist and fix

⁴²¹ Nordmann, “If and Then,” 42–43.

the subject of the discussion from the outset. This should raise doubts about their usefulness as thought experiments; instead, these scenarios are assumed to have greater salience for future decisions. Further, the kinds of thought experiments that Nordmann suggests we fashion from science-fictional scenarios appear to be open-ended without definitive answers. In this way they differ significantly from the typical invocation of imaginary cases in ethics where the thought experiment, much like a physical experiment, is closed—it ends with a result of some sort. The result might then lead to further reflection and generate further scenarios, or to ‘rerunning’ the original experiment by varying certain elements, but the experiment itself has at least initially run its course. Open-ended reflection on possible scenarios does not seem to fit the mold of the usual thought experiment. In line with these general considerations, I will argue that construing the socio-technical scenarios found within speculative bioethics as thought experiments usually does not generate moral insight or knowledge, or allow us to uncover values that might guide us in future decisions.

b. The Trouble with Thought Experiments in Speculative Bioethics

In Chapter Four, I argued that when speculative scenarios are viewed as rough descriptions of the future to be subject to regulatory inquiries, the result is less than useful. In such cases the future scenario is treated like the present and some version of reflective equilibrium is used illegitimately to arrive at firm ideas about how a possible future technology ought to be regulated. However, this is not the only way to approach a given scenario, and I attempted to translate the question of genetic justice into a thought experiment that might have some contemporary relevance. Since a thought experiment is understood as a hypothetical, it does not lend itself to reification. However,

I argued that as a thought experiment, the genetic justice scenario fails. We reach the limits of the information and intuitions available to us for achieving reflective equilibrium before we have anything useful to say about the present or the future, beyond what we already believe to be the case regarding technologies that exist today.

This points to a general problem with thought experiments in philosophy in that they are usually attempts to elicit, refine, or challenge existing intuitions, concepts or theories. As such, they may not be on firm footing when the scenario differs enough from the confines of the actual world such that our intuitions or concepts fail.⁴²² We might legitimately conclude that our intuitions and concepts are contingently suited to the world and when pushed beyond those limits they are—not surprisingly—unreliable.⁴²³ Scenarios may also be too abstract or too concrete to have broader implications.⁴²⁴ However, it would be close-minded to think that all of our concepts and intuitions are reliable and our principles well-formulated as they stand. Thought experiments, properly conceived and executed, can hone them, reveal their limits, uncover contradictions, and expose their dependence on particular ways of framing questions.⁴²⁵

The literature on thought experiments in science, philosophy, and moral philosophy in

⁴²² Bernard Williams, “The Self and the Future,” *The Philosophical Review* 79, no. 2 (1970): 161–180.

⁴²³ Jakob Elster, “How Outlandish Can Imaginary Cases Be?,” *Journal of Applied Philosophy* 28, no. 3 (2011): 241–258; Jeremy Goodenough, “The Trouble with Thought Experiments,” *Theoretical & Applied Ethics* 1 (Spring 2011): 7–12.

⁴²⁴ Jonathan Dancy, “The Role of Imaginary Cases in Ethics,” *Pacific Philosophical Quarterly* 66, no. 1–2 (1985): 141–153.

⁴²⁵ Adrian Walsh, “The Use of Thought Experiments in Health Care Ethics,” in *Principles of Health Care Ethics*, ed. Richard Edmund Ashcroft et al., 2nd ed. (West Sussex: John Wiley & Sons, 2007), 177–183.

particular, is now quite extensive. I will draw on some of it later, but for now I will point out that thought experiments in moral philosophy may not be reliable when they deviate too much from the facts of the actual world, when they are too abstract, too specific, activate cognitive biases, or reframe questions in ways that changes their emotional valence. These latter two problems have been increasingly explored empirically.⁴²⁶ At the same time there is as a growing appreciation for how encompassing the category of thought experiment may be from the most schematic case to the finest works of the literary imagination.⁴²⁷ But simply calling something a thought experiment indicates little beyond its familial resemblance to other thought experiments.

Our present concern is quite a bit narrower: can socio-technical scenarios, as thought experiments, contribute to our analysis of topics like human enhancement without treating these scenarios as representations of the future? The trouble here is that within speculative bioethics, even when a socio-technical scenario is explicitly presented as a ‘thought experiment,’ the intent is almost always to tell us something about the possible future as it is depicted in the thought experiment. It is therefore a rather odd class of thought experiment. Imagine if Judith Jarvis Thomson’s famous example of the dying violinist was intended solely to give us a good idea of

⁴²⁶ Tamar Szabó Gendler, “Philosophical Thought Experiments, Intuitions, and Cognitive Equilibrium,” *Midwest Studies in Philosophy* 31, no. 1 (2007): 68–89; Theo van Willigenburg, “Philosophical Reflection on Bioethics and Limits,” in *The Contingent Nature of Life*, ed. Marcus Düwell, Christoph Rehmann-Sutter, and Dietmar Mieth, International Library of Ethics, Law, and the New Medicine 39 (Dordrecht: Springer, 2008), 147–156.

⁴²⁷ David Davies, “Thought Experiments and Fictional Narratives,” *Croatian Journal of Philosophy* 7, no. 1 (2007).

what we might do if we ever woke up to find ourselves in such a bizarre situation;⁴²⁸ it would be laughable. But this is exactly what we find in speculative bioethics. For instance, in Walters and Palmer's *The Ethics of Human Gene Therapy*, the authors take up genetic enhancements and ask the reader to prepare for a "thought experiment" by assuming the "willing suspension of disbelief"⁴²⁹ before presenting the following scenario:

Let us imagine that in the year 2110 carefully targeted changes in 100 interrelated genetic sites are demonstrated to increase agreeableness or friendliness and to mute violent aggressive tendencies often exhibited by the human species. In what contexts, if any, would it be morally justifiable to consider the use of genetic intervention to stimulate friendliness and to suppress violent aggression?

... First, would it be ethically permissible for individuals who are not sociopaths but who wish to be more agreeable to accept gene-mediated friendliness-stimulation for themselves—presumably through somatic cell intervention? Second, would it be ethically permissible or even desirable to for governments to undertake mutually verifiable programs of friendliness-stimulation and violent-aggression suppression within their own societies with the aim of promoting greater international and domestic cooperation?⁴³⁰

The authors answer both questions in the affirmative—so long as the government policy is not coercive. They also speculate that most citizens would be inclined to go along with this initiative. This may technically qualify as a thought experiment, but it does not tell us anything about situations other than those identical to, or very much like, the scenario itself. It might have some

⁴²⁸ Judith Jarvis Thomson, "A Defense of Abortion," *Philosophy and Public Affairs* 1, no. 1 (1971): 47–66.

⁴²⁹ This is a rather odd request that I have never seen elsewhere in even the most bizarre thought experiments. This underscores the fact that the genre of bioethics lends itself to confusion between possible cases and expected futures. See section V below.

⁴³⁰ LeRoy Walters and Julie Gage Palmer, *The Ethics of Human Gene Therapy* (Oxford; New York: Oxford University Press, 1997), 126–127.

broader implications if the authors went so far as to suggest that this be the long-term goal of publicly funded research—but they understandably do not, as the scenario is a mere hypothetical. Perhaps it suggests that we should not be too slavishly committed to human nature in its present state because it is far from perfect. If so, they certainly leave it up to the reader to tease that point out. Even if they plausibly argued that in such a case humanity is better off by altering itself, it would take a good deal more to demonstrate practical implications *beyond the confines of the thought experiment*.

Upon reaching the end of the chapter there is some clarification: the authors intended to distinguish between physical, intellectual, and moral genetic enhancements—which again, if I am not mistaken, is a distinction that obtains solely in that imagined future. This kind of ‘experimenting’ brings to mind precisely the measure of success in a biomedical technoscientific experiment: it is the accomplishment of the intervention itself, not what it tells us about nature more generally, that counts as success. Socio-technical scenarios can be treated as thought experiments, but unless one can generalize from them, they are better thought of as attempts at theoretical socio-ethical engineering. In other words, they offer regulatory guidance for an imagined future—and indeed Walters and Palmer proceed via the dominant regulatory approach, although Palmer puts autonomy first while Walters prioritizes justice.⁴³¹

⁴³¹ The idea of ‘moral enhancement’ both at the societal and individual level is nothing other than the translation of moral theory into human biology. We therefore find that Rawlsians tend to imagine creating people in the image of the actors in the original position: they are more equal in their features, more willing to cooperate, more capable of reasoning about interests etc. They are actual people rendered as the pure theoretical subjects of justice.
(continues)

Walters and Palmer's chapter on enhancement is also an example of another problem endemic to regulatory explorations of speculative futures: they begin with bioethical principles formulated in and calibrated to the present and attempt to apply them to a speculative future scenario, apparently expecting something useful to materialize. This is akin to taking a combination of basic physics and the principles of aerodynamics that have been gradually developed in the design of airplanes and applying them to the design of a flying vehicle suitable for a planet that humans may colonize in the year 2110. The engineers offer as an explicit stipulation that by then we will have developed very powerful but small and lightweight power sources, and so they proceed to design a vehicle without accounting for the weight and volume of fuel or batteries. Fair enough, but there is a crucial tacit assumption as well: future colonists will find a planet that is very similar to Earth. Yet for all we know, the closest to a habitable planet may have half the atmospheric pressure and half the gravitational force. We may end up with what to Earth-dwelling engineers looks like a very nice and functional machine, but even if they happen develop the requisite expected power source, future colonists will probably not be able to safely use the design without making so many changes as to render it unrecognizable to the original engineers. What is

Utilitarians want people with more capacity for experiencing states of wellbeing and less prone to harm one another, and more willing to sacrifice to maximize utility. Walters and Palmer imagine the genetic encoding of two principlist ideals—nonmaleficence and beneficence, and so on. This could potentially be the most intriguing discussions in speculative ethics *if it were treated purely as a series of thought experiments*. When it becomes the subject of serious discussion it is the mark of bioethics having lost some of its collective mind; we have become the mad scientists plotting to remake the world in our own image. As much as I think Walters and Palmer's moral enhancement scenario fails as a useful thought experiment, I appreciate that they at least offered it in those terms—albeit over fifteen years ago, when discussing 'moral enhancement' as if it were a real concern would have raised a few eyebrows.

more likely is that future colonists will not be turning to plans drawn up more than one hundred years prior.

Reflective equilibrium cannot generate useful insights for the indeterminate technological future any more than engineers can design airplanes for a future colony on an unknown planet.

c. Present Judgments, Technological Futures, and Reflective Equilibrium

In the examples we have looked at (i.e., Walters and Palmer, Buchanan et al., Farrelly) reflective equilibrium is applied to the imagined technologically transformed future. Authors begin with certain established principles that are themselves the result of a prior process of reflective equilibrium that has more-or-less stabilized. They then imagine the future in a very schematic fashion that insures that it will mostly resemble the present to the extent that considered judgments regarding existing principles—as well as the many background conditions giving rise to them—will hold. They pose questions about regarding the uses of future technologies and then embark on a very narrow secondary process of reflective equilibrium to arrive at beliefs concerning what ought to be the case in such scenarios.

As I argued in Chapter Four, this is simply not how reflective equilibrium is supposed to function. Considered judgments must first be formed under appropriate conditions to grant them foundational validity. Discussions of technologically transformed futures either no longer reflect the initial conditions under which reflective equilibrium has been achieved and are unsuited for housing our considered judgments, or they are imagined to be substantially similar. This does not

seem to tell us anything about the future that is not merely a reflection of the present.⁴³² But suppose we treat a scenario as a thought experiment? If a peculiar and highly abstract thought experiment works for Rawls, might it not work here as well? So let us take up this claim as a useful suggestion and turn to Rawls to see how he uses his famous ‘original position’ thought experiment, in the hope of achieving some clarity on the relationship between reflective equilibrium, thought experiments, and future scenarios.

First, I will reiterate a claim that I take to be strictly true of Rawls: his use of reflective equilibrium is only meant to help in grounding the basic structure of society.⁴³³ Nonetheless, let us proceed under the more lax understanding of the utility of ‘wide’ reflective equilibrium in moral thinking common within bioethics. In this view, reflective equilibrium offers legitimation via the coherence of some constellation of beliefs, judgments, principles, theories, and intuitions held in balance. Rawls begins with a collection of considered judgments (firmly held views that do not appear to be formed as a result of personal bias or to admit of easy exceptions) regarding

⁴³² In a similar vein Ronald Lindsay—highlighting the extent to which Rawlsian justice is constructivist—closes his article critiquing the genetic justice research program by suggesting somewhat mischievously that we might as well imagine that powerful enhancement technologies have so undermined the cooperative scheme that the idea of political equality is not understood by the enhanced class to extend to the unenhanced. Lindsay, “Enhancements and Justice,” 27–32.

I take this to mean as follows: by focusing on how the principles of justice would address inequality in the enhancement future, they neglected to take a big step back and give due consideration to the possibility that enhancement erodes the shared idea expressed by Rawls that “the fact that we occupy a particular social position is not a good reason for us to accept, or to expect others to accept, a conception of justice that favors those in this position.” That might hold true so long as social position is mainly the product of social forces, but once differences in social position are translated into biological facts, all bets are off.

⁴³³ John, “Titanic Ethics, Pirate Ethics, Bioethics.”

specific issues (e.g., slavery is wrong, religious views are not to be imposed by the state, etc.) and from there he begins to formulate complementary intuitions regarding general ideas of political equality and cooperation in the modern constitutional state as it exists. Hence, “since justice as fairness is intended as a political conception of justice for a democratic society, it tries to draw solely upon basic intuitive ideas that are embedded in the political institutions of a constitutional democratic regime and the public traditions of their interpretation.”⁴³⁴ From this perspective, he arrives at two principles that “can be formulated clearly enough to be combined into a conception of political justice congenial to our most firmly held convictions”: ⁴³⁵ equality of rights and liberty, and equality of opportunity/the difference principle. Only then does he turn to a thought experiment specifically designed to justify these principles as a plausible basis for a social contract by representing subjects as idealizations of political equality and possessing the basic motivational set that all subjects could be reasonably thought to share—rational self-interest and a willingness to cooperate. The idea of the veil of ignorance is itself an idealization of a prior firm conviction: “the fact that we occupy a particular social position is not a good reason for us to accept, or to expect others to accept, a conception of justice that favors those in this position.”⁴³⁶

Rawls’s thought experiment is calibrated very precisely to reflect existing conceptions of justice to show that in a situation of ideal equality and cooperation, these are the principles that self-interested rational individuals would agree to. Since wide reflective equilibrium is far more lax

⁴³⁴ Rawls, “Justice as Fairness,” 225.

⁴³⁵ Ibid., 228.

⁴³⁶ Ibid., 237.

than Rawls's approach—and necessarily so, for otherwise it could not hope to arrive at practical judgments—we could grant that it will similarly be more lax in its use of thought experiments.

However, it could not be much more lax; it would be rather odd to entertain the serious possibility that our considered judgments might be open to revision solely on the basis of hypothetical cases.

Our considered judgments are not abstractions; they are firm and substantive views about particular matters. Thought experiments could reflect them and help to refine principles abstracted from them, but we cannot turn to thought experiments to arrive at considered judgments, and we should be sufficiently committed to them to be suspicious of thought experiments purporting to show that they are mistaken.

Let us concede that there are a range of ideas, intuitions, and concepts that are not nearly as foundational as our considered judgments, and that these should be open to revision via a process of wide reflective equilibrium that might involve thought experiments. The question remains where the process ought to begin. Do we jump straight into a thought experiment, or first try to get a better hold of our intuitions and try to arrange them into some semblance of formal coherence before testing them? I would argue that wide reflective equilibrium urges us to do the latter—especially when the subject is a possible future technology. Assuming that we have an existing equilibrium set of judgments, beliefs, and so on, what is the next step? If we wish to proceed on the basis of reflective equilibrium, then we ought to first look at the technology as if it were possible today. This is warranted by the fact that reflective equilibrium offers moral justification based on a form of moral epistemology of and for the present—not a global, God's-eye view. We would then gauge our intuitive responses and attempt to arrange them within an explanatory framework that coheres with our existing beliefs and judgments. At this point we

might proceed to more exotic thought experiments involving elaborate future scenarios. Or more generally, we stabilize and organize our beliefs in the present before subjecting them to a potentially destabilizing future scenario.

This approach is supported by the idea that imagined future technologies are perceived as incursions into the present but are actually its amplification. If we allow them into the present, then we must begin with the present and our present intuitive responses. If we jump into the imagined future first, be it an embellished utopian scenario or a bare outline of a technological inevitability, and then reflect on the ends presented via a future possibility before we have achieved equilibrium regarding the means proposed to get us there, then we have failed to ground our beliefs in the actual present. Without such an initial grounding, reflective equilibrium can lead to a coherent but vacuous arrangement of beliefs about the future anchored in the appeal of some technological fantasy. As such, discovering and clarifying our present intuitions takes priority, and we should prioritize these judgments when evaluating a future technological possibility.

It is inescapable that our intuitions and reflective practices are tied to a constellation of existing moral judgments and non-moral beliefs about the world. The charge that this may bias us to favor the present—what Bostrom and Ord⁴³⁷ followed by Green⁴³⁸ call status-quo bias, and what others more generally call fear of the unknown—is therefore merely a reflection of how we legitimately reason in moral matters. It might be reasonable to appeal to status-quo bias to explain retrospectively why a state of reflective equilibrium that follows actual technological or social

⁴³⁷ Nick Bostrom and Toby Ord, “The Reversal Test: Eliminating Status Quo Bias in Applied Ethics,” *Ethics* 116, no. 4 (2006): 656.

⁴³⁸ Green, *Babies by Design*, 8–9.

changes legitimately supersedes a prior state. But to question an existing state of reflective coherence *ex ante* by appealing to future possibilities that neither we, nor any other human beings, have actual experience with would undermine reflective equilibrium writ large. From the perspective of reflective equilibrium, the fact that a future person (or ideal observer) might come to a different conclusion is irrelevant.

In truth, if speculative scenarios were presented as mere hypotheticals, they would probably have little effect on present-day judgments. Explorations of future scenarios become problematic because regulatory analyses—especially when coupled with the rhetoric of inevitability—shift beliefs about what the actual future will likely hold. This, more than any explicit argumentation, can destabilize an existing state of reflective equilibrium. Shifts in non-moral beliefs about the world often have the greatest effect on changing moral views. The way we describe the world and explain it tends to have a greater purchase on people’s overall outlook than abstract moral beliefs. For example, shifts in societal views of sexual orientation are in large part the result of a redescription of homosexuality as a normal biological variation. Similarly, reinforcing the idea that powerful genetic enhancement technologies are inevitable and creating a reified image of the possible future can alter how people understand not only these possibilities and what options remain open for societal input, but even the way we conceive of ourselves.⁴³⁹

Reflective equilibrium may be a suitable method for reasoning about the basic structure of

⁴³⁹ I discuss this latter point in the next section from a phenomenological perspective. David Wasserman recently pointed me to Williams’s claim that it could change our understanding of individuals as “pure subjects or bearers of predicates.” Bernard Williams, “The Idea of Equality,” in *Problems of the Self* (Cambridge University Press, 1973), 169.

a democratic society, and in its more lax form it may work well in the formation of general principles and policies that govern relations and obligations between diverse individuals in public and professional spheres. However, I suspect that it is ill-suited for discussions of possible future technologies that are believed to be powerful enough to change society at the macro political level, the mezzo levels of community and the family, and the micro level of the individual. If wide reflective equilibrium constitutes the methodological basis of much of the work in regulatory bioethics, then it is typically seen as a process intended to culminate in a judgment, decision, or consensus position. When we discuss technological scenarios via this goal-oriented approach, we are drawn to the kinds of narrow, answerable, regulatory questions that are appropriate for current technologies, but which distort or elide the process of moral inquiry in the open-ended, reflective sense that characterizes much of what I term prophetic bioethics.

One could shoehorn an ongoing subjective and intersubjective process of moral reflection triggered by technological expectations into the notion of wide reflective equilibrium. But technological visions reflect and shape ongoing processes of scientific research and technological development that necessitate responsive approaches, lending themselves to a continuous reflective engagement with these possibilities—not necessarily firm judgments. If we imagine the interplay between technological expectations, envisioned futures, research and development, and realized technologies as an unfolding story, then attention to these narrative elements can help to sustain the most appropriate and constructive forms of moral competence.

III. Narrative Ethics and Future Technologies

a. Narrative, Identity, and Ethics

In my discussion of prophetic bioethics (Chapter Four), I appealed to the importance of narrative in portraying prophetic bioethics as an attempt to understand the larger narrative so that local decisions can be undertaken with some sense of how they might fit within the bigger picture. I analogized this process within bioethics to an individual's attempt to structure her own life such that smaller decisions cohere within a larger life story that the individual plays an active role in constructing.

This analogy reflects, albeit loosely, the fundamental connections between narrative and ethics identified by Alasdair MacIntyre in *After Virtue*. MacIntyre was attempting to show that even if we cannot hold to a metaphysical teleology founded in human nature, we can still only make sense of action by appealing to purpose. The purpose we attribute to an action will vary depending on the narrative frame of the action. From this general observation, MacIntyre goes on to argue that we can only make sense of a particular action as a moral act for which one is responsible within a narrative of one's life story. Likewise, one can only make sense of one's moral agency via narrative: "I can only answer the question 'What am I to do?' if I can answer the prior question 'Of what story or stories do I find myself a part?'"⁴⁴⁰

MacIntyre points out that we are all raised on stories through which we learn about the world, social roles, and what they demands of us: "there is no way to give us an understanding of

⁴⁴⁰ MacIntyre, *After Virtue*, 216.

any society, including our own, except through the stock of stories which constitute its initial dramatic resources.”⁴⁴¹ Intimately bound up with the question “what am I to do?” is the question “who am I?” Identity is constituted by one’s own life story, its place in a larger narratively constituted ‘tradition,’ its multifarious intersections with the stories of others, and the stories others tell about us.

b. Narrative Subjectivity and Technological Futures

MacIntyre’s theory of the narrative constitution of an individual’s identity, self-understanding and moral agency, how people become part of and help to shape each other’s narratives, as well as how we are bound up with larger formative narratives, points to various ways in which we can appeal to narrative within speculative bioethics. For instance, theorists ask how a given technology might reshape these constitutive narratives. Turning to biomedical enhancements, they ask how self-enhancement may change one’s self-conception/identity (the story I tell myself about myself), whether reducing a sense of natural contingency and bringing more of nature under control alters agency (how much of my story is of my sole authorship?), whether choosing children’s traits might change their self-conception and agency (how much of my life story is written by my parents?) and the nature of the relationship between parents and children (is parenthood the authoring of a child’s life story?).

These questions have been put to possible future technologies as well as to various current

⁴⁴¹ Ibid.

ones,⁴⁴² but they do not lend themselves to producing determinate answers regarding what the future will bring, regardless of whether some possibilities appear worrisome. Sensitivity to these kinds of questions is one aspect of narrative competence, allowing us to engage with technologies whether they remain in the realm of the imagination or begin to be realized. They may even suggest empirical questions to pose regarding existing technologies in order to better understand the potential consequences of emerging ones. However, when future human enhancement technologies become a topic for regulatory bioethics, substantive concerns such as these are usually dismissed as too speculative or simply averse to change.

Speculative or not, raising questions such as these is fundamental to moral reflection and not so easily written-off once we realize that we are asking profound questions about ourselves, and not offering an assessment of the lives of future people. The idea that discussions of the future are not simply taking place *in* the present, but are *of* the present is easy to lose sight of, but it is basic to any narrative mode of ethical engagement. If we attempt to project ourselves into a technologically transformed future to think through various possibilities, then we effectively sever ourselves from our own life stories—the context in which these speculative questions have true moral significance.

⁴⁴² For example, Leon R. Kass, “The Wisdom of Repugnance,” *The New Republic* no. 216 (1997): 17–26. This article’s unifying theme is the role of sex and procreation in the narrative formation of human identity and in giving a sense of purpose to one’s life story, a theme that was taken up in the broader context of enhancement in *Beyond Therapy*. Another oft-cited piece is Michael Sandel’s “The Case Against Perfection,” (originally an article then a short book) that is thematically interested in narrative identity and the natural as well (“The Case Against Perfection,” *The Atlantic*, April 2004). Carl Elliot’s *Better Than Well: American Medicine Meets the American Dream* (New York: Norton, 2004) looks at narrative identity and medical enhancement from the perspective of Charles Taylor’s conception of authenticity.

Sensitivity to narrative and the first-person perspective as foundational for moral salience can help us reclaim ‘ownership’ of these issues.⁴⁴³

Richard Zaner, the pioneer (sole practitioner?) of phenomenological narrative bioethics, suggests that questions about genomic technologies all reflect the enigmatic relationship between narrative, embodiment, and selfhood.

Each embodied person has his or her own birth, history, specific situation, and social context, and each of our biographies is both emergent from our own experiences and assimilated from others (parents, siblings, friends, teachers, as well as the extant socio-historical milieu with its nexus of folkways, mores, laws, institutions, etc.). What is this ‘body’ that is ‘mine’ and even ‘me’ (if something strikes my body, it hits me), yet is so uncanny and perplexing (‘this’ hair, which is ‘mine,’ grows all by itself), even alien (‘I’ want to jump 6 ft, but ‘my body’ just won’t do it)? ‘My body’ is ‘mine,’ yet what does ‘belong’ really mean? And how do other persons figure in what I am? How did ‘I’ get here, in this world, this place, this family, this body?

So profoundly intermeshed is each person with multiple others (who are also embodied) from the earliest stirrings of life on, that even the most cautious reflection seems stymied: even while ‘I’ and ‘you’ are clearly different, “where the me ends and the mine begins” seems locked not merely in mystery, but instead in a profound enigma. Indeed, the perplexing wonder here is a labyrinth at once deeply personal, and yet also social, historical, and even conceptual. Who are we? Who am I? How is each of us connected to that body we experience as our own? These are the actual pressing issues nestled deeply in and driving the development of biomedical ethics, especially since the establishment of the Human Genome Project.⁴⁴⁴

Zaner’s description of the issues raised by genomic technologies remind us that it is the *idea*

⁴⁴³ cf. Wittgenstein’s claim that ethical assertions must be made in the first person; Paul Johnston, “Bioethics, Wisdom, and Expertise,” in *Slow Cures and Bad Philosophers: Essays on Wittgenstein, Medicine, and Bioethics*, ed. Carl Elliott (Durham; London: Duke University Press, 2001), 160.

⁴⁴⁴ Richard M. Zaner, “Themes and Schemes in the Development of Biomedical Ethics,” in *The Development of Bioethics in the United States*, ed. Jeremy R. Garrett, Fabrice Jotterand, and D. Christopher Ralston, *Philosophy and Medicine* 115 (Dordrecht: Springer, 2013), 236.

that a biotechnology will offer answers to very basic human questions of personhood, identity, and kinship—let alone remake them—that destabilizes existing understandings of these concepts.

Compared to the style of reflective equilibrium pursued in American bioethics, Zaner's manner of formulating these questions may appear foreign, but it is a reflective practice similar to many of the analytical projects that use thought experiments to plumb the depths of our 'conceptual worlds.'

Philosophical reflection tries to deepen our understanding of the conceptual worlds in which we are at home (the houses of concepts and ideas in which we live). It analyses the structures and presuppositions of our thinking, choosing and acting. Philosophical reflection is a discipline of rigorous argumentation and rational analysis. Still, philosophical reflection also hinges on intuition and non analysable insight. It is a typical philosophers' game to come up with all kinds of exotic examples to trigger and test our conceptual intuitions.⁴⁴⁵

Unlike the "philosophers' game" of the hypothetical thought experiment, a mixture of scientific claims and exotic technological visions challenge and potentially reconfigure our conceptual-narrative habitat in the real world.⁴⁴⁶ The question is whether narrative modes can be applied within public discourse without running afoul of charges of making unfounded anthropological claims or predictions. I have already suggested that the first step is to eliminate the language of prediction; the next step is to find a way to bring narrative back into public bioethics.

c. Narrative in the Public Sphere

The call for narrative competence within clinical ethics has an undeniable appeal. Even skeptics of its postmodernist and particularist formulations seem to appreciate that narrative figures into the

⁴⁴⁵ Willigenburg, "Philosophical Reflection on Bioethics and Limits," 154.

⁴⁴⁶ This approach is similar to Dupuy's exploration of the effects of 'dreams of reason' on the human condition. My intent is to show that such an approach already exists within bioethics.

application of principles and helps us to reason better in practical ethical matters. Narrative is a natural fit for the case study approach central to discussions of clinical ethics, and its emphasis on lived experience enriches our conception of what the study and practice of ethics means in clinical settings. A clinical encounter takes place between a small number of participants, and appreciating the perspective of each actor and the larger social and institutional structuring of the situation contributes to an apprehension of its moral features that exceeds what could be grasped if we conceived of subjects only in terms of their abstract juridical identities, and ethics as impersonal duties.⁴⁴⁷ Perhaps most compellingly, in an increasingly multicultural society, narrative offers approaches to clinical ethics responsive to individual complexity and cultural diversity.⁴⁴⁸

But narrative approaches are not as accepted when bioethics takes on broad societal questions. When public bioethics contributes to “deliberation and debate aimed at determining how societies should respond to the ethical dilemmas associated with biomedical science and technology,”⁴⁴⁹ this tends to be anchored by regulatory approaches. It seems evident that policies which apply to everyone ought to be formed on the basis of neutral standards that are ideally acceptable to all, and theories which appeal to impersonal duties legitimately do most of the philosophical work. In a political culture that is partisan and rife with competing claims put forth by interest groups, national bioethics commissions were designed to offer reasoned and careful

⁴⁴⁷ Margaret Urban Walker, “Keeping Moral Space Open: New Images of Ethics Consulting,” *The Hastings Center Report* 23, no. 2 (1993): 33–40.

⁴⁴⁸ Leigh Turner, “Bioethics in a Multicultural World: Medicine and Morality in Pluralistic Settings,” *Health Care Analysis* 11, no. 2 (2003): 99–117.

⁴⁴⁹ Mark B. Brown, “Three Ways to Politicize Bioethics,” *The American Journal of Bioethics* 9, no. 2 (2009): 43.

deliberation that would come up with recommendations acceptable to everyone.⁴⁵⁰ In contrast to clinical bioethics, authors who draw on narrative when writing about public issues typically appeal more toward the idea of community and shared values than the stories that bind the two together. Could a robust narrative ethics inform discussions of future technological possibilities and enter public conversation?

The boldest attempt along these lines was probably the PCBE's *Beyond Therapy* report that embraced a narrative form of ethics.⁴⁵¹ Its central question amounted to: "what is a good life story?" Its answer was: "one enriched by its very fragility and finitude." However, rather than talk about *Beyond Therapy*, I would like to focus instead on its companion volume, *Being Human: Readings from the President's Council on Bioethics*.⁴⁵² If the report was the meditation of a wary prophet writing in the anthropological narrative mode, *Being Human*, released several months later, was source material and a study guide for the people. This large anthology of readings that capped the Council's first term ranged from the Bible to Ovid to Malcolm Gladwell. It tried to reintroduce the American people to (Leon Kass's idea of) their Western narrative heritage and to remind them of what it had to say about the nature of a good human life in an age of rapidly advancing biotechnology. It reflected the themes of several of the Council's meetings where

⁴⁵⁰ For a discussion various models of the political function of bioethics commissions, see Brown, "Three Ways to Politicize Bioethics."

⁴⁵¹ In Kass's words "we have sought to probe the meanings of the intersections of biology and biography, where life as lived experientially encounters the results of life studied scientifically." President's Council on Bioethics, "Transcript: Session 5," January 16, 2004.

⁴⁵² President's Council on Bioethics, *Being Human: Readings from the President's Council on Bioethics* (Washington, DC, 2003).

members discussed some of the same pieces of literature as part of their deliberations. Although the very notion of releasing a volume like *Being Human* is unabashedly didactic, the idea, I think, was to offer a means of articulating the apprehensions that Kass believed that many Americans already shared about the biotechnologies expected to emerge on the heels of the nearly completed HGP. It endeavored to inject some narrative competence into, and perhaps encourage a more reflective and participatory form of, public bioethics.

If it did not achieve these goals, the problem was not only that *Being Human* did not become an instant bestseller, nor was it due to its distinctive view of the tension between scientific progress and human flourishing.⁴⁵³ The fundamental problem is that public bioethics in America, as reflected by the succession of national bioethics commissions—including the PCBE—has remained a discourse of elites. If Kass had wanted to subvert this trend, then recruiting some scholars and public intellectuals who were not of the professional bioethics class and adding elements of a ‘great books’ seminar to the mix was a rather ineffectual way of going about it. The PCBE rejected the idea of bioethical expertise and tried to encourage a ‘richer’ form of ethical discourse, but it was no more concerned with the participation and opinions of lay citizens than any other commission.

A public form of narrative bioethics mirroring the ethos of its clinical counterpart would need to mirror the latter’s attempt to change the dynamics that arise within a culture of medical and bioethical professional expertise. There, a dominant story portrays bioethics as speaking for

⁴⁵³ I particularly appreciate Green’s description of this view as “cranky dissent against modernity.” It manages to be both apt and unfair at the same time. Green, “The President’s Council on Bioethics—Requiescat in Pace,” 202.

the liberal value of self-determination and pushing back against a medical tradition of paternalism. In this overarching narrative, the actual stories of patients and medical professionals are replaced by rote scripts and moral justification is formulated in universal terms. This undercuts the narrative agency of all the actors—especially patients thrust into vulnerable roles—along with the possibility of achieving mutual understanding among them. Narrative ethics can dislodge this overarching story and allow patients and professionals to engage in constructive encounters in which they can make decisions commensurate with their understanding of the good and in consonance within their own traditions—whether of a particular culture, community, family, or health profession.

The closest that public bioethics comes to this narrative model is a portrayal of consensus formation among diverse participants that achieves a shared form of understanding.⁴⁵⁴ Although this is valuable, its use of narrative is derivative: it offers a reenactment of the founding story of public bioethics (i.e. Toulmin's idea of a return to casuistry in his story of the Belmont Report) that inaugurated the principlist approach to begin with. But unlike the original instance of achieving consensus that may have been a true process of coming to a shared understanding, participants in public bioethics now have a prearranged shared language of principles with which they are expected to express themselves in their deliberations. A community of experts speaking a restricted professional patois is exactly what narrative tries to overcome in clinical ethics; it argues that moral understanding does not equal the ability to agree—especially when only some voices are

⁴⁵⁴ Mark Kuczewski, "Bioethics' Consensus Method: Who Could Ask for Anything More?," in *Stories and Their Limits: Narrative Approaches to Bioethics*, ed. Hilde Lindemann Nelson (New York; London: Routledge, 1997), 134–149.

heard and only particular ways of speaking are allowed. The parallel aim of narrative ethics in public discourse would be to overcome the ‘community of experts’ model that tends to reduce the public’s voice and allow lay narrative voices to be heard.⁴⁵⁵

d. Narrative and Democratic Deliberation

National bioethics commissions of the sort we are familiar with in the U.S. are, for reasons discussed earlier, not agenda-setting bodies (in other words, they do not clarify the ends for strategic initiatives to pursue to begin with), nor are they effective at sustaining broad-based public deliberation when they are also tasked with developing oversight policy guidelines for governmental oversight. Trying to introduce narrative into this institutional configuration is counterproductive unless these two functions can be cleaved, so that we would have a quasi-political body that could focus on substantive deliberation and agenda setting in a less overtly politicized setting than the legislature, and a more open setting than governmental agencies. Narrative approaches will still be difficult to introduce into public deliberation if culturally bound narratives are viewed as parochial and the tendency is to ask those who would present them to distill or translate their meaning into a language that would meet a universal “informed citizen comprehension standard.”⁴⁵⁶ In the semi-closed setting of the clinic it is easier to argue that the

⁴⁵⁵ Kass’s PCBE can be seen as a rejection of the language of professional bioethics and an attempt to return to a narrative mode of ethics that put shared moral understanding ahead of consensus—and in this it may have succeeded a bit. Unfortunately, getting rid of the language of expertise does not get rid of experts. For a presidential bioethics commission to actually accomplish such a self-negating goal would seem to require a kind of Hegelian negation of negation. What that might actually entail is anyone’s guess.

⁴⁵⁶ Campbell, “Prophecy and Policy,” 16.

onus should be on those in positions of power to understand those whose voices are often disregarded. In public deliberation, it seems that the opposite is the case: the onus is those with conceptions of the good founded in particularistic traditions to speak in terms that all can understand and evaluate within a neutral framework. Such is the basic idea behind Rawls's requirement of public reason, and it has much going for it. Do we not need a common language for public discourse divorced from the views of particular religions, philosophies, or other assorted doctrines?

One approach to questioning this view begins by pointing out that public bioethics was never a narrative-free zone; it is simply one constructed from dominant narratives of liberal individualism. Recognizing that this is a tradition with its own foundational narratives makes room for other traditions to tell their own stories without having to translate them into the dominant idiom; or so argues Campbell:

The standard of informed citizen comprehension as a test of policy relevance is also problematic in that it imposes on religious thinkers a higher burden of relevance than is imposed on other discussants... Religious views of cloning, it may be argued, require this higher standard because they are characteristically rooted in a creation narrative that, whether it be the Genesis creation account, the Native American story of Wakan Tanka, or the Hindu creation narrative of Purusha, is understood as belonging to the realm of "myth." Yet, the foundations of philosophical bioethics are no less rooted in constructed fictional stories about the beginnings of human moral community, such as "the state of nature" or the "veil of ignorance," and the philosophical justifications of cloning required the construction of imaginary scenarios that might otherwise be deemed science fiction. Policymakers (and bioethicists) need to take seriously the relationships between norms and the narratives within which they are embedded. Doing so will enable the connection

between policy and prophecy to be fully (and fairly) acknowledged.⁴⁵⁷

I appreciate Campbell's point, and it might be possible to resist having to translate narratives into an abstract conceptual idiom in a setting where there is a particular policy question that needs to be answered and the issue is not immediately divisive. We could imagine that this is something like what happened in the course of the story that Toulmin tells: no one could agree why they agreed (they all told different stories), but given the necessity of formulating a policy to address the mistreatment of research subjects, they were able to come to some shared understanding nonetheless. But what happens when at least one of those two factors is absent? If a deliberative body is not tasked with coming to a firm policy decision on a specific issue, but is instead formed to clarify the various goals that society wishes to pursue by developing advanced technologies, then without the pressure that forces participants to muddle through to a policy recommendation, consensus formation might be very difficult. Consensus may not be the end-all of moral discourse, but without consensus, the results of deliberative processes would not carry much public weight. Questions would be left to be worked out via the vagaries of legislative processes or ignored until the next great bioethical spectacle emerges.

⁴⁵⁷ Ibid., 16–17. Aside from pointing to the mythic nature of the liberal political narrative it is interesting that Campbell flags the use of imaginary scenarios used to justify the development of a biotechnology such as human reproductive cloning. The point seems somewhat out of place, but it makes more sense if we rephrase it as follows: if the claims that some imaginary person has on us can be invoked to justify the development of a certain technology, then why is it wrong for me to appeal to my community's foundational story (even if you deem it imaginary) to justify preventing it. We are both telling stories to explain our normative commitments.

e. Lay Ethics, Dramatic Resources, and Master Narratives

What is the alternative? One of the great platitudes of bioethics—one that I am guilty of appealing to—is the notion of ‘public conversations.’ Somehow bioethical discourse is supposed to engage in and encourage public conversations, and these are alleged to wend their way through the conduits of social consciousness and political processes in order to facilitate public understanding and improve the governance of emerging and future biotechnologies. Yet, if narrative bioethics questions the primacy of expertise, then instead of seeing lay engagement as the byproduct of expert discourse, strengthening lay voices so that they are heard and have a say in governance should be a primary goal. Direct voting and opinion polling are usually ill-conceived because these issues are too complex to reduce to a small number of options, let alone to properly explain on a ballot or questionnaire.⁴⁵⁸ Another possibility is to have a representative sample of the lay public engage in a long deliberative process. If we believe that the strictures of public reason are too onerous and limiting, then we need not impose any prior constraints on how they discuss the issues, so that narratives of all kinds could be freely invoked and discussed. We might then hope that given enough time and willingness to get through all the relevant information and then deliberate at length, a useful consensus position might emerge for shaping public policy. At the very least, it would reveal where opinions diverge. This sounds like a good idea in theory, but it is very difficult to arrange (there is a reason why jury duty is usually compulsory), and given the

⁴⁵⁸ On the problematic meeting of bioethics, public policy, and ballot measures, see M. L. Tina Stevens, “Intellectual Capital and Voting Boot Bioethics: A Contemporary Historical Critique,” in *The Ethics of Bioethics: Mapping the Moral Landscape*, ed. Lisa A. Eckenwiler and Felicia G. Cohn (Baltimore: Johns Hopkins University Press, 2007), 59–73.

uncertainty of achieving useful results, it is not likely to be an effective use of resources.⁴⁵⁹

Perhaps there is another option for public narrative ethics. Instead of beginning with a requirement for ‘public reason’ and attempting to achieve consensus, we would work to elucidate ‘public narrative’ itself. Recall that MacIntyre refers to a shared collection of formative stories he terms society’s ‘dramatic resources.’ Could we somehow tap into these resources to discover a shared understanding useful for guiding policy discussions? MacIntyre would surely answer that this is precisely how a traditional society with a shared culture would go about tackling complex questions. Such a society would be able to choose a way of proceeding and to make difficult choices when necessary by appealing to its narrative resources—just as was the case in ancient Athens.⁴⁶⁰ But today, in a heterogeneous post-traditional society such as our own, that is a remote possibility.

Perhaps there is reason to be more sanguine. Diverse cultures tell different stories, but many have similar themes and premises—even if they take different forms, remain inchoate, or tend to be expressed in religious terms. Coming to a shared moral understanding can be thought of as a matter of converging on these common narrative elements or identifying a shared cache of dramatic resources.

Consider the following counterfactual: if Toulmin’s colleagues on the Belmont

⁴⁵⁹ Public deliberative bodies of all kinds (commissions, citizen juries, etc.) are useful when there is a question that must be answered, not necessarily when we are simply trying to get a better sense of how citizens, given some reasonable understanding of future possibilities, express their understanding of the moral issues involved and policy preferences.

⁴⁶⁰ MacIntyre, *After Virtue*, chap. 11.

commission had been given the task of formulating their consensus in terms of a shared narrative, or had they thought of justification as consisting in narrative and not in consensus itself, they might have been able to formulate a shared story. Or maybe they themselves could not have done so, but someone carefully following the conversation could have noted the invocation of stories and dramatic themes and identified common elements. Toulmin's fellow committee members could not agree why they agreed, but someone observing their deliberations and paying attention to the resources they were drawing upon in their discussions might have been able to detect common narrative threads and weave them into archetypal stories.

In place of highly educated professionals serving on a commission, substitute small focus groups of regular folks—each with a certain degree of commonality. Then switch deliberation for facilitated discussion and that hypothetical is roughly the idea behind an E.U. project that attempted to better understand a lay ethics of future technologies in terms of archetypal ‘master narratives.’ This project may be the best example of how the European nanoethics community has tried something that flies in the face of the American model of public bioethics. At the same time, the concept will be immediately recognizable to proponents of narrative ethics.

Research carried out as part of the DEEPEN project used extensive empirical interventions to try and uncover in more detail the ways in which public responses to nanotechnology develop and are resourced. In responding to the challenges of public engagement on emerging technologies...Theatrical techniques are able to harness unexamined, affective and intuitive ethical responses, and thus provide insight into the social dynamics and the perceived moral orders driving those responses. Through them it is possible to examine the shaping of ethical narratives

and the resources that people bring to bear on this process.⁴⁶¹

This sounds nothing like public bioethical discourse as we know it, but turning back to MacIntyre we find that it is actually a much older form of moral dialogue.

We ought to recognize that the categories *political*, *dramatic*, *philosophical* were much more intimately related in the Athenian world than in our own. Politics and philosophy were shaped by dramatic form, the preoccupations of drama were philosophical, and political philosophy had to make its claims in the arena of the political and the dramatic... The Athenians had not insulated, as we have by a set of institutional devices, the pursuit of political ends from dramatic representation or the asking of philosophical questions from either.⁴⁶²

The DEEPEN project facilitated and legitimated an indigenous form of ethical engagement in which citizens freely drew upon stories or thematic elements—their culture’s dramatic resources—to express their hopes and concerns for the future.⁴⁶³ The project then analyzed qualitative data from these sessions and identified archetypal ‘master narratives’ within them.

Our analysis suggests that the concerns and excitements that appear within focus group talk can be understood as being structured by a number of archetypal and deep-rooted cultural narratives—familiar and enduring stories which act as a resource for responding to new developments. These are ‘master-narratives’ in Agnes Heller’s sense: ‘guides of imagination’ and ‘references to a shared tradition’ which are “not just cognitively understood but also emotionally felt, without footnotes, without explanation or interpretation.”⁴⁶⁴ The narratives we identify as important in the focus group context are familiar stories that are deeply embedded in European culture, and which provide foundation and strength to a more broadly

⁴⁶¹ Phil Macnaghten, Sarah Davies, and Matthew Kearnes, “Narrative and Public Engagement: Some Findings from the DEEPEN Project,” in *Understanding Public Debate on Nanotechnologies: Options for Framing Public Policy: A Report from the European Commission Services*, ed. René von Schomberg and Sarah Davies (Luxembourg: Publ. Off. of the European Union, 2010), 17.

⁴⁶² MacIntyre, *After Virtue*, 138.

⁴⁶³ DEEPEN conducted parallel discussions with scientists, generating interesting findings from that constituency as well

⁴⁶⁴ I reproduce the full quote from Heller in the subsequent section.

applicable type of imagination. Concerns about nanotechnology, in other words, form part of a larger context of concerns about technological society in general, and general cultural storylines can be applied to them. We have identified five such narratives underpinning responses to the issues posed by nanotechnology:

1. 'Be careful what you wish for';
2. 'Opening Pandora's box';
3. 'Messing with nature';
4. 'Kept in the dark';
5. 'The rich get richer and the poor get poorer'.

The names of the five narratives indicate, in shorthand, their storylines. Indeed, their very familiarity is a sign that they are deeply rooted within contemporary culture, and can be understood as mythic cultural tropes.⁴⁶⁵

Faced with tantalizing stories of powerful and transformative future technologies, the participants did not try to come up with a 'new ethics' or frame their concerns in terms of any particular philosophy (though understandably the idea of choosing for oneself was prominent). Instead, they drew on familiar thematic and symbolic resources that can be traced to archetypal stories that societies have been telling and retelling through the centuries. The larger import of these findings is that these lay narratives challenge the dominant narratives that usually structure public discourses on science and biotechnology. These master narratives embody the mythic view of technoscience by portraying an inherent connection between increases in scientific knowledge, control of nature, and human betterment.

The lay narratives identified by DEEPEN 'resist,' or at least do not fully buy into, this dominant narrative. That is not to say that we did not already know that people are apprehensive about rapidly advancing technologies, but in general, the only counter-narrative that has had any

⁴⁶⁵ Macnaghten, Davies, and Kearnes, "Narrative and Public Engagement: Some Findings from the DEEPEN Project," 20.

currency in public discourse is the ‘Pandora’s box’ trope that worries that science may unleash destructive forces which it cannot control. This concern is taken seriously precisely because it complements the dominant narrative linking scientific progress with control. Once the unintended loss of control is perceived as the only accepted counterweight to the desire for unfettered scientific advancement, public bioethics becomes the highly reductive discourse on risks and benefits that we are familiar with.

DEEPEN reimagines what public discourse might look like if society’s shared moral language were conceived of in terms of narrative instead of principles and theories. Although it is a novel form of public engagement, DEEPEN would benefit from work done in bioethics, as it has begun to tread along many of the same paths. The results of the project were analyzed and discussed in a special issue of *NanoEthics*,⁴⁶⁶ and many of these papers intersect with narrative bioethics. For instance, Dupuy points out that “if lay ethics such as brought out by the DEEPEN project can be likened to a moral philosophy, this would be what goes today by the name of “virtue ethic.”⁴⁶⁷ Although there are clearly elements of modern virtue ethics in various iterations of narrative ethics, and modern virtue ethics could plausibly be called a form of narrative ethics (per *After Virtue*), calling this virtue ethics is somewhat misleading. What the DEEPEN project identified *was* narrative ethics *par excellence*. Narrative bioethics could serve as a valuable resource, having already explored a number of ways in which narrative can be constructively engaged in practical ethics.

⁴⁶⁶ *NanoEthics*, 4, no. 2 (2010).

⁴⁶⁷ Jean-Pierre Dupuy, “The Narratology of Lay Ethics,” *NanoEthics* 4, no. 2 (2010): 154.

Another article hints at the potential for projects like DEEPEN to change the tenor of the enhancement discourse by taking lay narrative ethics seriously. Davies and Macnaghten identify a consistent theme running through the five lay narratives, pointing to a conceptual foundation shared with Sandel's "The Case Against Perfection":

Sandel's notion of giftedness—in the shape of humility, generosity, and the valuing of what is given—can, then, be traced through the five lay narratives we have discussed. More broadly we can characterise these as being essentially amodern, rejecting the visions of progress, rational knowledge, and control that the Enlightenment project entails.⁴⁶⁸

This is not at all dispositive for Sandel's argument, but it does blunt the charge that there is something illegitimate about expressing serious and wide-ranging reservations about enhancement technologies in the form of narrative ethics without (essentially unattainable) empirical data that would generate reliable predictions. To see why, we should first look at one such critique.

Buchanan fulminates against authors like Sandel who:

[T]ry to discredit enhancement *in toto*, rather than just some enhancements under some circumstances, by attributing unseemly motivations to all who want to enhance. In doing so, they show no awareness either of the *prima facie* implausibility of such claims or the need for evidence to support them. In addition, these writers tend to make sweeping generalizations about the effects of enhancement on social institutions—for example, that they will lead to an extreme stratification of society, undermine solidarity, and erode the commitment to distributive justice. In this regard the enhancement literature is one of the last academic strongholds of *a priori* psychology and sociology. One would think that one was living in the eighteenth century, when serious intellectuals still believed they could formulate interesting and controversial generalizations about human behavior or the workings of human society from the armchair.⁴⁶⁹

⁴⁶⁸ Sarah R. Davies and Phil Macnaghten, "Narratives of Mastery and Resistance: Lay Ethics of Nanotechnology," *NanoEthics* 4 (2010): 150.

⁴⁶⁹ Buchanan, *Beyond Humanity?*, 9.

Before continuing, a brief digression is warranted: there is a curious elision about what precisely is under discussion. If the enhancement discourse was limited to technologies available today or more effective versions of them, and discussions of selection technologies remained limited to PGD and selective abortion, Buchanan would not have written a book called *Beyond Humanity*? The entire ‘enhancement’ discourse is outsized and fanciful. Calling someone out for broadly critiquing ‘enhancement’ and not making fine practical distinctions among the various uses of technologies that do not exist determinedly ignores the entire speculative premise of the discussion—something that transhumanists, at least, are not always guilty of.⁴⁷⁰

Returning to the present issue, I cannot tell if Buchanan is being purposefully obtuse or is a neo-positivist. He does not appear to notice that many useful theories in psychology and sociology (and obviously philosophy) cannot be proven; they are explanatorily useful without being neatly predictive. If they have staying power, it is because they continue to be helpful in explaining events and processes in human life and society. Aspects of Weber’s theory of modernity, for instance, are still in use (as in Evans’s study) because they continue to be useful. Could Rawls’s theory of justice proceed without armchair “generalizations about human behavior or the workings of human society”?

Similarly, Sandel’s theory of the given is useful in that explains, for many people, one of the aspects of human existence and relationships that make them particularly meaningful to us *in*

⁴⁷⁰ Nick Bostrom, “Technological Revolutions: Ethics and Policy in the Dark,” in *Nanoscale: Issues and Perspectives for the Nano Century*, ed. Nigel M. de S. Cameron and M. Ellen Mitchell (Hoboken: John Wiley & Sons, 2007), 129–152.

the first person.⁴⁷¹ Does this mean that it can predict what would happen in a world where children were carefully selected or enhanced? No, it cannot—and here the use of predictive language gets Sandel and others into trouble. But it can claim that if x makes something valuable, then in a world where x is changed or lost, from our perspective something valuable will likely have been altered or lost. It also means that when important aspects of society pursue projects that tacitly disvalue x, an important way of valuing can be lost. This is what Sandel is (hopefully) getting at.⁴⁷² The DEEPEN results suggest that many people are likewise concerned that with powerful new technologies something valuable could be lost; these possibilities reflected in present discourses, not predicted effects, are a legitimate focus of speculative bioethics.

DEEPEN further suggests that the public discourse about powerful and transformative future technologies is itself *mythic*. It pits a modern mythic view of science, technology, and human progress, amplified by hope and hype, against an amodern mythology of the ‘given’ that explains what it means to live a human life subject to forces beyond one’s control. This is precisely why the enhancement discourse has, from its inception, assumed larger-than-life proportions and a prophetic quality that lends itself all too easily to predictions and generalizations on all sides of the debate. On the mythic stage, there are no average people with modest goals of giving their children a better start in life; rather, there are archetypal figures whose motivations are primal. These characters represent the conflict between the desire for transcendence and the danger of

⁴⁷¹ See Martha Nussbaum’s review of CtC: “Brave Good World,” *The New Republic*, December 4, 2000.

⁴⁷² For an in-depth defense of Sandel along similar lines see Michael Hauskeller, “Human Enhancement and the Giftedness of Life,” *Philosophical Papers* 40, no. 1 (2011): 55–79.

irreversible transgression that lies at the heart of so many archetypal narratives. What Buchanan sees as “attributing unseemly motivations to all who want to enhance” merely reflects what happens when a discussion reaches into mythic dimensions. This mythologizing tendency is characteristic of discussions of speculative technologically transformed futures,⁴⁷³ not of current technologies.

When technologies materialize, they appropriately become disenchanting and no longer serve as props on a mythic stage. At that point, a more circumscribed and nuanced discourse should proceed. However, attempts by authors to rationalize the future proactively miss the point. The indeterminate technological future is a contested imaginary space in which a modern society can still collectively question itself and debate its substantive ends. This kind of moral discourse is intelligible because it draws on and speaks through shared dramatic resources. Attempts to translate the discourse into concepts like human dignity and human nature tend to crumble into a heap of abstracted terms with no clear, agreed-upon referent. De-romanticize it, civilize it, and bring it under the aegis of regulatory ethics and it quickly loses its substantive content.

Where does this leave bioethics in relation to public discussions of speculative biotechnologies? Should it be in the business of understanding, refining, and building on lay ethics, or debunking them—much in the way that ideas about nature and the natural appear regularly in the enhancement literature as conceptual balloons that need a good popping? The results of DEEPEN would undoubtedly fail to impress hard-nosed theorists, but others may be inspired to leave their armchairs and listen to the stories that people are telling. The impetus for

⁴⁷³ Michael Hauskeller, “Reinventing Cockaigne,” *Hastings Center Report* 42, no. 2 (2012): 39–47.

bioethics to take up narrative need not stem from the idea that there is no need for theory—only from the recognition that theories tell stories as well. And in the speculative enhancement discourse, where overt storytelling is the rule and not the exception, narrative competence can reveal how these stories structure the discussions. I now turn to this kind of analysis.

IV. Reading and Retelling Technological Narratives

Even highly schematic descriptions of technological futures within speculative bioethics entail a larger story. They begin with a sense of how science and technology have reached current capabilities and present the future technology as a coherent continuation of the story, leading to a denouement of sorts in the form of a morally compelling future scenario. In this section, I offer a few examples of how one can approach speculative bioethics attentive to its narrative features. Exercising this form of narrative competence obliges us to read stories critically and to draw on insights and techniques from literary studies, an approach pioneered within bioethics by literary scholars such as Todd Chambers.

This narrative approach has applied techniques of literary analysis to clinical case studies, showing how the literary construction of cases has rhetorical significance that influences and constrains how we understand cases and the interpretations and analyses given by ethicists.⁴⁷⁴ The case study format was imported from medical pedagogy to bioethics and is at least somewhat indigenous to the field. Attention to its literary conventions deepens our understanding of clinical bioethics itself—in addition to how we analyze particular cases. However, as I explain below

⁴⁷⁴ Chambers, “The Fiction of Bioethics.”

(section V), in many ways speculative bioethics is already engaged in a form of science fiction (SF), albeit one that blurs the line between fiction and reality. Understanding the history of SF literature can therefore uncover important truths about speculative bioethics. First, however, I will discuss how we might apply some more general tools of literary analysis.

a. Filling-in the Gaps: Archetypes, History, and Scripts

Schematic descriptions of socio-technical scenarios consist of little more than a technological capability and some idea of how it might be instantiated. Once we move past the seeming concreteness of a particular technology, the wider picture of the future is hazy. Even if technological projections are thought to be accurate, the larger future is not nearly as clear so authors and readers look for ways to take the technology and build a world around it. In building a richer description, one can draw upon archetypal stories, the history of the technology, or the technology itself to fill in the gaps.

Archetypes: Master narratives were the subject of the previous section; instead of rehashing the discussion, a more detailed description of their form and function will be useful:

A master narrative can be termed an ‘arche’ of a culture in both interpretations of the Greek word. The ‘arche’ stories are stories to which we always return, they are the final, or ultimate foundations of a type of imagination. Yet as the guides of imagination they also rule, control, and are vested with power. Direct or indirect references to master narratives provide strengths and power to new stories or new images, they lend them double legitimacy: legitimacy by tradition and by charisma, for in case of master narratives tradition itself is charismatic. References to a shared tradition are not just cognitively understood but also emotionally felt, without footnotes, without explanation or interpretation. It is not even necessary for single men and women to be familiar with the master narrative itself, for they are living in

a world where a host of memories and interpretations are imbued by their spirit.⁴⁷⁵

In speculative bioethics, the most common master narratives used to fill in the gaps and “guide the imagination” embody the themes of ‘science-technology→ control→ progress,’ or ‘science-technology→ loss of control→ destruction.’ As the DEEPEN project demonstrated, this neglects important ‘arche’ stories. When speculative scenarios reflect only these two archetypal stories they reinforce the thin risk-regulation mode of public bioethics.

Historical Narratives: Technological visions such as genetic engineering are encumbered by their histories. The history of eugenics is frequently ugly, but its most egregious manifestations occurred in the main prior to the birth of molecular genetics in the years after World War II. In telling the future story of human genetic engineering, does one begin with Darwin, Galton and eugenics, or with Mendel, Darwin, Crick, Watson, and molecular genetics? If the former, does the history of eugenics teach us where we went wrong so that we can do better, or warn us that we likely will go wrong again? (Was Nazi eugenics the expression of an ethos latent in eugenic aspirations, or, as CtC puts it, simply a ‘debacle’?) Each of these storylines can be found in speculative bioethics.

Technological Scripts: Technologies carry their own scripts as well.⁴⁷⁶ A technological idea like genetic engineering may be too abstract to begin to populate the future with fuller scenarios and characters, but add a bit of specification and more of the story starts to unfold. If genetic

⁴⁷⁵ Agnes Heller, “European Master-Narratives about Freedom,” in *Handbook of Contemporary European Social Theory*, ed. Gerard Delanty (London; New York: Routledge, 2006), 257.

⁴⁷⁶ Bastiaan De Laat, “Scripts for the Future: Using Innovation Studies to Design Foresight Tools,” in *Contested Futures: A Sociology of Prospective Science and Technology*, ed. Nik Brown, Brian Rappert, and Andrew Webster (Aldershot, UK: Ashgate, 2000), 195.

engineering is easiest to imagine as successfully accomplished on gametes or at the early embryonic stage, then the typical story of human reproduction changes, and soon technological necessity multiplies: “Within one or two decades... two new technologies could make IVF the way that many babies are conceived.”⁴⁷⁷ The technologies Green refers to are methods of preserving oocytes, and an increasingly complex web of technologies now begin to construct a more detailed story: more and more women wanting to preserve their fertility in order to have children later in life may well, at a rather early age, go through a medical procedure to extract oocytes or ovarian tissue to be preserved for later use. The story of human reproduction is then relocated in both time and space and the question is not only choosing children, but how to have children, and what it means to have a part of one’s body stored for later use.

The questions that speculative bioethics takes up depend on the scripts it associates with a particular technology, and it is apparent from the literature that these tend to be quite limited. Authors revisit the same scripts over and over as if the technological possibility itself told only one story. Instead of looking deeply at a technology while recognizing that its future is nonetheless indeterminate, speculative bioethics is bound to a few tropes that tie-in easily with existing bioethical principles such as harm (unintended consequences), justice (increased inequality), and autonomy (coercion and control). Regulatory bioethics in particular is notable for imagining problems that are amenable to regulatory solutions. Williams has referred to this limited array of scripts as a kind of ‘narrative bias’:

The tendency of particular sub-disciplines and schools of analysis to revolve around

⁴⁷⁷ Green, *Babies by Design*, 49.

particular stories, whether exemplary or cautionary tales. Across these stories we will find a (restricted) set of scripts: a repertoire of narrative structures, populated by certain groups of actors, sets of problems and their solutions; and often a set of somewhat stereotyped roles and characters: demons, potential victims and heroic rescuers (as well as a particular storyteller's viewpoint). The consequence is the romanticization of certain players and strategic moves. The kinds of analytic frameworks we advance when we investigate new technologies are laden with presuppositions: technologies—and our tools for analysing them—come with stories attached.⁴⁷⁸

Narrative bias is apparent across the entire spectrum of the speculative enhancement discourse; I pick on regulatory bioethics only because its self-portrayal as a heroic character in these future stories is so obvious. Aside from initiatives like DEEPEN, narrative bias within bioethics could be moderated by increased interdisciplinary engagement with scholars from other fields, and perhaps by reading more widely and deeply in the genre of science fiction to broaden its stock of scripts. However, as I discuss below (section V) science fiction can itself be problematic.

b. Framing and Temporal Shaping

Technological futures, even when presented in abstract technical terms and as largely unpredictable, can be framed by concrete stories. Kitcher opens *The Lives to Come* with a chapter titled “The Shapes of Suffering” beginning with an evocative tour of the long-term care ward of a children's hospital. As we peer in at various pediatric patients with neurodegenerative diseases, the plight of these children frames the quest for genetic knowledge and technologies in humanitarian terms. However, since future technologies will not be able to help *these* children, Kitcher implicates

⁴⁷⁸ Robin Williams, “Compressed Foresight and Narrative Bias: Pitfalls in Assessing High Technology Futures,” in *The Yearbook of Nanotechnology in Society, Volume I: Presenting Futures*, ed. Erik Fisher, Cynthia Selin, and Jameson M. Wetmore (Dordrecht: Springer, 2008), 281.

the reader in a voyeuristic attempt at pathos. Instead of serving as a ‘story of illness’ in which doctors and ethicists can better understand patients, we peer in at children, “some whose limbs convulse erratically, others who are unnaturally still,”⁴⁷⁹ and are struck by their helplessness and our inability to help them. But science, someday, will reduce our helplessness, and even if it cannot relieve *their* suffering, “then by reducing their number, it can soften the edges of human suffering.”⁴⁸⁰ This framing subtly introduces the reader to a quasi-utilitarian viewpoint. Those children are not individuals whom we as readers are introduced to so that we might care about them; they are units of suffering multiplied by their parents’ observing “with unending anguish, the half-lives their children lead.” Science can reduce the amount of suffering when “doctors and parents work together to avert lives destined to be cramped and diminished.”⁴⁸¹

Aside from the rhetorical pathos, there is a distinctive structuring of time in Kitcher’s narrative framing. The present is not simply the ‘now’; it is defined by the measure of suffering that genetic technologies could prevent in the future. The future is not defined by its temporal relation to the present, but by its transcendence of the shifting present in which we live, in the midst of “a scientific revolution, a transformation of our ideas about nature.”⁴⁸² In contrast, Green begins *Babies by Design* by depicting the “center of a revolution” as curiously mundane; the revolution is occurring almost unnoticed in a nondescript office building in which Affymetrix is

⁴⁷⁹ Kitcher, *The Lives to Come*, 13.

⁴⁸⁰ Ibid., 15.

⁴⁸¹ Ibid.

⁴⁸² Ibid.

manufacturing DNA microarray chips.⁴⁸³ Green's framing has an altogether different rhetorical purpose: it alerts us to the fact that technological time is moving ever more quickly *without us noticing* and the time to discuss designing our children has therefore arrived.

The way in which an author conveys a sense of the time until the realization of the technology reflects an implicit portrayal of the present. In the midst of the HGP, in 1996, when Kitcher wrote *The Lives to Come*, time was construed in epochal terms: the coming completion of the HGP constituted the dawn of a new age, and the technologies that would become possible due to the HGP were portrayed in relation to a concrete and soon-to-be realized goal. Kitcher's revolutionary present was therefore a time of anticipation. But promises changed once this epoch arrived. A decade later, Green tells us that we are still in the middle of a revolution, but the fulfillment now lacks a time-bound concrete goal like completing the HGP. Instead, time is accelerating and we are rushing to the future because thanks to the HGP, "the cost of DNA sequencing is now in a free fall."⁴⁸⁴ The post-HGP present is therefore an even less stable construct. At the close of *Babies by Design*, it is the ability to portray time as accelerating and stretching endlessly into the future that allows Green to envision any technological goal as attainable: "whether in ten, twenty, or thirty years, the first deliberate inheritable modifications of human genes will take place... From that moment on the pace of change will accelerate."⁴⁸⁵ It is

⁴⁸³ This author must disclose that he unfortunately owns a small number of shares in Affymetrix, a company whose stock is currently worth about ten percent of its value in 2005 when Green likely was writing his book.

⁴⁸⁴ Green, *Babies by Design*, 2.

⁴⁸⁵ *Ibid.*, 228.

again interesting to note how speculative bioethics acquires the same rhetorical features as other modes of analysis that attempt to foresee and shape the future:

A key part of technological foresight rhetoric is ‘the assumption that change is taking place at an increasing pace’. Nowotny sees the rise of ‘instantaneous time’ and the sense of increasing pace as affecting our views of the future to the extent we now see ourselves as living in an extended present. The future is always within our easy grasp and new rhetorics in which the future becomes immediately realisable arise.⁴⁸⁶

Look at virtually any discussion within speculative bioethics and you will find the rhetorical cues that warrant bioethics’ advanced engagement with future; in many cases these cues are ways of characterizing time and the distance between the present and future. The idea that we are living in an extended present that is already a part of the future is fairly widespread and we will encounter it again shortly in our discussion of ‘science-fictionality’.

Technologies themselves shape narrative time as well. Life-extending technologies change the chronology of the human life story. IVF does so as well by indefinitely stretching the time between conception and birth. The idea of genetically enhancing future children by manipulating embryos compresses both the time (shortly after in vitro conception) and the space (the sub-microscopic level of nucleic acids) in which one has the singular opportunity to make what is potentially a profound impact on a child’s entire future. Somewhat paradoxically, this spatiotemporally compressed form of control gives rise to the idea that responsibly entering into parenthood obliges a new kind of prudential foresight that extends far into future. Identifying the way in which a technology constructs time allows us to better understand how it might change our

⁴⁸⁶ Michael, “Futures of the Present: From Performativity to Prehension,” 31–32.

own narratives, and attunes us to how technological possibilities structure the stories in which they appear.

c. Deus Ex Machina

If the surprise artificial plot twist that settles all accounts and solves all problems is a staple of bad fiction, it is a staple of lousily plotted speculative bioethics as well. Will our continued poisoning of the environment threaten our existence? Genetic enhancement may be our only chance to help our bodies filter out those toxins. Will global warming turn the planet as hot as the Sahara? Enhancements may help us to survive by improving our bodies' thermal regulation. Our most pressing global problems seem to exceed our ability to formulate effective solutions, but with the right modifications we can make ourselves smarter. Can we ever learn to stop fighting and just get along? Moral enhancement may be the way to escape our base tendencies.⁴⁸⁷

The lousy plotting is not the real issue; it is the fact that no one in their right mind would peg our hopes of solving these very real problems on a nonexistent technology. The problems caused by ongoing environmental degradation and climate change may not come about, but neither are they screened-off by indeterminacy. They demand immediate responses. An ethical discourse where agency is located in the technologically improved future cannot realistically address the problems of the present.

⁴⁸⁷ Buchanan, *Beyond Humanity?*, chap. 2.

d. Language, Perspective, and Redescription

Meaning is shaped by a storyteller's choice of language and narrative structure. Narrative competence requires sensitivity to these elements, coupled with an imaginative ability to retell stories by altering these features.

Conflicting language abounds in descriptions of technological futures. Is IVF manufacturing babies or helping infertile couples? Does genetic selection prevent suffering or eliminate difference? Does one use the term genetic 'intervention,' 'engineering,' 'therapy,' or 'enhancement'? Are those who would seek enhancements for their kids the epitome of 'helicopter parenting,' or simply 'responsible'? Beyond particular arguments, evocative language and metaphor has the power to shape how people relate to a technology. New technologies entail the adoption of new metaphors as we seek to incorporate something novel within existing structures of thought and language. When authors debate future possibilities, there is therefore an undercurrent of contestation over which metaphors will prevail.

As we get farther afield into ever more speculative scenarios, attempts at redescription can become the focal point of the discourse. Is the quest for radical life extension 'promethean' or is it just like trying to stave off diseases that take people 'before their time'? To argue for the latter point, Bostrom tells a rather long fairy-tale about a hungry dragon (death) and a society's acquiescence to its demands to be fed thousands of people every day.⁴⁸⁸ Death is thereby redescribed as an arbitrary contingency that should be eliminated. In an inversion of the

⁴⁸⁸ Nick Bostrom, "The Fable of the Dragon Tyrant," *Journal of Medical Ethics* 31, no. 5 (May 1, 2005): 273-277.

Frankenstein archetype, untamed nature, not scientific hubris, becomes the ‘monster.’

Retelling a story or redescribing a scenario reveals its rhetorical force and emotional valence. In more developed stories, retelling can proceed by making another character the protagonist and revealing moral salencies from that person’s perspective. On this point there is convergence with work on thought experiments. Gendler shows that thought experiments in ethics are often vehicles for shifting the reader’s perspective—something that is not easily done simply by arguing for abstract principles.⁴⁸⁹ Williams has pointed to the narrativity of bizarre cases and shown that retelling them differently evokes opposing intuitions.⁴⁹⁰ Similarly, Jackson wonders whether intuitions in Thomson’s violinist case would change if we substituted Desmond Tutu for the sick violinist.⁴⁹¹ Souder argues that subtle details, such as the phrasing of a thought experiment in the second or third person, reflect the rhetorical purpose of the ‘experimenter’ and can affect how readers react.⁴⁹² More recent empirical work has shown convincingly that classic scenarios like the runaway trolley provoke different responses depending on narrative presentation.⁴⁹³

In a similar vein, Cooper emphasizes the difference between asking what ‘you’ would do in a hypothetical situation versus what “some ideally calm, good, and rational person would say or

⁴⁸⁹ Gendler, “Philosophical Thought Experiments, Intuitions, and Cognitive Equilibrium.”

⁴⁹⁰ Williams, “The Self and the Future.”

⁴⁹¹ M. W. Jackson, “The Gedankenexperiment Method of Ethics,” *The Journal of Value Inquiry* 26, no. 4 (1992): 525–535.

⁴⁹² Lawrence Souder, “What Are We to Think about Thought Experiments?,” *Argumentation* 17, no. 2 (2003): 203–217.

⁴⁹³ Some of the experiments are summarized by Gendler, “Philosophical Thought Experiments, Intuitions, and Cognitive Equilibrium.”

do,” presuming that answers to the latter question are what thought experiments in ethics are supposed to get at.⁴⁹⁴ But the latter formulation does not seem to be asking the right questions about future technologies (it probably is not asking the right kind of question about morality generally).⁴⁹⁵ Along these lines, I offer a reformulated and redescribed ‘thought experiment’ with a premise similar to the scenario that Walters and Palmer posed. In formulating my version, I have consciously made two crucial changes: I have turned the scenario into a story complete with a narrative and characters ascribed with a minimum semblance of identities, and I have invited the reader into the story by posing it in the second-person ‘you’ which has the perlocutionary characteristic of generating the first-personal ‘I’ in the reader’s mind. This rhetorical strategy was noted in Souder’s analysis of the dying violinist thought experiment. It is posed by Thomson in the second person, and retold by Jackson—seeking to question its usefulness—in the third person.⁴⁹⁶ In the enhancement literature, this rhetorical strategy is prominent in an article by Bostrom titled “Why I Want to be a Posthuman when I Grow Up,” in which the ‘I’ of the title is transmuted into the intersubjective ‘you,’ as most of the article consists of a tour of *your* future life once *you* “develop into a being that has posthuman healthspan and posthuman cognitive and

⁴⁹⁴ Rachel Cooper, “Thought Experiments,” *Metaphilosophy* 36, no. 3 (2005): 344.

⁴⁹⁵ Dancy, “The Role of Imaginary Cases in Ethics.”

⁴⁹⁶ Souder, “What Are We to Think about Thought Experiments?”.

emotional capacities.”⁴⁹⁷ My ‘thought experiment’ taps into the same rhetorical scheme.

Let us imagine that you have grown up in a family that displays the occasional violent and aggressive tendencies often exhibited by the human species. Your family is mostly friendly, but members sometimes become grumpy and disagreeable. Mom and Dad are very passionate about their own vocations and this sometimes results in conflicts in which they get really angry and scream at each other. Your younger brothers, close in age, are best friends, but are very competitive with one another and sometimes get into nasty fights. You yourself are pretty even-keeled, but become enraged when thinking about the dire poverty experienced by the millions who live on less than one dollar per day. You have therefore gone off to spend a year abroad doing humanitarian work before starting college. Unbeknownst to you, a biotech company has developed a neural implant that increases agreeableness and friendliness and mutes violent and aggressive tendencies. Your family has been persuaded to take part in the first human trials. When you return, you notice that everyone smiles more and they are constantly in an agreeable state. No one lifts their voice or yells. Your brothers no longer bet on who can hold their breath underwater longest or roughhouse like they used to. Everyone is so nice, but also a bit foreign to you. You don’t quite feel like you have returned to your old family. A few days later a representative of the company comes to your house and asks you to enroll in the trial. As you sit at the table reading the twenty page informed consent document, you look up and see everyone smiling at you in a very agreeable manner. Although they do not say as much, you sense that your parents agreed to the trial because things had gotten very tense between them. In what contexts, if any, would it be morally justifiable for you to use of this intervention to stimulate friendliness and to suppress violent aggression?

Whether or not this is a particularly useful thought experiment—I make no claim that it is—it highlights a number of important differences between the schematic scenario and the short sketch.

⁴⁹⁷ Nick Bostrom, “Why I Want to Be a Posthuman When I Grow Up,” in *Medical Enhancement and Posthumanity*, ed. Bert Gordijn and Ruth Chadwick (Dordrecht: Springer, 2008), 111. The ‘tour’ structure reflects the topos of early utopian literature that was less a story than a tour-like description of the society. This topos actually extends much farther back into literary history than More’s *Utopia*, at least to Second Temple period apocalyptic works such as the *Book of Enoch*, where the protagonist is given a tour of heaven.

In the latter form, the same technological capability can play an active role in the story. The story does not merely begin at the point where the technology is offered out of the blue and a choice needs to be made; the technology has already become a force in shaping the plot before you, the ‘experimenter,’ faces the decision whether or not to use it.⁴⁹⁸ Further, when we get to the end, the question “would it be morally justifiable to use this intervention?” does not seem to quite capture the nature of the morally salient considerations. Surely it is justifiable on some grounds and less so on others. The question sounds more true to life when phrased, “what would it mean to use or not use this technology?” Considering this question leads to a host of others: What is a good family? What does it mean to be a good spouse, sibling or child? In what way is this enhanced family better than it was before?

In response to the last question, one could imagine that the biotech company has a cadre of trained observers watching video taken of their trial families before and after they have had their implants. They record the number of arguments and fights, the tones of voice used, the amount that people smile, and various important aspects of body language that signal aggression or agreeableness. They conclude that the family is much better off. They are friendlier and appear happier. Should this matter to the daughter or son who finds their family suddenly uncanny?

When we tell stories about possible technologies, are we like the external bystanders ticking off marks next to what any neutral observer could perceive (less aggression: check; friendlier: check; more just: check), or is the future drawn into the present and populated with characters we

⁴⁹⁸ I have changed the technology so that the same effect is achieved proximally by intervening on the brain versus distally at the genetic level. The idea that a somatic intervention in an adult could result in complex behavioral changes may be less ‘realistic’.

can identify with so that the meaning of their choices becomes at least as clear to us as it does to them? Narrative competence in speculative bioethics allows us to identify where stories about future technologies fail to deliver the elements that distinguish meaningful stories from narrative abstractions—the latter being mere amplifications of present technological expectations with no moral imagination invested in their creation.

e. Revolutionary and Perplexing, Yet Familiar

Narrative competence can also help us to identify why philosophical stories about the technologically enhanced future often do not quite make sense or attempt to incorporate contradictory themes. After offering five ‘perplexing’ scenarios that are never taken up in the rest of the book, the authors of *From Chance to Choice* describe the book’s primary objective as making “a contribution to toward answering a single question: What are the most basic moral principles that would guide public policy and individual choice concerning the use of genetic interventions in a just and humane society in which the powers of genetic intervention are much more developed than they are today?”⁴⁹⁹ The future is apparently strange enough to perplex us, but familiar enough to be amenable to our best theories.⁵⁰⁰ This is because the imagined future is simply an abstracted projection of the present, unimpeded by any creative imagining or the subjective concerns of real or imagined people. It is therefore no wonder that in CtC, the answer to this question does not stray very far from something roughly like “the very same principles that

⁴⁹⁹ Buchanan et al., *From Chance to Choice*, 4–5.

⁵⁰⁰ Robert Sparrow has identified similarly contradictory themes running through writing on nanotechnology; Sparrow, “Revolutionary and Familiar, Inevitable and Precarious.”

we believe ought to guide public policy and individual choice today.” The only place where these principles run into sustained difficulty is when they encounter situations that mirror those introduced via series of thought experiments by Parfit.⁵⁰¹ Here CtC is forced to uphold two incompatible moral theories—one ‘familiar’, one less so—in strained equilibrium.⁵⁰²

Uncovering narrative shortcomings reminds us that the schematic technological futures that speculative bioethics explores do not portray the historical future that we or our successors will eventually see. Nor are they the creative expression of a modern mythopoetic impulse cast into literary fiction (i.e., science fiction). Since we do not have access to the actual future, and since speculative bioethics has no special expertise in imagining it, we might do better by turning directly to science fiction—modern society’s unique literary engagement with science, technology, culture, and the possible shape of the future.

V. Speculative Fiction: Valuable Resource or Force to Resist?

a. Why Read Science Fiction?

Thus far, the forms of narrative competence I addressed as having particular relevance for speculative bioethics can be described as the invocation of narrative within moral discourses, and paying close attention to stories within speculative bioethics and how they are told. These, along with casuistry, cover three of the four ways of using narrative within bioethics identified by Hilde

⁵⁰¹ Derek Parfit, *Reasons and Persons* (New York; Oxford: Oxford University Press, 1986).

⁵⁰² Buchanan et al., *From Chance to Choice*, chap. 6. The ‘familiar’ theory is the person-affecting view of harm, the ‘unfamiliar’ is Parfit’s non-person-affecting utilitarian view.

Lindemann Nelson.⁵⁰³ Another use of narrative, and hence another aspect of narrative competence, is the ability to read stories for moral insight and development and to hone one's moral perception.⁵⁰⁴ This idea has currency among philosophers such as Iris Murdoch, Bernard Williams, and Martha Nussbaum, who approach ethics primarily by asking narrative questions such as "how should I live?" or "what is a good life?" Lindemann Nelson describes this approach as follows:

The second approach is to read stories (or listen to them, or view them), where the story is a work of literary or theatrical or cinematic art. Here the idea is to attend carefully to the nuances and complexities of great literature, films, or plays as a means of broadening one's morally formative experiences and so sharpening one's moral sensibilities. Martha Nussbaum is perhaps best known for her exploration of the role of artistic literature in developing the moral emotions. By reading serious fiction, she argues, one can make of oneself a person "on whom nothing is lost." One does this by allowing the author of the work to direct one's attention to the rich and subtle particulars of the narrative—the moral, intellectual, emotional, and social nuances. When the author has set these out with skill and imagination, overlooking no meaningful detail, the educated reader can see what is morally at issue in the narrative she becomes, in the words Nussbaum borrows from Henry James, "finely aware and richly responsible." "Moral knowledge," Nussbaum writes, "is not simply intellectual grasp of propositions; it is not even simply intellectual grasp of particular facts; it is perception. It is seeing a complex, concrete reality in a highly lucid and richly responsive way; it is taking in what is there, with imagination and feeling." Having broadened her field of vision and refined her moral perception, Nussbaum argues, the reader is in a better position to respond excellently to actual people in the world.⁵⁰⁵

The trouble with applying Nussbaum's approach is that it appears to exclude much of speculative

⁵⁰³ Nelson, "Handbook of Bioethics."

⁵⁰⁴ A similar line of thought went into the PCBE's decision to produce the *Being Human* anthology.

⁵⁰⁵ Nelson, "Handbook of Bioethics," 168–169.

fiction when it is simply not of the literary caliber of the works that she and others examine. What tends to distinguish literature by authors like Henry James and Jane Austen is its keen psychological realism and social nuance, which in this view can contribute to the development and refinement of moral discernment. Because Austen's fiction possesses these qualities, MacIntyre can, without a preamble about the value of great literature, point to her oeuvre as presenting a finely calibrated theory of the virtues.⁵⁰⁶ Absent such qualities, why read speculative fiction? I offer four plausible answers.

First, one could argue that reading speculative fiction (I include cinema, but for the sake of convenience will refer generically to its literary form) has the benefit of expanding our ability to imagine all manner of future technical and social possibilities. They also allow us to become emotionally invested in them—precisely what is missing from the bare socio-technical scenarios we usually encounter in bioethics. This enhances moral reflection by casting discussions of possible futures in vivid and emotionally resonant terms—a crucial aspect of moral engagement. In other words, science fiction develops the kind of moral imagination appropriate for speculative bioethics.⁵⁰⁷ Even fairly mediocre works could help to do this, so long as their scenarios thematically relate to the questions we are asking and are written with enough skill to allow us to care about the characters and plot.

A second response is that we ought to be less dismissive of the genre. There is actually

⁵⁰⁶ MacIntyre, *After Virtue*, chap. 14.

⁵⁰⁷ cf. Rosalyn W. Berne, "Science Fiction, Nano-Ethics, and the Moral Imagination," in *The Yearbook of Nanotechnology in Society, Volume I: Presenting Futures*, ed. Erik Fisher, Cynthia Selin, and Jameson M. Wetmore (Dordrecht: Springer, 2008), 291–302.

some rather good science fiction, but one needs to be able to read it with a critical eye. Some of it is powerful extended metaphor, some is the modern retelling of ancient myth, and some offers incisive social criticism. One needs to be able to see past the speculative or fantastic surface.⁵⁰⁸ In appropriate places, engaging with good science fiction can potentially be as productive a mode of narrative ethics as reading nonfiction stories of illness or *The Death of Ivan Ilyich*.⁵⁰⁹

Third, for better or worse, science fiction and other forms of popular culture have the ability to enrich and sustain public conversations that would otherwise attract only sporadic interest: “Art and other cultural activities can people make aware [sic] of opportunities and barriers by framing scientific and technological innovations (or promises of innovations!) in a new light.”⁵¹⁰ Ignoring the dominant cultural medium for presenting possible futures would obviate many important channels for public bioethical engagement.

Finally, nothing about the genre of science fiction precludes psychological realism. Taking

⁵⁰⁸ Even not-so-great science fiction looks a bit better when we peer below the surface. *Gattaca* (1997) is many rungs below the handful of great SF movies, but it is undoubtedly the most cited movie in bioethics because it explores a mostly familiar future transformed by genetic engineering. At its heart is the recurring biblical theme of brothers vying for a birthright—only here the chronologically older brother effectively becomes the younger brother upon the birth of his enhanced sibling who is christened with their father’s name. When the movie is effective, it successfully presents a future in which the same mythic conflicts play out with a new twist.

⁵⁰⁹ The only extended study of this kind that I am familiar with is Valentina Adami, *Bioethics through Literature: Margaret Atwood’s Cautionary Tales* (Trier: Wissenschaftlicher Verlag Trier, 2011). Adami pursues a feminist/Foucauldian reading of Atwood applied to issues in reproductive and environmental ethics.

⁵¹⁰ Michiel Korthals, “The Naked Emperor,” in *The Contingent Nature of Life*, ed. Marcus Düwell, Christoph Rehmann-Sutter, and Dietmar Mieth, International Library of Ethics, Law, and the New Medicine 39 (Dordrecht: Springer, 2008), 230–231.

well-drawn characters into fantastical situations, as Percy Bysshe Shelley wrote in the preface to *Frankenstein*, “affords a point of view to the imagination for the delineating of human passions more comprehensive and commanding than any which the ordinary relations of existing events can yield.” Consonant with this view, authors have begun to argue for the idea that literature, even when speculative, may function as a type of thought experiment capable of generating knowledge—provided that it has the right realistic elements needed to serve the experiment’s purpose.⁵¹¹ I will not pursue this promising (though potentially reductive) idea, but will suppose simply that if one can develop moral sensibilities and gain insight from literature generally, then the same can be true of good science fiction as well.

However, this does not preclude the risk that the overt similarities between science fiction scenarios and technological futures discussed in bioethics may more often than not lead to the misuse of SF literature within bioethics or the distortion of bioethics by SF. While there may be an overt affinity between speculative issues in bioethics and in science fiction, perhaps those speculative issues are best left to be addressed in a fictional genre. This idea returns us to the original critique of speculative bioethics that we encountered at the start of Chapter Three: Ruth Clayton’s review of Glover’s *What Sort of People Should There Be?*

To whom, then, is Dr. Glover’s book directed? If it is to the lay public, it would surely be helpful to distinguish clearly between the imaginative, the possible and the likely.

Readers of science fiction will know that most of the possible scenarios have

⁵¹¹ Noël Carroll, “The Wheel of Virtue: Art, Literature, and Moral Knowledge,” *The Journal of Aesthetics and Art Criticism* 60, no. 1 (2002): 3–26; Davies, “Thought Experiments and Fictional Narratives”; Peter Swirski, *Of Literature and Knowledge: Explorations in Narrative Thought Experiments, Evolution, and Game Theory* (London; New York: Routledge, 2007).

been tested out already. We may take a few well known and well presented examples which deal with personality change and manipulation, or with genetic modification and species crosses—all themes in Dr. Glover’s book. The issues which might arise if human-subhuman hybrids were made, the ethics of the use of primitives, groups with low or limited intelligence, and of animals, are explored in the novel *Les Animaux Dénaturés* by Vercors: aspects of sexuality and the possible psychological and social consequences of sex changes, whether regular, as in *The Left Hand of Darkness* by le Guin, or at will, as in *Options* by Varley; genetic optimisation by Brunner in *Total Eclipse* and in *Stand on Zanzibar*—a book which also considers the development and use of techniques for control and manipulation of the mind and personality (for military purposes, in this case)—also a theme in Haldeman’s *By All My Sins Remembered*. When I read Dr. Glover’s non-fictional, decent, humane and earnestly informed treatment of these problems I felt less enlightened than by these works of fiction.⁵¹²

Clayton maintains that science fiction can deal with speculative biotechnological futures in an insightful manner—a contention that I tend to agree with. Aside from the aforementioned reasons for being hopeful about the possibility of finding moral insight in science fiction, reasonably good SF stories allow us to look past the means and focus on the larger ends to which a technology might be put.⁵¹³

However, Clayton also alerts us to the problem of conjoining science fiction scenarios with bioethics in the failure to “distinguish clearly between the imaginative, the possible and the likely.” One might think that turning to the creations of a fictional genre would liberate speculative bioethics from its aspiration to be a discussion on the actual future. But in practice, speculative bioethics has become so ‘science-fictional’ that even when it explicitly invokes science fiction literature or the term ‘science fiction,’ it does not usually shatter the pretense of discussing

⁵¹² Clayton, “Review of,” 163.

⁵¹³ I do not mean the actual ends, but thematic representations of such ends.

important questions about *the future*.⁵¹⁴ Furthermore, the explicit use of science fiction in bioethics is almost inevitably lazy. It is easy to raise concerns by invoking *Brave New World* and *Frankenstein*; it is easy to imagine that genetic engineering technologies will be our salvation; it is easy to recap some plot points and tell the reader what they mean. None of this constitutes an encounter with a work of imaginative fiction *as fiction*. If science fiction can enhance bioethics, it cannot be by means of mere invocation—any more than Nussbaum would claim to offer moral insight by invoking the title of a novel by Henry James.

Given these problems, instead of trying to read science fiction in order to pursue bioethics I look at some of the more fundamental and foundational connections between science fiction and speculative bioethics. This will illuminate the origins of the two aforementioned problems: the failure to distinguish between reality and fiction, and the lazy rhetorical uses of SF. Narrative competence of this sort is the ability to ‘read’ the field itself in light of the literary and social history and conventions of science fiction.

⁵¹⁴ Although CtC does not discuss SF literature, at one point (p. 153) the authors warn the reader that “the premise behind the rest of this chapter [4] as well as Chapter 5 is that there is some prospect for vastly improving our knowledge and skills... On that view, [that enhancing complex traits is unlikely to be possible] we are engaged in the ethics of science fiction, not applied ethics. Despite this warning, and partly because the issues attract attention in any case, we shall continue our argument.”

This warning is rather *pro forma* considering that they had already exclaimed on page 56 that “humankind’s future abilities to rewrite our genetic code are apparently limitless.” Is this supposed to mean that we will be able to rewrite our genetic code, but it will be ineffective at enhancing complex traits? Whatever the tension between these two statements are supposed to reveal about the authors’ beliefs, it is the regulatory examination of the possible future that is itself the problem.

b. Predicting Technology and Shaping the Future in SF and Bioethics

By examining the history of science fiction, one can appreciate just how much speculative bioethics and the enhancement discourse are intertwined with the genre—and not only in the obvious sense that they explore the same scientifically-spawned possibilities. Beginning with Edward Bellamy's *Looking Backward* (1888),⁵¹⁵ science fiction took the idea that had already existed in utopian literature and, instead of locating these possibilities in a 'no place,' began to locate them in the future by way of telling a future retrospective history.⁵¹⁶ This changed the conception of what it meant to speak of future possibilities, whether utopian or otherwise. Soon after, followed the idea that we might be able to predict the contours of the future and begin to shape its course to our liking. The grandfather of this idea is none other than H.G. Wells (party to a public literary feud with Henry James) who attempted to think systematically about the effects of technological progress in a book entitled, *Anticipations of the Reaction of Mechanical and Scientific Progress Upon Human Life and Thought* (1900). Wells later proposed that this become an academic discipline for "working out strands of biological, intellectual, economic consequences... for efficient world-planning."⁵¹⁷ Recalling his presentation of this idea in a 1902 Royal Institute lecture, Wells writes:

I insisted that we overrated the darkness of the future, that by adequate analysis of

⁵¹⁵ I owe the reference to Bellamy and his influence on H.G. Wells to Robert Scholes and Eric Rabkin, *Science Fiction: History, Science, Vision* (New York: Oxford University Press, 1977). I draw from their history tracing various aspects of the SF genre in the remainder of this chapter.

⁵¹⁶ The topos of the backward-looking future history occurs in a number of places in speculative bioethics, such as Silver's *Remaking Eden* and the "previews of perplexities" in CtC.

⁵¹⁷ H. G. (Herbert George) Wells, *An Experiment in Autobiography*, 1934, chap. 9.

contemporary processes its conditions could be brought within the range of our knowledge and its form controlled, and that mankind was at the dawn of a great change-over from life regarded as a system of consequences to life regarded as a system of constructive effort. I did not say that the future could be foretold but I said that its conditions could be foretold. We should be less and less bound by the engagements of the past and more and more ruled by a realization of the creative effect of our acts. We should release ourselves more and more from the stranglehold of past things.⁵¹⁸

This kind of thinking could only take flight in a world where the forces and products of nature—including humankind—can be conceived of in mechanistic terms. Thus the idea of anticipating and guiding the future was a product of the same SF literary imagination that was born of the scientific revolution and the increasing control over nature that it enabled. The hope of “working out strands of biological, intellectual, economic consequences... for efficient world-planning” could describe the goals of theorists like Buchanan as much as Wells, revealing that speculative ethics owes both its content and form to science fiction.⁵¹⁹

Bioethicists would counter that they are doing no such thing and that they confine their ethical explorations rather narrowly to the immediate vicinity of technological projections. Once again, this is a notion that was put forth by another admittedly prescient SF writer, Arthur C. Clarke, in his *Profiles of the Future*: “With a few exceptions... I am limiting myself to a single aspect of the future—its technology, not the society that will be based on it. This is not such a limitation

⁵¹⁸ Ibid.

⁵¹⁹ Controlling the future has been a recurring theme in science fiction and it has evolved along with science and technology. Isaac Asimov’s *Foundation* trilogy (1951-53) reflects the ascendancy of behavioral psychology; Michael Flynn’s *In the Country of the Blind* (1990) places the power of predicting and controlling the future in the power of the computer.

as it may seem; for science will dominate the future even more than it dominates the present.”⁵²⁰

The idea that we can have a coherent form of bioethics that deals with future technologies long before they arrive rests on the same dual premises of the predictability and outsized impact of technology, coupled with the notion I explored in Chapter Five that the most opportune time to influence the course of the technological future is early in the development process.

Speculative bioethics’ pretense of foretelling technological futures rests on inadequate understanding of how technologies develop.⁵²¹ But the fact that regulatory bioethics is now trying to predict *and* shape the future is the product of its own ascendancy as a form of expertise within a technocratic society. Expertise becomes vested with power due to its perceived ability to predict and control nature, the economy, the effects social policies, and so on.⁵²² A public bioethics that did not claim to be able to think long-term and reason strategically would lose its legitimacy as an expert discourse and revert back to a much less politically potent form of practical ethics. But the mechanistic view that presumes to be able to predict the interplay between technological and societal change—a notion that every reader of SF must provisionally accept to ‘believe’ in the depiction of a future world—is not a reflection of reality. It “overlook[s] first the way in which innovation continues as designed artefacts are implemented and used, and, further, underplays the complex biography of technologies including the cumulative character of their innovation

⁵²⁰ Arthur C. Clarke, *Profiles of the Future: An Inquiry Into the Limits of the Possible* (New York: Random House, 1962); quoted in Robert U. Ayres, *Uncertain Futures: Challenges for Decision-Makers* (New York: Wiley, 1979), vi.

⁵²¹ Williams, “Compressed Foresight and Narrative Bias,” 274.

⁵²² See MacIntyre, *After Virtue*, chap. 6–8.

processes over a multiplicity of sires of application and product design-implementation cycles.”⁵²³

c. The Science-Fictional Origins of the Human Enhancement Discourse

If bioethics simply owed the idea of technological prediction to SF it would be of some ancillary interest, but the overlap between SF and speculative bioethics runs much deeper. This is not the place to offer a full account of the origins and evolution of the discussion of enhancement via biotechnology that predated contemporary bioethics by approximately forty years. In the brief and very incomplete account that follows, I highlight how biologists, philosophers, and novelists were engaged in a wide-ranging discourse that combined ‘nonfiction,’ in the sense of scientifically grounded predictions, and imaginative fiction rather freely.⁵²⁴

Appropriately, we begin again with H.G. Wells who studied with the prominent biologist T.H. Huxley. This informed his repeated engagement with the idea of human biological evolution, both unguided (*The Time Machine*, 1895) and guided (*The Food of the Gods*, 1904), and technological change (*When the Sleeper Wakes*, 1899) as forces that would lead to bleak futures if they were not controlled via careful social planning. Wells wrote cautionary tales because he believed that the technologies that would change the world could be foreseen and used for good. The idea that radical technological change was essentially inevitable, and the only choice was to use it wisely or irresponsibly, set the tenor of the discourse.

For Wells, the question was whether the rigid English class system would become

⁵²³ Williams, “Compressed Foresight and Narrative Bias,” 275.

⁵²⁴ In addition to Scholes and Rabkin, *Science Fiction*; this section also draws from James J. Hughes, “Back to the Future,” *EMBO Reports* 9, no. S1 (2008): S59–S63.

entrenched via technology or overcome through its judicious use. (Buchanan's concern for ensuring the diffusion of enhancements and other technological innovations is a postmodern globalized version of the same question). But after World War I, the question changed: would mankind use science to destroy itself, or could scientific rationalism ensure that science is used wisely? In 1923, the Cambridge biologist J.B.S. Haldane delivered a lecture to the university's "Heretics Society," titled *Daedalus, or Science and the Future*, published the following year.⁵²⁵ The lecture was a prophetic look into the future told partly via the SF topos of a backward-looking future history, "an essay on the on the influence of biology on history during the 20th century" written 150 years in the future. Notably, Haldane presents technoscience (not pure science) in mythic terms. He draws on the myth of Daedalus, who created the Minotaur as a model of the courageous scientist willing to ignore the gods and transgress traditional norms and boundaries in the quest to control nature: "if every physical and chemical invention is a blasphemy, every biological invention is a perversion. There is hardly one which, on first being brought to the notice of an observer from any nation which has not previously heard of their existence, would not appear to him as indecent and unnatural." Coupled with this is a view of science and traditional religion (one that sees its mythology and morals as fixed) as mutually incompatible, and religious morality as too rigid to adapt to a technologically-changed world. The take-home message at the close of the essay is that

science is as yet in its infancy, and we can foretell little of the future save that the thing that has not been is the thing that shall be; that no beliefs, no values, no

⁵²⁵ J.B.S. Haldane, "Daedalus, Or, Science and the Future" (Cambridge University, February 4, 1923).

institutions are safe... Whether in the end man will survive his ascensions of power we cannot tell. But the problem is no new one. It is the old paradox of freedom re-enacted with mankind for actor and the earth for stage.

The literary response to *Daedalus* with which we are most familiar today is Aldous Huxley's *Brave New World* (1932), a true SF dystopia imaginatively constructed from Haldane's projections of the benefits that various technological developments would bring. Huxley's view was widely seen as anti-science, and in a sense it was—if the vision of the future that science offered was one where anything that could be done would be done and no values were sacrosanct. But this picture is misleading, as the novel reflects Huxley's political thought more than his concern with technology. His treatment of Haldane's technological prophecies serves as a satirical backdrop to the central 'character,' the system of worldwide political domination. Put differently, if Haldane viewed technoscience as the knowledge and power that put Man at the center of a mythic "paradox of freedom," then Huxley rejected this mythic vision and presented science and technology as means entirely subordinate to political ends.

We next turn to the SF novels of Olaf Stapledon, a philosopher whose fiction reflects the idea that "mankind now has so much power that it must either destroy itself or improve itself."⁵²⁶ *Last and First Men: A Story of the Near and Far Future* (1930) tells the history of the future in the timescale of billions of years in which Man and his many evolutionary successors exist for only a cosmic blink of the eye. In *Odd John* (1934), the next phase of human evolution is represented in the story of a superior mutant who tries to found a colony of "supernormals" like him. Stapledon's novels spawned a sub-genre of SF, often associated with transhumanism, in which humanity as we

⁵²⁶ Scholes and Rabkin, *Science Fiction*, 32.

know it comes to an end and is superseded by its evolutionary successor. Stapledon summarizes the philosophy behind his novels as follows: “By means of intelligence and creative imagination conscious beings can sometimes so manipulate reality in the external world and in themselves that it will manifest entirely new aspects of itself.”⁵²⁷

Stapledon’s most famous disputant is C.S. Lewis. Believing that SF literature “ignored or mocked by the intellectuals,” was nonetheless popularizing what he saw as ‘scientistic’ ideologies and reshaping the modern imagination, he turned to SF himself to counter its message. Lewis’s space trilogy (1938-1945) offered, via SF, a Christian moralist’s rejection of Stapledon’s philosophy, Haldane’s view of the obsolescence of religious morality, and an idea that he saw implicit in their writings and in much of the pulp SF of the era—that humankind’s highest end is self-perpetuation no matter the cost. Moreover, he rejected the idea at the heart of Wells’s and Haldane’s prophetic technological optimism that saw the continual progress of science and technology as a foregone conclusion, necessitating other forms of scientific rationality that could shape the future for the benefit of humanity.⁵²⁸

I hope that this brief survey is sufficient to demonstrate that science fiction literature is not incidental to the enhancement discourse; it is its very progenitor. In these works of SF and technological prognostication one can already detect elements that remain sources of contention today: mythic and anti-mythic views of science; technology as inevitable and predictable coupled with a belief in the possibility for instrumental reason to control it; prophetic streams for and

⁵²⁷ Olaf Stapledon, *Philosophy and Living*, 1939, chap. 12.

⁵²⁸ C.S. Lewis, “A Letter to Professor Haldane,” in *Of Other Worlds: Essays and Stories* (Orlando: Harcourt Brace and Co., 1966), 76–77.

against improvement of the species via science and technology, combining technological expectations with social critique; and proto-transhumanism. The enhancement discourse was therefore intertwined with SF from its inception, and so it remained when it was taken up by the newly-formed field of bioethics. The fact that the entire discourse has a science-fictional quality is not accidental, and invocations of the works of Huxley and Lewis (and Shelley) in bioethics should not surprise us. But as aspects of some technological visions began to be realized, the line between fiction and reality became blurred. The consequences of this blurring occupy the balance of this chapter.

d. Science-Fictional Habits of Mind

Given Ruth Clayton's early comparison of speculative bioethics with science fiction—with the former coming in at a decidedly second place—one would have expected some sustained critical attention to this relationship within literary studies. To my knowledge, a critical assessment along these lines has only been published recently, and in a bit of coincident intertextual homonymy, the author is literary scholar Jay Clayton. Writing more than twenty-five years earlier, Clayton the biologist preempted Clayton the literary theorist (henceforth I will be referring only to the latter Clayton):

The truth is, scientific thrillers and science fiction are better suited to this kind of thought experiment than most of the nonfiction about posthumanism that aims to influence public policy. The formal conventions of fiction alert readers to the provisional nature of analogy and extrapolation. As many critics have pointed out, science fiction does *not* pretend to predict the future or give prophecies of things to come. By contrast, nonfiction advocacy [within bioethics for and against] the posthuman does exactly that: It specializes in prophecies and predictions. This difference is part of what is at stake in emphasizing SF's fictionality. Coleridge famously wrote that literature required a "willing suspension of disbelief," but the act of willing oneself to enter an imaginary world affords a kind of safeguard against

taking *possible* futures as inevitable (or even probable in any testable way).⁵²⁹

Clayton's concerns are strikingly close to my own. He hones in on the sense of inevitability that pervades speculative bioethics and the language of prediction that follows from taking a fictional scenario as a reality that must be embraced, prevented, or regulated. Clayton demonstrates how literary scholarship can contribute to bioethics discourse, and, much like Chambers's contribution to clinical ethics, his analysis has the immediate effect of encouraging reflexivity within the field.

Clayton observes that speculative bioethics proceeds by taking science fiction scenarios seriously and claiming that they are very real and near possibilities. Opponents of genetic enhancement refer to dystopian works (which are unrepresentative of the genre overall) for rhetorical effect, and proponents charge that these negative portrayals should not be taken seriously for they are *merely science fiction*. It is potentially facile to look only at the extremes where posthumanism and radical enhancement are invoked—underwriting my tendency to avoid discussing transhumanism—but Clayton offers a number of important insights that apply more widely and mirror one of my core contentions in this chapter: “the failure of bioethicists to examine the images, metaphors, and storylines of the science fiction that they so frequently invoke distorts their findings and recommendations.”⁵³⁰

I hope to have made a small contribution toward remedying this in the previous section, but Clayton points to the depths of the problem, which go beyond the simple invocation or appropriation of SF themes and tropes. He gets to the heart of the compulsion to investigate the

⁵²⁹ Jay Clayton, “The Ridicule of Time: Science Fiction, Bioethics, and the Posthuman,” *American Literary History* 25, no. 2 (2013): 332–333.

⁵³⁰ *Ibid.*, 318.

future in bioethics. In the previous subsections I pointed to the historical roots of such an inclination; Clayton further argues that the transformation of visions from SF into predictions and the invocation of SF for rhetorical effect

illustrates the pervasiveness of what Istvan Csicsery-Ronay, Jr., has called “science-fictional habits of mind.” The reach of technology into every aspect of our lives has so saturated our consciousness “that we no longer treat sf as purely a genre-engine producing formulaic effects, but rather as a kind of awareness we might call *science-fictionality*, a mode of response that frames and tests experiences as if they were aspects of a work of science fiction.”⁵³¹

From this perspective, the fact that regulatory bioethics now pursues speculative futures and prophetic authors have come to believe that we ought to establish restrictions in the present in light of an imagined future are both manifestations of “science-fictional habits of mind.” The sense that the future exists and poses questions that need to be addressed now, the impulse to treat ethical questions that exist today in a manner that coheres with the questions that emerge in imagined futures, and the attempt to achieve reflective equilibrium regarding scenarios that are closer to SF than our everyday experiences—all carry the distinct imprint of a habit of mind that “frames and tests experiences as if they were aspects of science fiction.”

Clayton also mentions the issue of trust and responsibility that I raised in the previous chapter, noting that in speculative bioethics, we encounter authors who “rely on sweeping analogies and engage in the kind of extrapolation that is the hallmark of SF. Their underlying syntax is the question, what if? They ask us to ‘frame and test experiences as if they were aspects of science fiction’ *while enjoying the trust accorded to nonfiction*.”⁵³² When reading speculative fiction,

⁵³¹ Ibid., 319.

⁵³² Ibid., 320. My emphasis.

we willingly and knowingly suspend disbelief, so any seemingly firm moral insight we draw is tentative and provisional, and possibility remains distinct from inevitability. If we, as readers, shape our intuitions about the desirability or undesirability of future technologies by reading and discussing SF, this constitutes what Dupuy would include in the discourse on ‘dreams of reason’; an engagement with questions that emerge in the present within a technologically saturated and ever-changing culture in which the stability of the human condition is no longer taken for granted.

But this is a long way from the kind of speculative bioethics that discusses the imagined future as if it demanded as much of our attention as the present; it “constitute[s] a rhetorical genre of science writing, the nonfiction cousin of science fiction, while borrowing [its] authority from the sciences.”⁵³³ Here, authors demand to be taken seriously because they speak of the scientifically promised future, and in doing so abuse the reader’s trust. Clayton warns readers to “be wary of drawing ethical conclusions from science-fictional habits of mind without acknowledging their character and understanding their provenance.”⁵³⁴ I would add that these habits of mind are not only present at the margins where authors explicitly discuss the posthuman; they also saturate the enhancement discourse and can be traced to its roots in early twentieth century futurism and science fiction.⁵³⁵

⁵³³ Ibid., 319.

⁵³⁴ Ibid.

⁵³⁵ For a similar assessment focusing on nanotechnology see Colin Milburn, “Nanotechnology in the Age of Posthuman Engineering: Science Fiction as Science,” *Configurations* 10, no. 2 (2002): 261–295.

e. Dreams of Reason Revisited

So long as bioethics delves into the possible future of biotechnology, it will need to continuously disentangle itself from lazy uses of science fiction, unquestioned technological expectations, boom and bust cycles of hype, mythic images of science, the idea that it can predict and shape the future, and other science-fictional habits of mind. One cannot help but wonder if there is a potential benefit commensurate with the costs that are borne from the failure to do so. This question has occupied my mind for much of the course of this study. Yet I cannot help but conclude that it would be a loss if bioethicists completely disengaged from all of the various strands of discourse on possible biotechnological futures of that run through society.

P.D. Medawar, François Jacob, Jean-Pierre Dupuy—all following the work of Karl Popper—recognize that “no science exists which does not rest on a ‘metaphysical research program,’ a set of presuppositions about the structure of the world which are neither testable nor ‘falsifiable’ empirically, but which nonetheless play an essential role in the progress of science.”⁵³⁶ As we leave the actual of the present and venture farther into the realm of the possible future, technoscientific research programs in biotechnology are constituted less by the goals of improving the lives we have, and more by the goal of giving us the lives we dream of. The same ‘dreams of reason’ that generate science fiction are constitutive of this ‘metaphysical research program,’ as is much of the enhancement discourse that follows from it. This speculative edifice is stories all the way down, and self-aware forms of narrative bioethics have something important to contribute to the discussion. ‘Dreams of reason’ are not recalcitrant to reasoned critique, but critique needs to

⁵³⁶ Dupuy, “Some Pitfalls in the Philosophical Foundations of Nanoethics,” 243.

proceed first by understanding their narrative constitution and literary history. And perhaps reason that speaks through stories can motivate the most effective forms of public engagement.

VI: Closing Thoughts: The End of the Line for Anticipatory and Visionary Bioethics?

Cultural theory, whatever its merits, cannot seem to generate theories that stop well short of a totalizing assessment of society. Nonetheless, sometimes we need a representation—imperfect exaggerated, and surreal—of the bigger picture in order to put things into perspective. With that warning, I offer the following analysis: Looking beyond bioethics, science-fictional habits of mind are pervasive. A number of SF authors, literary theorists, and cultural critics have, in their own ways, described the sense that the present is overwhelmed by the future.

“Science fiction” has come to refer in the past few decades not only to a popular narrative genre, but also to a kind of popular cultural discourse, a way of thinking about a sociopolitical present defined by radical and incessant technological transformation. As Jonathan Benison suggests, “it might be argued that [one] reason for the special contemporary relevance of SF is that our present has in actuality come increasingly to make sense less as a continuation of the past than as an anticipation of the future, which it pre-empts or incorporates before it can ever arrive.” The present represents itself as science fiction, as already the future...⁵³⁷

If this is a reasonably accurate description of the times we live in, then speculative bioethics of any kind is a perilous undertaking. The future—anchored in the language of science and embellished with the vividness of fiction—looms over a present that is ever on the edge of becoming something else. The stories we tell about the future seem to be more contiguous with the present than the

⁵³⁷ Veronica Hollinger, “Stories About the Future: From Patterns of Expectation to Pattern Recognition,” *Science Fiction Studies* 33, no. 3 (2006): 453.

stories of the past. As a result, we feel deep-down that we *know* the future. The future speaks to us through shared technological expectations that tend to come true: our next cell phone will do more than our last; our next laptop will be faster and cost less; our next car will get better mileage and last longer; our next TV will be clearer and thinner. Our kids will be using technologies that don't appeal to us. They will ask us to buy them gadgets that we never imagined we or anyone ever needed, and we will find out that things we thought were safe are dangerous and things we have stopped eating are healthy. How then could we not know the future?

This sense of an impending, knowable technological future was already present at the dawn of contemporary bioethics. If speculative bioethics did not initially threaten to overwhelm the everyday practice of bioethics with the imperative to address present questions in light of possible futures scripted from the narratives of emerging biotechnologies, then that danger was always latent, waiting for a time when certain dreams of reason would achieve enough materiality to make the imagined future seem real and imminent enough to demand our full attention.

When visions of the future began to take shape in the present in the form of research on recombinant DNA and IVF, the most ready source of symbolic currency for the suspicious stream of prophetic bioethics was its progenitor: the dystopian science fiction novel that combined images of a technologically transformed future with social critique of the present. Authors writing in this mode naturally began to admonish society to prevent a *Brave New World*, and regulatory bioethics followed in kind by telling society that it could trust professional ethicists not to let it come to that. Another set of prophets joined the conversation, sharing the notion of technological inevitability, but drawing from the font of SF and utopian literature for inspiration. The prophets, followed by the regulators, forgot that these stories set in the future are potentially valuable cultural resources,

but they are not predictions—and they certainly are not realities. The most important truths they hold for bioethics are truths about why we find certain dreams of reason attractive or repellent—not about which technologies are really possible or what would actually happen if babies could be conceived in vitro or we could alter the human genome.

When fragments of the imagined future achieve materiality, distinctions between the present and the future, the real and the fictional become obscured. Thus, Paul Ramsey closes his commentary on the birth of Louise Brown with a stunning intercutting of reality with science fiction:

Readers may wish to perform the following experiment on themselves. Turn off the tube. Don't pick up the newspaper for two days. Instead, read *That Hideous Strength*, the third book in C. S. Lewis's science fiction trilogy (New York: Macmillan, 1946). The final assault upon humanity is gathering in Edgestow, a fictional British college town. The forces of technology, limited no more by the Christian ages, are trying to combine with pre-Christian forces, represented by Merlin the Magician whose body is buried on the Bracton College grounds. Only the philologist Ransom can save humankind from the powers of the present age concentrated in the National Institute of Coordinated Experiments (acronym NICE). It is NICE that the Browns have a wonderful baby. Lewis need not have thought of his fictional college, Bracton. Cambridge University is NICE too. To give couples a baby sexed to their desires will be NICE. Every other step taken will certainly be NICE. Finally, *Brave New World* is entirely NICE. For everyone is happy. Only there is no poetry there. Nor will a baby ever be a surprise.⁵³⁸

In a science-fictional culture of anticipation where the future overwhelms the present, realities and fictions, stories and predictions, dreams and inevitabilities are no longer sufficiently distinct. Bioethics needs to come to terms with the fact that we live in a society in which the present and its ethical concerns wither easily under the presumed gaze of anticipated technological

⁵³⁸ Ramsey, "Manufacturing Our Offspring," 9.

futures. Moral futurism then becomes the rule and not the exception. Bioethics must institutionalize ways of pushing back against the incessant intrusion of the future into the present. It can begin by openly critiquing authors who trade in the easy currency of science-fictional habits of mind and allow the seductive or repulsive promises of mythic science to determine our understanding of the present. Bioethics can no longer give quarter to an anticipatory regulatory discourse that exceeds the bounds of reasonable policymaking. Nor can it abide a prophetic discourse that has nothing to offer regarding the present not contingent on the fulfillment of visions of the distant future. Bioethics must stop ‘ridiculing time’ before time turns it into an object of ridicule itself.

In order to responsibly address the moral questions that arise within a culture inundated with stories about the future, bioethics needs to reach beyond itself to develop the necessary competencies to contend with the technological stories being told about what is possible, what is desirable, and what is menacing. Reading a wide range of science fiction can help to exercise the imagination and better acquaint us with society’s morally ambiguous ‘dreams of reason.’ Literary approaches can show us how to become better readers of works of fiction and more attentive to the stories told within bioethics. Scholars who study science fiction can point to the roots of current discussions and explain how SF stories have changed and why. They can point out when bioethicists misunderstand and misappropriate SF. Research projects like DEEPEN can draw out the shared dramatic resources that can contribute to a richer public discourse on emerging and future biotechnologies.

The possibility of drawing all these approaches together into a convergent narrative discourse is an incredibly ambitious goal, but perhaps we can set it as a ‘metaphysical research

program' for speculative bioethics. If 'NBAC convergence' can galvanize nanotechnology research, then perchance 'narrative convergence' can do the same for bioethics. First, however, bioethicists must hold themselves accountable for treating fiction as prediction.

BIBLIOGRAPHY

BIBLIOGRAPHY

- Adami, Valentina. *Bioethics through Literature: Margaret Atwood's Cautionary Tales*. Trier: Wissenschaftlicher Verlag Trier, 2011.
- Agar, Nicholas. *Humanity's End: Why We Should Reject Radical Enhancement*. Cambridge, MA: MIT Press, 2010.
- . *Liberal Eugenics: In Defence of Human Enhancement*. Malden, MA: Blackwell, 2004.
- . "Whereto Transhumanism? The Literature Reaches a Critical Mass." *Hastings Center Report* 37, no. 3 (2007): 12–17. doi:10.1353/hcr.2007.0034.
- Alper, Joseph S., Catherine Ard, Adrienne Asch, Jon Beckwith, Peter Conrad, and Lisa N. Geller, eds. *The Double-Edged Helix: Social Implications of Genetics in a Diverse Society*. Baltimore: Johns Hopkins University Press, 2002.
- Anderlik, Mary R. "Respecting Difference and Moving Beyond Regulation: Tasks for U.S. Bioethics Commissions in the Twenty-First Century." *Kennedy Institute of Ethics Journal* 15, no. 3 (2005): 289–303.
- Andre, Judith. *Bioethics as Practice*. Chapel Hill: University of North Carolina Press, 2004.
- . "Learning to Listen: Second-Order Moral Perception and the Work of Bioethics." In *The Ethics of Bioethics: Mapping the Moral Landscape*, edited by Lisa A. Eckenwiler and Felicia G. Cohn, 220–228. Baltimore: The Johns Hopkins University Press, 2007.
- Annas, George J. "The Human Genome Project as Social Policy: Implications for Clinical Medicine." *Bulletin of the New York Academy of Medicine* 68, no. 1 (1992): 126–134.
- Annas, George J., Leonard H. Glantz, and Patricia Roche. *Genetic Privacy Act and Commentary*. Boston, February 28, 1995.
http://www.ornl.gov/sci/techresources/Human_Genome/resource/privacy/privacy1.html
.
- Arras, John D. "The Way We Reason Now: Reflective Equilibrium in Bioethics." In *The Oxford Handbook of Bioethics*, edited by Bonnie Steinbock, 46–71. Cambridge; New York: Oxford University Press, 2007.
- Ashcroft, Richard. "The Ethics and Governance of Medical Research: What Does Regulation Have to Do with Morality?" *New Review of Bioethics* 1, no. 1 (November 2003): 41–58. doi:10.1080/1740028032000131413.
- Asveld, Lotte, and Sabine Roeser, eds. *The Ethics of Technological Risk*. London; Sterling, VA:

- Earthscan, 2009.
- Ayres, Robert U. *Uncertain Futures: Challenges for Decision-Makers*. New York: Wiley, 1979.
- Baillie, Harold W., and Timothy K. Casey, eds. *Is Human Nature Obsolete?: Genetics, Bioengineering, and the Future of the Human Condition*. Cambridge, MA: MIT Press, 2004.
- Baron Cohen, Simon. "Our Research Was Not about Prenatal Screening for Autism." *The Guardian*, January 20, 2009, sec. Comment is free.
<http://www.guardian.co.uk/commentisfree/2009/jan/20/research-autism-health-response-comment>.
- Baylis, Françoise, and Jason Scott Robert. "The Inevitability of Genetic Enhancement Technologies." *Bioethics* 18, no. 1 (2004): 1-8211.
- Bennett, Ira, and Daniel Sarewitz. "Too Little, Too Late? Research Policies on the Societal Implications of Nanotechnology in the United States." *Science as Culture* 15, no. 4 (2006): 309-325. doi:10.1080/09505430601022635.
- Berne, Rosalyn W. "Science Fiction, Nano-Ethics, and the Moral Imagination." In *The Yearbook of Nanotechnology in Society, Volume I: Presenting Futures*, edited by Erik Fisher, Cynthia Selin, and Jameson M. Wetmore, 291-302. Dordrecht: Springer, 2008.
- Bill Joy. "Why the Future Doesn't Need Us." *Wired*, April 2000.
<http://www.wired.com/wired/archive/8.04/joy.html>.
- Blackburn, Elizabeth, and Janet Rowley. "Reason as Our Guide." *PLoS Biology* 2, no. 4 (2004): e116. doi:10.1371/journal.pbio.0020116.
- Borup, Mads, Nik Brown, Kornelia Konrad, and Harro Van Lente. "The Sociology of Expectations in Science and Technology." *Technology Analysis & Strategic Management* 18, no. 3-4 (2006): 285-298. doi:10.1080/09537320600777002.
- Boseley, Sarah. "Is Autism Screening close to Reality?" *The Guardian*, January 12, 2009, sec. Society. <http://www.guardian.co.uk/lifeandstyle/2009/jan/12/autism-screening-health>.
- Bostrom, Nick. "Technological Revolutions: Ethics and Policy in the Dark." In *Nanoscale: Issues and Perspectives for the Nano Century*, edited by Nigel M. de S. Cameron and M. Ellen Mitchell, 129-152. Hoboken: John Wiley & Sons, 2007.
- . "The Fable of the Dragon Tyrant." *Journal of Medical Ethics* 31, no. 5 (May 1, 2005): 273-277. doi:10.1136/jme.2004.009035.
- . "Why I Want to Be a Posthuman When I Grow Up." In *Medical Enhancement and Posthumanity*, edited by Bert Gordijn and Ruth Chadwick, 107-136. Dordrecht: Springer, 2008.

- Bostrom, Nick, and Toby Ord. "The Reversal Test: Eliminating Status Quo Bias in Applied Ethics." *Ethics* 116, no. 4 (2006): 656.
- Brody, Howard. *The Future of Bioethics*. New York: Oxford University Press, 2009.
- . "Who Gets to Tell the Story? Narrative in Postmodern Bioethics." In *Stories and Their Limits: Narrative Approaches to Bioethics*, edited by Hilde Lindemann Nelson. New York: Routledge, 1997.
- Brosnan, Caragh. "The Sociology of Neuroethics: Expectational Discourses and the Rise of a New Discipline." *Sociology Compass* 5, no. 4 (2011): 287–297.
- Brown, James Robert, and Yiftach Fehige. "Thought Experiments." Edited by Edward N. Zalta. *The Stanford Encyclopedia of Philosophy*, 2011.
<http://plato.stanford.edu/archives/fall2011/entries/hought-experiment/>.
- Brown, Mark B. "Three Ways to Politicize Bioethics." *The American Journal of Bioethics* 9, no. 2 (2009): 43–54. doi:10.1080/15265160802617811.
- Brown, Nik. "Hope against Hype: Accountability in Biopasts, Presents and Futures." *Science Studies* 16, no. 2 (2003): 3–21.
- Brown, Nik, and Mike Michael. "A Sociology of Expectations: Retrospecting Prospects and Prospecting Retrospects." *Technology Analysis & Strategic Management* 15, no. 1 (2003): 3–18.
- Brown, Nik, Brian Rappert, and Andrew Webster, eds. *Contested Futures: A Sociology of Prospective Science and Technology*. Aldershot, UK: Ashgate, 2000.
- Buchanan, Allen. *Beyond Humanity?: The Ethics of Biomedical Enhancement*. New York: Oxford University Press, 2011.
- Buchanan, Allen, Dan W. Brock, Norman Daniels, and Daniel Wikler. *From Chance to Choice: Genetics & Justice*. Cambridge; New York: Cambridge University Press, 2000.
- Callahan, Daniel. "Bioethics as a Discipline." *The Hastings Center Studies (Report)* 1, no. 1 (1973): 66–73. doi:10.2307/3527474.
- . "Bioethics, Our Crowd, and Ideology." *The Hastings Center Report* 26, no. 6 (1996): 3–4. doi:10.2307/3528741.
- . "Religion and the Secularization of Bioethics." *The Hastings Center Report* 20, no. 4 (1990): 2–4. doi:10.2307/3562776.
- . "The Social Sciences and the Task of Bioethics." *Daedalus* 128, no. 4 (1999): 275–294.
- . "Why America Accepted Bioethics." *The Hastings Center Report* 23, no. 6 (1993): S8–S9.

- Cameron, Nigel M. de S., and M. Ellen Mitchell, eds. *Nanoscale: Issues and Perspectives for the Nano Century*. Hoboken: John Wiley & Sons, 2007.
- Campbell, Courtney S. "Prophecy and Policy." *Hastings Center Report* 27, no. 5 (1997): 15–17. doi:10.2307/3527795.
- . "Religion and Moral Meaning in Bioethics." *The Hastings Center Report* 20, no. 4 (July 1, 1990): 4–10. doi:10.2307/3562777.
- Carroll, Noël. "The Wheel of Virtue: Art, Literature, and Moral Knowledge." *The Journal of Aesthetics and Art Criticism* 60, no. 1 (2002): 3–26. doi:10.2307/1519970.
- Carson, Ronald A. "Sensibility and Rationality in Bioethics." *The Hastings Center Report* 24, no. 3 (1994): 23–24. doi:10.2307/3563393.
- Chambers, Tod. "The Fiction of Bioethics: A Précis." *The American Journal of Bioethics* 1, no. 1 (2001): 40–43.
- Charon, Rita. *Narrative Medicine: Honoring the Stories of Illness*. Oxford; New York: Oxford University Press, 2006.
- Charon, Rita, and Martha Montello, eds. *Stories Matter: The Role of Narrative in Medical Ethics*. New York: Routledge, 2002.
- Christopher Coenen. "Deliberating Visions: The Case of Human Enhancement in the Discourse on Nanotechnology and Convergence." In *Governing Future Technologies*, edited by Mario Kaiser, Monika Kurath, Sabine Maasen, and Christoph Rehmann-Sutter, 73–87. *Sociology of the Sciences Yearbook* 27. Dordrecht: Springer, 2010.
- Clarke, Arthur C. *Profiles of the Future: An Inquiry Into the Limits of the Possible*. New York: Random House, 1962.
- Clayton, Jay. "The Ridicule of Time: Science Fiction, Bioethics, and the Posthuman." *American Literary History* 25, no. 2 (2013): 317–340.
- Clayton, Ruth. "Review of: What Sort of People Should There Be? By Jonathan Glover." *Journal of Medical Ethics* 12, no. 3 (1986): 163–164. doi:10.2307/27716517.
- Collingridge, David. *The Social Control of Technology*. New York: St. Martin's Press, 1980.
- Collins, Francis S. "Medical and Societal Consequences of the Human Genome Project." *New England Journal of Medicine* 341, no. 1 (1999): 28–37. doi:10.1056/NEJM199907013410106.
- Cook-Deegan, Robert. *Cloning Human Beings: Do Research Moratoria Work?* Rockville, MD: National Bioethics Advisory Commission, June 1997.

<http://bioethics.georgetown.edu/nbac/pubs/cloning2/cc8.pdf>.

- . *The Gene Wars: Science, Politics, and the Human Genome*. New York: Norton, 1994.
- Cook-Deegan, Robert, Kathleen N. Lohr, and Julie Gage Palmer. “How Bioethics Can Inform Policy Decisions About Genetic Enhancement.” In *Altering Nature*, edited by B. Andrew Lustig, Baruch A. Brody, and Gerald P. McKenny, 161–198. *Philosophy and Medicine* 98. Dordrecht: Springer, 2008.
- Cooper, Rachel. “Thought Experiments.” *Metaphilosophy* 36, no. 3 (2005): 328–347. doi:10.1111/j.1467-9973.2005.00372.x.
- Dancy, Jonathan. “The Role of Imaginary Cases in Ethics.” *Pacific Philosophical Quarterly* 66, no. 1–2 (1985): 141–153.
- Daniels, Norman. *Just Health Care*. Cambridge; New York: Cambridge University Press, 1985.
- Darnovsky, Marcy. “Biopolitics, Mythic Science, and Progressive Values.” In *Progress in Bioethics: Science, Policy, and Politics*, edited by Jonathan D. Moreno and Sam Berger, 189–215. Cambridge, MA: MIT Press, 2010.
- Davies, David. “Thought Experiments and Fictional Narratives.” *Croatian Journal of Philosophy* 7, no. 1 (2007).
- Davies, Sarah R., and Phil Macnaghten. “Narratives of Mastery and Resistance: Lay Ethics of Nanotechnology.” *NanoEthics* 4 (2010): 141–151. doi:10.1007/s11569-010-0096-5.
- De Laat, Bastiaan. “Scripts for the Future: Using Innovation Studies to Design Foresight Tools.” In *Contested Futures: A Sociology of Prospective Science and Technology*, edited by Nik Brown, Brian Rappert, and Andrew Webster, 175–208. Aldershot, UK: Ashgate, 2000.
- Dupuy, Jean-Pierre. “Some Pitfalls in the Philosophical Foundations of Nanoethics.” *Journal of Medicine and Philosophy* 32, no. 3 (2007): 237–261. doi:10.1080/03605310701396992.
- . “The Narratology of Lay Ethics.” *NanoEthics* 4, no. 2 (2010): 153–170. doi:10.1007/s11569-010-0097-4.
- Eckenwiler, Lisa A., and Felicia G. Cohn, eds. *The Ethics of Bioethics: Mapping the Moral Landscape*. Baltimore: Johns Hopkins University Press, 2007.
- Ehrenfeld, David. “Unethical Contexts for Ethical Questions.” In *Expanding Horizons in Bioethics*, edited by Arthur W. Galston and Christiana Z. Peppard, 19–34. Dordrecht: Springer, 2005.
- Elliott, Carl. “Adventure! Comedy! Tragedy! Robots! How Bioethicists Learned to Stop Worrying and Embrace Their Inner Cyborgs.” *Journal of Bioethical Inquiry* 2, no. 1 (2005): 18–23.

- . *Better Than Well: American Medicine Meets the American Dream*. New York: Norton, 2004.
- . “Where Ethics Comes from and What to Do about It.” *The Hastings Center Report* 22, no. 4 (July 1, 1992): 28–35. doi:10.2307/3563021.
- Elshtain, Jean Bethke. “To Clone or Not to Clone.” In *Clones and Clones: Facts and Fantasies about Human Cloning*, edited by Martha C. Nussbaum and Cass R. Sunstein, 181–189. New York: Norton, 1998.
- Elster, Jakob. “How Outlandish Can Imaginary Cases Be?” *Journal of Applied Philosophy* 28, no. 3 (2011): 241–258. doi:10.1111/j.1468-5930.2011.00531.x.
- Elster, Jon. *Solomonic Judgements: Studies in the Limitation of Rationality*. Cambridge: Cambridge University Press, 1989.
- Engelhardt, H. Tristram. *The Foundations of Bioethics*. Oxford; New York: Oxford University Press, 1996.
- Estlund, David. “The Audacious Humility of John Rawls.” *Dissent* 50, no. 2 (Spring 2003): 89–91.
- Etzioni, Amitai. *Genetic Fix*. New York: Macmillan, 1973.
- Evans, James P., and Robert C. Green. “Direct to Consumer Genetic Testing: Avoiding a Culture War.” *Genetics in Medicine* 11, no. 8 (2009): 568–569. doi:10.1097/GIM.0b013e3181afbaed.
- Evans, James P., Eric M. Meslin, Theresa M. Marteau, and Timothy Caulfield. “Deflating the Genomic Bubble.” *Science* 331, no. 6019 (February 18, 2011): 861–862. doi:10.1126/science.1198039.
- Evans, John H. *Playing God?: Human Genetic Engineering and the Rationalization of Public Bioethical Debate*. University of Chicago Press, 2002.
- Farrelly, Colin. “The Genetic Difference Principle.” *The American Journal of Bioethics* 4, no. 2 (2004): W21–W28. doi:10.1162/152651604323097952.
- Festinger, Leon. *When Prophecy Fails*. Minneapolis: University of Minnesota Press, 1956.
- Fleck, Leonard M. *Just Caring: Health Care Rationing and Democratic Deliberation*. Oxford; New York: Oxford University Press, 2009.
- Fletcher, John C., and W. French Anderson. “Germ-Line Gene Therapy: A New Stage of Debate.” *The Journal of Law, Medicine & Ethics* 20, no. 1–2 (1992): 26–39. doi:10.1111/j.1748-720X.1992.tb01171.x.
- Fletcher, Joseph F. *The Ethics of Genetic Control: Ending Reproductive Roulette*. Garden City, NY:

- Anchor Press, 1974.
- Fortun, Mike. "For an Ethics of Promising, or: A Few Kind Words about James Watson." *New Genetics and Society* 24, no. 2 (2005): 157–173. doi:10.1080/14636770500184792.
- Fox, Renee C., and Judith P. Swazey. *Observing Bioethics*. New York: Oxford University Press, 2008.
- Franklin, Sarah. "Better by Design?" In *Better Humans? The Politics of Human Enhancement and Life Extension*, edited by Paul Miller and James Wilsdon, 86–94. London: Demos, 2006.
- . "Culturing Biology: Cell Lines for the Second Millennium." *Health* 5, no. 3 (2001): 335–354. doi:10.1177/136345930100500304.
- Fukuyama, Francis. *Our Posthuman Future: Consequences of the Biotechnology Revolution*. New York: Farrar, Straus and Giroux, 2002.
- Garreau, Joel. *Radical Evolution: The Promise and Peril of Enhancing Our Minds, Our Bodies—and What It Means to Be Human*. New York: Broadway Books, 2006.
- Gaylin, Willard. "Harvesting the Dead." *Harper's* 249, no. 1492 (September 1974): 23–30.
- . "The Frankenstein Myth Becomes a Reality." *New York Times Magazine*, March 5, 1972.
- Gendler, Tamar Szabó. "Philosophical Thought Experiments, Intuitions, and Cognitive Equilibrium." *Midwest Studies in Philosophy* 31, no. 1 (2007): 68–89.
- Glover, Jonathan. *Choosing Children: Genes, Disability, and Design*. Oxford; New York: Oxford University Press, 2006.
- . "Jonathan Glover's Philosophy Website." Accessed January 23, 2013.
<http://jonathanglover.co.uk/books/what-sort-of-people-should-there-be>.
- . *What Sort of People Should There Be?* Middlesex, UK: Penguin Books, 1984.
- Goodenough, Jeremy. "The Trouble with Thought Experiments." *Theoretical & Applied Ethics* 1 (Spring 2011): 7–12.
- Goodfield, June. *Playing God: Genetic Engineering and the Manipulation of Life*. New York: Random House, 1977.
- Gordijn, Bert. "Converging NBIC Technologies for Improving Human Performance: A Critical Assessment of the Novelty and the Prospects of the Project." *Journal of Law, Medicine and Ethics* 34, no. 4 (2006): 726–732.
- Gordijn, Bert, and Ruth Chadwick, eds. *Medical Enhancement and Posthumanity*. Dordrecht: Springer, 2008.

- Green, Ronald M. *Babies by Design: The Ethics of Genetic Choice*. New Haven: Yale University Press, 2007.
- . “Bioethics and Human Betterment: Have We Lost Our Ability to Dream?” In *Biotechnology: Our Future As Human Beings and Citizens*, edited by Sean D. Sutton, 49–66. Albany: SUNY Press, 2009.
- . “The President’s Council on Bioethics—Requiescat in Pace.” *Journal of Religious Ethics* 38, no. 2 (2010): 197–218. doi:10.1111/j.1467-9795.2010.00426.x.
- Greif, Karen F., and Jon F. Merz. “Manufacturing Children: Assisted Reproductive Technologies and Self-Regulation by Scientists and Clinicians.” In *Current Controversies in the Biological Sciences: Case Studies of Policy Challenges from New Technologies*, 77–99. Basic Bioethics. Cambridge, MA: MIT Press, 2007.
- Grunwald, Armin. “From Speculative Nanoethics to Explorative Philosophy of Nanotechnology.” *NanoEthics* 4, no. 2 (2010): 91–101. doi:10.1007/s11569-010-0088-5.
- Gustafson, James M. “Moral Discourse about Medicine: A Variety of Forms.” *Journal of Medicine and Philosophy* 15, no. 2 (1990): 125–142.
- Guyer, Ruth Levy, and Jonathan D. Moreno. “Slouching Toward Policy: Lazy Bioethics and the Perils of Science Fiction.” *The American Journal of Bioethics* 4, no. 4 (2004): W14–17. doi:10.1080/15265160490908022.
- Haldane, J.B.S. “Daedalus, Or, Science and the Future.” Cambridge University, February 4, 1923. <http://vserver1.cscs.lsa.umich.edu/~crshalizi/Daedalus.html>.
- Hansson, Sven Ove. “Philosophical Problems in Cost-Benefit Analysis.” *Economics and Philosophy* 23, no. 02 (2007): 163–183. doi:10.1017/S0266267107001356.
- Harris, Maureen, ed. *Early Diagnosis of Human Genetic Defects: Scientific and Ethical Considerations*. Washington, DC: Government Printing Office, 1972.
- Hauskeller, Michael. “Human Enhancement and the Giftedness of Life.” *Philosophical Papers* 40, no. 1 (2011): 55–79. doi:10.1080/05568641.2011.560027.
- . “Reinventing Cockaigne.” *Hastings Center Report* 42, no. 2 (2012): 39–47. doi:10.1002/hast.18.
- Hedgecoe, Adam. “Bioethics and the Reinforcement of Socio-Technical Expectations.” *Social Studies of Science* 40, no. 2 (2010): 163.
- Hedgecoe, Adam M. “Critical Bioethics: Beyond the Social Science Critique of Applied Ethics.” *Bioethics* 18, no. 2 (2004): 120–143. doi:10.1111/j.1467-8519.2004.00385.x.

- Hedgecoe, Adam M., and Paul A. Martin. "Genomics, STS, and the Making of Sociotechnical Futures." In *The Handbook of Science and Technology Studies*, edited by Edward J. Hackett, 817–840. 3rd ed. Cambridge, MA: MIT Press, 2008.
- Heller, Agnes. "European Master-Narratives about Freedom." In *Handbook of Contemporary European Social Theory*, edited by Gerard Delanty, 257–265. London; New York: Routledge, 2006.
- Hilton, Bruce, Daniel Callahan, Maureen Harris, Peter Condliffe, and Burton Berkley, eds. *Ethical Issues in Human Genetics*. Fogarty International Proceedings 13. New York: Plenum Press, 1973.
- Hollinger, Veronica. "Stories About the Future: From Patterns of Expectation to Pattern Recognition." *Science Fiction Studies* 33, no. 3 (2006): 452–472. doi:10.2307/4241464.
- Hood, Leroy. "The Human Genome Project—Launch Pad for Human Genetic Engineering." In *Engineering the Human Germline*, edited by Gregory Stock and John H. Campbell, 17–24. New York: Oxford University Press, 2000.
- Hook, C. Christopher. "Transhumanism and Posthumanism." Edited by Stephen G. Post. *Encyclopedia of Bioethics*. New York: Macmillan Reference, 2004. Gale Virtual Reference Library.
- Hughes, James. *Citizen Cyborg: Why Democratic Societies Must Respond To The Redesigned Human Of The Future*. New York: Basic Books, 2004.
- Hughes, James J. "Back to the Future." *EMBO Reports* 9, no. S1 (2008): S59–S63. doi:10.1038/embor.2008.68.
- Humanityplus.org. "Transhumanist FAQ." Accessed January 21, 2013. http://humanityplus.org/philosophy/transhumanist-faq/#answer_19.
- Jackson, M. W. "The Gedankenexperiment Method of Ethics." *The Journal of Value Inquiry* 26, no. 4 (1992): 525–535.
- Jacob, Francois. *The Possible and the Actual*. New York: Pantheon, 1982.
- Jamieson, Dale. "Ethics, Public Policy, and Global Warming." *Science, Technology, & Human Values* 17, no. 2 (1992): 139–153. doi:10.2307/689781.
- Jelsøe, Erling, Arne Thing Mortensen, Mercy Wambui Kamara, Maria Rusanen, Susana Costa, Torben Hviid Nielsen, and Nicola Lindsey. "Moving the Goalposts in Bioethics." In *Genomics and Society: Legal, Ethical, and Social Dimensions*, edited by George Gaskell and Martin W. Bauer, 44–59. Science in Society Series. London; Sterling, VA: Earthscan, 2006.

- John, Stephen. "Titanic Ethics, Pirate Ethics, Bioethics." *Studies in History and Philosophy of Science Part C: Studies in History and Philosophy of Biological and Biomedical Sciences* 35, no. 1 (2004): 177–184. doi:10.1016/j.shpsc.2003.12.013.
- Johnston, Paul. "Bioethics, Wisdom, and Expertise." In *Slow Cures and Bad Philosophers: Essays on Wittgenstein, Medicine, and Bioethics*, edited by Carl Elliott, 149–160. Durham; London: Duke University Press, 2001.
- Jones, D. Gareth. "Enhancement: Are Ethicists Excessively Influenced by Baseless Speculations?" *Medical Humanities* 32, no. 2 (December 1, 2006): 77–81. doi:10.1136/jmh.2005.000234.
- Jones, D. Gareth, Maja Whitaker, and Michael King. "Speculative Ethics: Valid Enterprise or Tragic Cul-De-Sac?" In *Bioethics in the 21st Century*, edited by Abraham Rudnick. InTech, 2011. <http://www.intechopen.com/books/bioethics-in-the-21st-century/speculative-ethics-valid-enterprise-or-tragic-cul-de-sac->.
- Jonsen, Albert R. "Beating up Bioethics." *The Hastings Center Report* 31, no. 5 (2001): 40. doi:10.2307/3527703.
- . *The Birth of Bioethics*. New York: Oxford University Press, 1998.
- Jotterand, Fabrice. "At the Roots of Transhumanism: From the Enlightenment to a Post-Human Future." *Journal of Medicine and Philosophy* 35, no. 6 (2010): 617–621. doi:10.1093/jmp/jhq050.
- Judith Shulevitz. "The Grayest Generation." *New Republic* 243, no. 19 (December 20, 2012): 8–13.
- Juengst, Eric T. "Germ-Line Gene Therapy: Back to Basics." *Journal of Medicine and Philosophy* 16, no. 6 (1991): 587–592.
- . "The Human Genome Project and Bioethics." *Kennedy Institute of Ethics Journal* 1, no. 1 (1991): 71–74.
- . "What Does Enhancement Mean?" In *Enhancing Human Traits*, edited by Erik Parens, 29–47. Washington, DC: Georgetown University Press, 2000.
- Karinen, Risto, and David H. Guston. "Toward Anticipatory Governance: The Experience with Nanotechnology." In *Governing Future Technologies*, edited by Mario Kaiser, Monika Kurath, Sabine Maasen, and Christoph Rehmann-Sutter, 217–232. *Sociology of the Sciences Yearbook* 27. Dordrecht: Springer, 2010.
- Kass, Leon R. "Forbidding Science: Some Beginning Reflections." *Science and Engineering Ethics* 15, no. 3 (2009): 271–282. doi:10.1007/s11948-009-9122-9.
- . "The Wisdom of Repugnance." *The New Republic* no. 216 (1997): 17–26.

- Kelly, Susan E. "Toward an Epistemological Luddism of Bioethics." *Science Studies* 19 (2006): 69–82.
- Keulartz, Jozef, Maartje Schermer, Michiel Korthals, and Tsjalling Swierstra. "Ethics in Technological Culture: A Programmatic Proposal for a Pragmatist Approach." *Science, Technology & Human Values* 29, no. 1 (2004): 3–29. doi:10.1177/0162243903259188.
- Khushf, George. "Open Questions in the Ethics of Convergence." *Journal of Medicine and Philosophy* 32, no. 3 (2007): 299–310. doi:10.1080/03605310701397057.
- . "The Ethics of NBIC Convergence." *Journal of Medicine and Philosophy* 32, no. 3 (2007): 185–196. doi:10.1080/03605310701396950.
- Kitcher, Philip. *The Lives to Come: The Genetic Revolution and Human Possibilities*. New York: Simon & Schuster, 1996.
- Klerkx, Greg. "The Transhumanists as Tribe." In *Better Humans? The Politics of Human Enhancement and Life Extension*, edited by Paul Miller and James Wilsdon, 59–66. London: Demos, 2006.
- Korthals, Michiel. "The Naked Emperor." In *The Contingent Nature of Life*, edited by Marcus Düwell, Christoph Rehmann-Sutter, and Dietmar Mieth, 221–232. International Library of Ethics, Law, and the New Medicine 39. Dordrecht: Springer, 2008.
- Kuczewski, Mark. "Bioethics' Consensus Method: Who Could Ask for Anything More?" In *Stories and Their Limits: Narrative Approaches to Bioethics*, edited by Hilde Lindemann Nelson, 134–149. New York; London: Routledge, 1997.
- Kymlicka, Will. "Moral Philosophy and Public Policy: The Case of NRTs." *Bioethics* 7, no. 1 (1993): 1–26. doi:10.1111/j.1467-8519.1993.tb00268.x.
- Lewis, C.S. *Of Other Worlds: Essays and Stories*. Orlando: Harcourt Brace and Co., 1966.
- Liebert, Wolfgang, and Jan C. Schmidt. "Collingridge's Dilemma and Technoscience." *Poiesis & Praxis* 7, no. 1–2 (March 24, 2010): 55–71. doi:10.1007/s10202-010-0078-2.
- Lillehammer, Hallvard. "Who Needs Bioethicists?" *Studies in History and Philosophy of Science Part C: Studies in History and Philosophy of Biological and Biomedical Sciences* 35, no. 1 (March 2004): 131–144. doi:10.1016/j.shpsc.2003.12.009.
- Lindblom, Charles E. "The Science of 'Muddling Through.'" *Public Administration Review* 19, no. 2 (1959): 79–88. doi:10.2307/973677.
- Lindsay, Ronald A. "Enhancements and Justice: Problems in Determining the Requirements of Justice in a Genetically Transformed Society." *Kennedy Institute of Ethics Journal* 15, no. 1 (2005): 3–38.

- Litton, Paul. "Nanoethics'? What's New?" *The Hastings Center Report* 37, no. 1 (2007): 22–25. doi:10.2307/4625707.
- MacIntyre, Alasdair. *After Virtue: A Study in Moral Theory*. 3rd ed. University of Notre Dame Press, 2007.
- Macklin, Ruth. "The New Conservatives in Bioethics: Who Are They and What Do They Seek?" *Hastings Center Report* 36, no. 1 (2006): 34–43. doi:10.1353/hcr.2006.0013.
- Macnaghten, Phil, Sarah Davies, and Matthew Kearnes. "Narrative and Public Engagement: Some Findings from the DEEPEN Project." In *Understanding Public Debate on Nanotechnologies: Options for Framing Public Policy: A Report from the European Commission Services*, edited by René von Schomberg and Sarah Davies, 13–29. Luxembourg: Publ. Off. of the European Union, 2010.
- Maeroff, Gene I. "The Hastings Center—a Cool Look at Hot Issues." *Change* 11, no. 1 (February 1979): 12–13. doi:10.1080/00091383.1979.9939682.
- Manson, Neil A. "Formulating the Precautionary Principle." *Environmental Ethics* 24, no. 3 (2008): 263–274.
- May, William. "Attitudes toward the Newly Dead." *The Hastings Center Studies* 1, no. 1 (January 1973): 3–13. doi:10.2307/3527469.
- Mehlman, Maxwell J. *The Price of Perfection: Individualism and Society in the Era of Biomedical Enhancement*. Baltimore: Johns Hopkins University Press, 2009.
- Mendeloff, John. "Politics and Bioethical Commissions: 'Muddling Through' and the 'Slippery Slope.'" *Journal of Health Politics, Policy and Law* 10, no. 1 (1985): 81–92. doi:10.1215/03616878-10-1-81.
- Messikomer, Carla M., Renée C. Fox, and Judith P. Swazey. "The Presence and Influence of Religion in American Bioethics." *Perspectives in Biology and Medicine* 44, no. 4 (2001): 485–508.
- Miah, Andy. "A Critical History of Posthumanism." In *Medical Enhancement and Posthumanity*, edited by Bert Gordijn and Ruth Chadwick, 2:71–94. Dordrecht: Springer, 2008.
- Michael, Mike. "Futures of the Present: From Performativity to Prehension." In *Contested Futures: A Sociology of Prospective Science and Technology*, edited by Nik Brown, Brian Rappert, and Andrew Webster, 21–39. Aldershot, UK: Ashgate, 2000.
- Milburn, Colin. "Nanotechnology in the Age of Posthuman Engineering: Science Fiction as Science." *Configurations* 10, no. 2 (2002): 261–295. doi:10.1353/con.2003.0017.
- Mitchell, M. Ellen. "Scientific Promise: Reflections on Nano-Hype." In *Nanoscale: Issues and*

- Perspectives for the Nano Century*, edited by Nigel M. de S. Cameron and M. Ellen Mitchell, 43–60. Hoboken: John Wiley & Sons, 2007.
- Mnyusiwalla, Anisa, Abdallah S. Daar, and Peter A. Singer. “‘Mind the Gap’: Science and Ethics in Nanotechnology.” *Nanotechnology* 14, no. 3 (2003): R9–R13. doi:10.1088/0957-4484/14/3/201.
- Moor, James. “Why We Need Better Ethics for Emerging Technologies.” *Ethics and Information Technology* 7, no. 3 (2005): 111–119. doi:10.1007/s10676-006-0008-0.
- Moreno, Jonathan D. *Deciding Together: Bioethics and Moral Consensus*. Oxford University Press, 1995.
- . “The End of the Great Bioethics Compromise.” *Hastings Center Report* 35, no. 1 (2005): 14–15. doi:10.1353/hcr.2005.0011.
- Morgan, Rose M. *The Genetics Revolution: History, Fears, and Future of a Life-Altering Science*. Westport, Conn: Greenwood Press, 2006.
- Morrison, Michael. “Beyond the Perils and Promise of Human Enhancement: The Social Shaping of Enhancement Technologies.” *eSharp* 12 (Winter 2008): 1–24.
- Mundy, Liza. “Souls on Ice: America’s Human Embryo Glut and the Unbearable Lightness of Almost Being.” *Mother Jones*, August 2006.
<http://www.motherjones.com/politics/2006/07/souls-ice-americas-embryo-glut-and-wasted-promise-stem-cell-research>.
- Murray, Thomas H. “Enhancement.” In *The Oxford Handbook of Bioethics*, edited by Bonnie Steinbock, 491–515. Oxford; New York: Oxford University Press, 2007.
- Nagel, Thomas. “Justice and Nature.” *Oxford Journal of Legal Studies* 17, no. 2 (1997): 303–321. doi:10.2307/764593.
- National Bioethics Advisory Commission (USA). *Cloning Human Beings*. Rockville, MD, 1997.
- National Institutes of Health. “About the HapMap.” Accessed March 13, 2013.
<http://hapmap.ncbi.nlm.nih.gov/thehapmap.html.en>.
- Nelkin, Dorothy, and M. Susan Lindee. *The DNA Mystique: The Gene as a Cultural Icon*. 2nd ed. University of Michigan Press, 2004.
- Nelson, Hilde Lindemann. “Four Narrative Approaches to Bioethics.” In *Handbook of Bioethics: Taking Stock of the Field from a Philosophical Perspective*, edited by George Khushf, 163–181. Philosophy and Medicine 78. Dordrecht: Kluwer Academic Publishers, 2004.
- . , ed. *Stories and Their Limits: Narrative Approaches to Bioethics*. New York: Routledge, 1997.

- Nick Bostrom. "A History of Transhumanist Thought." *Journal of Evolution and Technology* 14, no. 1 (April 2005). <http://jetpress.org/volume14/bostrom.html>.
- NIH-DOE ELSI Working Group. "Genetic Testing Report-Executive Summary." Accessed April 14, 2013. <http://www.genome.gov/10002393>.
- . "Genetic Testing Task Force." Accessed April 14, 2013. <http://www.genome.gov/10001808>.
- . *Task Force Report on Genetic Information and Insurance*. Accessed April 14, 2013. <http://www.genome.gov/Pages/ELSI/TaskForceReportGeneticInfo1993.pdf>.
- Nordmann, Alfred. "A Forensics of Wishing: Technology Assessment in the Age of Technoscience." *Poiesis & Praxis* 7, no. 1-2 (2010): 5-15. doi:10.1007/s10202-010-0081-7.
- . *Converging Technologies: Shaping the Future of European Societies*. Office for Official Publications of the European Communities, 2004.
- . "If and Then: A Critique of Speculative NanoEthics." *NanoEthics* 1, no. 1 (2007): 31-46. doi:10.1007/s11569-007-0007-6.
- . "Knots and Strands: An Argument for Productive Disillusionment." *Journal of Medicine and Philosophy* 32, no. 3 (2007): 217-236. doi:10.1080/03605310701396976.
- . "No Future for Nanotechnology? Historical Development vs. Global Expansion." In *Emerging Conceptual, Ethical and Policy Issues in Bionanotechnology*, edited by Fabrice Jotterand, 43-63. Philosophy and Medicine 101. Dordrecht: Springer, 2008.
- Nussbaum, Martha C. "Brave Good World." *The New Republic*, December 4, 2000.
- O'Neill, Onora. *Autonomy and Trust in Bioethics*. Cambridge; New York: Cambridge University Press, 2002.
- Paden, Roger. "Rawls's Just Savings Principle and the Sense of Justice." *Social Theory and Practice* 23, no. 1 (1997): 27-51.
- Paprzycka, Katarzyna. "Normative Expectations, Intentions, and Beliefs." *The Southern Journal of Philosophy* 37, no. 4 (1999): 629-652. doi:10.1111/j.2041-6962.1999.tb00886.x.
- Parens, Erik. "Is Better Always Good?: The Enhancement Project." *Hastings Center Report* 28, no. 1 (1998): s1-s17. doi:10.2307/3527981.
- . "Tools from and for Democratic Deliberations." *Hastings Center Report* 27, no. 5 (1997): 20-22. doi:10.2307/3527797.
- . "Toward a More Fruitful Debate about Enhancement." In *Human Enhancement*, edited by Julian Savulescu and Nick Bostrom, 181-197. Oxford; New York: Oxford University Press,

2009.

Parens, Erik, Audrey R. Chapman, and Nancy Press, eds. *Wrestling with Behavioral Genetics: Science, Ethics, and Public Conversation*. Baltimore: Johns Hopkins University Press, 2006.

Parfit, Derek. *Reasons and Persons*. New York; Oxford: Oxford University Press, 1986.

Parker, Lisa S. "Bioethics as Activism." In *The Ethics of Bioethics: Mapping the Moral Landscape*, edited by Lisa A. Eckenwiler and Felicia G. Cohn, 144–157. Baltimore: Johns Hopkins University Press, 2007.

President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research. *Splicing Life: A Report on the Social and Ethical Issues of Genetic Engineering with Human Beings*. Washington, DC, 1982.

President's Council on Bioethics. *Being Human: Readings from the President's Council on Bioethics*. Washington, DC, 2003.

———. *Beyond Therapy: Biotechnology and the Pursuit of Happiness*. Washington, DC, 2003.

———. *Reproduction and Responsibility: The Regulation of New Biotechnologies*. Washington, DC, 2004.

———. "Transcript: Session 3," March 6, 2003.
<http://bioethics.georgetown.edu/pcbe/transcripts/march03/session3.html>.

———. "Transcript: Session 5," January 16, 2004.
<http://bioethics.georgetown.edu/pcbe/transcripts/jan04/session5.html>.

Ramsey, Paul. *Fabricated Man: The Ethics of Genetic Control*. New Haven: Yale University Press, 1970.

———. "Manufacturing Our Offspring: Weighing the Risks." *Hastings Center Report* 8, no. 5 (1978): 7–9. doi:10.2307/3561438.

Rawls, John. *A Theory of Justice*. Original Edition. Harvard University Press, 2005.

———. "Justice as Fairness: Political Not Metaphysical." *Philosophy and Public Affairs* 14, no. 3 (1985): 223–251.

———. "The Priority of Right and Ideas of the Good." *Philosophy & Public Affairs* 17, no. 4 (1988): 251–276. doi:10.2307/2265400.

Rehmann-Sutter, Christoph, and Jackie Leach Scully. "Which Ethics for (of) the Nanotechnologies?" In *Governing Future Technologies*, edited by Mario Kaiser, Monika Kurath, Sabine Maasen, and Christoph Rehmann-Sutter, 233–252. *Sociology of the Sciences Yearbook* 27. Dordrecht: Springer, 2010.

- Reich, Warren T., ed. *Encyclopedia of Bioethics*. 2nd ed. New York: Macmillan, 1995.
- Resnik, David. "Debunking the Slippery Slope Argument against Human Germ-Line Gene Therapy." *Journal of Medicine and Philosophy* 19, no. 1 (1994): 23–40.
doi:10.1093/jmp/19.1.23.
- Rip, Arie, and Haico te Kulve. "Constructive Technology Assessment and Socio-Technical Scenarios." In *The Yearbook of Nanotechnology in Society, Volume I: Presenting Futures*, edited by Erik Fisher, Cynthia Selin, and Jameson M. Wetmore, 49–70. The Yearbook of Nanotechnology in Society, Volume I: Presenting Futures 1. Dordrecht: Springer, 2008.
- Roache, Rebecca. "Ethics, Speculation, and Values." *NanoEthics* 2, no. 3 (2008): 317–327.
doi:10.1007/s11569-008-0050-y.
- Robert Wachbroit. "Human Enhancement Uses of Biotechnology: Overview." In *Encyclopedia of Ethical, Legal, and Policy Issues in Biotechnology*, edited by Thomas H. Murray and Maxwell J. Mehlman, 549–552. New York: John Wiley & Sons, 2000.
- Roberts, Leslie. "Capital Report: Whither the ELSI Program?" *The Hastings Center Report* 23, no. 6 (1993): 5. doi:10.2307/3562916.
- Robertson, John A. *Children of Choice: Freedom and the New Reproductive Technologies*. Princeton University Press, 1996.
- . "In Vitro Conception and Harm to the Unborn." *The Hastings Center Report* 8, no. 5 (1978): 13–14. doi:10.2307/3561441.
- . "The Virtues of Muddling Through." *The Hastings Center Report* 37, no. 4 (2007): 26–28.
doi:10.1353/hcr.2007.0060.
- Roco, Mihail C., and William Sims Bainbridge. *Converging Technologies for Improving Human Performance: Nanotechnology, Biotechnology, Information Technology and Cognitive Science*. Dordrecht; Boston: Kluwer Academic Publishers, 2003.
- Rogers, Michael. *Biohazard*. New York: Knopf, 1977.
- Rose, Hilary, and Steven Rose. *Genes, Cells and Brains: The Promethean Promises of the New Biology*. London: Verso Books, 2013.
- Rose, Steven. "Don't Mess with Human Nature..." *The Guardian*, June 1, 2002, sec. Books.
<http://www.guardian.co.uk/books/2002/jun/01/highereducation>.
- Rosenfeld, Albert. *The Second Genesis: The Coming Control of Life*. Vintage Books, 1975.
- Rosoff, Philip. "The Myth of Genetic Enhancement." *Theoretical Medicine and Bioethics* 33, no. 3 (2012): 163–178. doi:10.1007/s11017-012-9220-6.

- Rothman, David. *Strangers at the Bedside: A History of How Law and Bioethics Transformed Medical Decision-Making*. New York: Basic Books, 1991.
- Rubin, Charles T. "What Is the Good of Transhumanism?" In *Medical Enhancement and Posthumanity*, edited by Bert Gordijn and Ruth Chadwick, 2:137–156. Dordrecht: Springer, 2008.
- Sandel, Michael J. "The Case Against Perfection." *The Atlantic*, April 2004.
<http://www.theatlantic.com/magazine/archive/2004/04/the-case-against-perfection/302927/>.
- Savulescu, Julian, and Nick Bostrom, eds. *Human Enhancement*. Oxford; New York: Oxford University Press, 2009.
- Savulescu, Julian, Ruud ter Meulen, and Guy Kahane, eds. *Enhancing Human Capacities*. West Sussex: Wiley-Blackwell, 2011.
- Scholem, Gershom. *The Messianic Idea in Judaism and Other Essays on Jewish Spirituality*. New York: Schocken Books, 1971.
- Scholes, Robert, and Eric Rabkin. *Science Fiction: History, Science, Vision*. New York: Oxford University Press, 1977.
- Schulman, Paul R. *Large-Scale Policy Making*. New York; Oxford: Elsevier, 1980.
- Schummer, Joachim. "From Nano-Convergence to NBIC-Convergence: 'The Best Way to Predict the Future Is to Create It.'" In *Governing Future Technologies*, edited by Mario Kaiser, Monika Kurath, Sabine Maasen, and Christoph Rehmann-Sutter, 57–71. *Sociology of the Sciences Yearbook* 27. Dordrecht: Springer, 2010.
- Scully, Jackie Leach, and Christoph Rehmann-Sutter. "When Norms Normalize: The Case of Genetic 'Enhancement.'" *Human Gene Therapy* 12, no. 1 (2001): 87–95.
- Searle, John R. "A Taxonomy of Illocutionary Acts." In *Expression and Meaning*. Cambridge University Press, 1979. <http://dx.doi.org/10.1017/CBO9780511609213.003>.
- Selin, Cynthia. "Negotiating Plausibility: Intervening in the Future of Nanotechnology." *Science and Engineering Ethics* 17, no. 4 (2011): 723–737. doi:10.1007/s11948-011-9315-x.
- Silver, Lee M. *Remaking Eden: Cloning and Beyond in a Brave New World*. New York: HarperCollins, 1997.
- Souder, Lawrence. "What Are We to Think about Thought Experiments?" *Argumentation* 17, no. 2 (2003): 203–217.
- Sparrow, Robert. "Revolutionary and Familiar, Inevitable and Precarious: Rhetorical

- Contradictions in Enthusiasm for Nanotechnology." *NanoEthics* 1, no. 1 (2007): 57–68. doi:10.1007/s11569-007-0008-5.
- Stapledon, Olaf. *Philosophy and Living*, 1939.
<http://ebooks.adelaide.edu.au/s/stapledon/olaf/philosophy/>.
- Stevens, M. L. Tina. *Bioethics in America: Origins and Cultural Politics*. Baltimore: Johns Hopkins University Press, 2000.
- . "Intellectual Capital and Voting Boot Bioethics: A Contemporary Historical Critique." In *The Ethics of Bioethics: Mapping the Moral Landscape*, edited by Lisa A. Eckenwiler and Felicia G. Cohn, 59–73. Baltimore: Johns Hopkins University Press, 2007.
- Stock, Gregory. *Redesigning Humans: Our Inevitable Genetic Future*. New York: Houghton Mifflin, 2002.
- Stock, Gregory, and John H. Campbell, eds. *Engineering the Human Germline*. New York: Oxford University Press, 2000.
- Stockdale, Alan, and Sharon F. Terry. "Advocacy Groups and the New Genetics." In *The Double-Edged Helix: Social Implications of Genetics in a Diverse Society*, edited by Joseph S. Alper, Catherine Ard, Adrienne Asch, Jon Beckwith, Peter Conrad, and Lisa N. Geller, 80–101. Baltimore: Johns Hopkins University Press, 2002.
- Swirski, Peter. *Of Literature and Knowledge: Explorations in Narrative Thought Experiments, Evolution, and Game Theory*. London; New York: Routledge, 2007.
- Thomson, Judith Jarvis. "A Defense of Abortion." *Philosophy and Public Affairs* 1, no. 1 (1971): 47–66.
- Toulmin, Stephen. "In Vitro Fertilization: Answering the Ethical Objections." *The Hastings Center Report* 8, no. 5 (1978): 9–11. doi:10.2307/3561439.
- . "The Tyranny of Principles." *Hastings Center Report* 11, no. 6 (1981): 31–39. doi:10.2307/3560542.
- Turner, Leigh. "Anthropological and Sociological Critiques of Bioethics." *Journal of Bioethical Inquiry* 6, no. 1 (December 2008): 83–98. doi:10.1007/s11673-008-9130-5.
- . "Bioethics in a Multicultural World: Medicine and Morality in Pluralistic Settings." *Health Care Analysis* 11, no. 2 (2003): 99–117.
- . "Medical Facilities as Moral Worlds." *Medical Humanities* 28, no. 1 (June 1, 2002): 19–22. doi:10.1136/mh.28.1.19.
- . "Politics, Bioethics, and Science Policy." *HEC Forum* 20, no. 1 (2008): 29–47.

doi:10.1007/s10730-008-9062-9.

- Van Lente, Harro. "Forceful Futures: From Promise to Requirement." In *Contested Futures: A Sociology of Prospective Science and Technology*, edited by Nik Brown, Brian Rappert, and Andrew Webster, 43–63. Aldershot, UK: Ashgate, 2000.
- Vorhaus, Dan, Daniel MacArthur, and Luke Jostins. "DTC Genetic Testing and the FDA: Is There an End in Sight to the Regulatory Uncertainty?" *Genomes Unzipped*. Accessed March 13, 2013. <http://www.genomesunzipped.org/2011/06/dtc-genetic-testing-and-the-fda-is-there-an-end-in-sight-to-the-regulatory-uncertainty.php>.
- Walker, Margaret Urban. "Keeping Moral Space Open: New Images of Ethics Consulting." *The Hastings Center Report* 23, no. 2 (1993): 33–40. doi:10.2307/3562818.
- Walsh, Adrian. "The Use of Thought Experiments in Health Care Ethics." In *Principles of Health Care Ethics*, edited by Richard Edmund Ashcroft, Angus Dawson, Heather Draper, and John McMillan, 177–183. 2nd ed. West Sussex: John Wiley & Sons, 2007.
- Walters, LeRoy. "Human Genetic Intervention: Past, Present, and Future." In *Is Human Nature Obsolete?: Genetics Bioengineering, and the Future of the Human Condition*, edited by Harold W. Baillie and Timothy Casey, 367–384. Basic Bioethics. Cambridge, Mass: MIT Press, 2005.
- Walters, LeRoy, and Julie Gage Palmer. *The Ethics of Human Gene Therapy*. Oxford; New York: Oxford University Press, 1997.
- Weckert, John. "Editorial." *NanoEthics* 1, no. 1 (2007): 1–2. doi:10.1007/s11569-007-0009-4.
- Wells, H. G. (Herbert George). *An Experiment in Autobiography*, 1934. http://ebooks.adelaide.edu.au/w/wells/hg/experiment_in_autobiography/.
- Wilkinson, Stephen. *Choosing Tomorrow's Children: The Ethics of Selective Reproduction*. New York; Oxford: Oxford University Press, 2010.
- Williams, Bernard. *Moral Luck: Philosophical Papers, 1973-1980*. Cambridge; New York: Cambridge University Press, 1981.
- . "The Idea of Equality." In *Problems of the Self*. Cambridge University Press, 1973. <http://dx.doi.org/10.1017/CBO9780511621253.016>.
- . "The Self and the Future." *The Philosophical Review* 79, no. 2 (1970): 161–180. doi:10.2307/2183946.
- Williams, Robin. "Compressed Foresight and Narrative Bias: Pitfalls in Assessing High Technology Futures." In *The Yearbook of Nanotechnology in Society, Volume I: Presenting Futures*, edited by Erik Fisher, Cynthia Selin, and Jameson M. Wetmore, 265–289. Dordrecht: Springer, 2008.

- Willigenburg, Theo van. "Philosophical Reflection on Bioethics and Limits." In *The Contingent Nature of Life*, edited by Marcus Düwell, Christoph Rehmann-Sutter, and Dietmar Mieth, 147–156. International Library of Ethics, Law, and the New Medicine 39. Dordrecht: Springer, 2008.
- Wilson, Duncan. "Creating the 'Ethics Industry': Mary Warnock, in Vitro Fertilization and the History of Bioethics in Britain." *BioSocieties* 6, no. 2 (2010): 121–141.
doi:10.1057/biosoc.2010.26.
- Zaner, Richard M. "Themes and Schemes in the Development of Biomedical Ethics." In *The Development of Bioethics in the United States*, edited by Jeremy R. Garrett, Fabrice Jotterand, and D. Christopher Ralston, 223–239. Philosophy and Medicine 115. Dordrecht: Springer, 2013.
- Zonneveld, Leo, Huub Dijstelbloem, and Danielle Ringoir, eds. *Reshaping the Human Condition: Exploring Human Enhancement*. The Hague: Rathenau Institute, 2008.