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Narcissus at the Gene Pool

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These are the days of miracle and wonder
This is the long distance call
The way the camera follows us in slo-mo
The way we look to us all
The way we look to a distant constellation
That’s dying in a corner of the sky
These are the days of miracle and wonder
And don’t cry baby, don’t cry
Don’t cry

The future has come to bring us one last chance to know ourselves. Millennia of self-discovery have brought us to the brink of startling evolutionary possibilities. Our reward and our destiny, say the new eugenics enthusiasts, will be self-transformation. Having decoded the human genome, it now appears that learning what we are made of was meant to be merely rudimentary. By means of genetic interventions, techniques not yet viable but “clearly visible on the horizon,” we will prime ourselves to take flight and land in a posthuman world. There, if all goes according to plan, we will continue to genetically perfect ourselves to a point beyond human recognition. Homo sapiens, supplanted in due course by this new order of beings, will sleep with the fossil fishes.

While the prospect of extinguishing ourselves by design is appalling to many, others see it as cause for celebration. To an exultant Gregory Stock, “the road to our eventual

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disappearance might be paved not by humanity’s failure but by its success.”\(^3\) By means of what Lee Silver calls “reprogenetics,”\(^4\) we will soon be able to build a more perfect human, encoding genetic enhancements in the germ line for delivery to future generations. Biologists predict that, over time, deliberately selecting for certain traits while discarding others could lead to species-wide evolution.\(^5\) Whether we call this new creature “posthuman, metahuman, transhuman [or] ultrahuman,”\(^6\) it is either our fondest hope or our most pernicious fantasy.

Stock argues that “fast-forwarding”\(^7\) our species’ development is imperative because, as some scientists maintain, human evolution has stopped. According to Steve Jones, professor of genetics at University College London, we have so accommodated our environment to our needs and specifications that we have eliminated the harsh conditions that create evolutionary pressure.\(^8\) Where natural selection once determined fitness for survival and reproduction, most people in the Western world now live long enough to pass their genes to succeeding generations.\(^9\) In-breeding among smaller, isolated populations, the ideal opportunity for preserving and perpetuating random mutations, is far less common today.\(^10\) Our more diversified breeding pool is “‘buffered’ against minor genetic changes,”\(^11\) and less vulnerable to individual genetic mutations than in-bred populations. Stephen Jay Gould agreed that natural selection is increasingly extraneous to human evolution. “There’s been no biological change in humans in

\(^3\) GREGORY STOCK, REDESIGNING HUMANS, 4 (2002).
\(^5\) Simonstein, supra note at 654.
\(^7\) STOCK, supra note at 4
\(^9\) Id.
\(^10\) Id.
40,000 or 50,000 years,” he said. “Everything we call culture and civilization we’ve built with the same body and brain.”

Population geneticist Mark Stoneking argues that natural selection and human evolution are ongoing and that there is ample evidence to prove it. Because the selection process is “largely invisible,” pinpointing specific instances of it has, until now, been difficult. Comparing the genomes of Tibetans and Han Chinese, biologists have detected genetic changes which allow Tibetans to thrive at high altitudes, breathe air with vastly reduced oxygen levels and avoid mountain sickness. Geneticists believe these developments occurred as recently as 3,000 years ago although archaeologists date them at 6,000 years or more. The next most recent evidence of evolution concerns lactose tolerance, the ability to digest milk in adulthood, thought to have spread among Northern Europeans 7,500 years ago. With data from gene mapping, population geneticists are now able to trace human history since our dispersal from Africa 50,000 years ago. They are able to locate genes that “bear the fingerprints of recent natural selection” perhaps as close in time as 5,000 to 25,000 years ago. As much as 13 percent of our genes may have been “actively shaped by recent evolution,” changes manifested in biological functions like skin color, diet, and the olfactory sense. Signals of selection are most often seen in populations that have adapted to new environments. In fact, the rapidity of some adaptations

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13 Id.
17 Id.
19 Wade, Adventures in Very Recent Evolution, supra note .
20 Id.
suggests that mechanisms other than random mutation might be at work in the modification of human traits.  

Whether or not evolution has stalled, natural selection’s rumored decline is a convenient pretext for stepping up germline engineering. There is “no longer any doubt among molecular geneticists” that, as Silver contends, safe, efficient genetic engineering technologies will be developed by the middle of the 21st century. If we continue to rely on random mutation and natural selection for evolutionary change, “it could take tens or hundreds of generations for a new gene to become widespread.” This is enough to try the patience of any of the new breed of scientist bent on revamping human reproductive biology. Because, “while nature has eons,” warns Gregory Stock. “you and I do not.” Our emerging technologies have brought us within sight of better lives, asserts Stock. “We are not about to turn away from this.” James Watson, co-discoverer of DNA’s double helix, and rarely shy about the primacy of his profession asks, “…if scientists don’t play God, who will?”

The most obvious aspect of auto-evolution is also its most problematic, that, having opted out of nature’s dominion, the humans will be in charge. Contrary to the post-human credo, however, we are guaranteed neither the vision nor the capacity for “making ourselves anew.” Fiddling with our genetic essence, adding here, subtracting there, even constructing the human ideal, seems a curiously sterile pursuit, an end without new beginnings. In choosing to go it

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21 Id.
22 Simonstein, supra note at 652.
23 SILVER, supra note at 233.
25 Id. at 13.
27 Id. at 162.
28 STOCK, supra note at 184.
alone, in turning our backs on nature’s serendipity, we appoint ourselves both the instrumentality and the appraiser of our evolutionary progress. We trust that we can see so far beyond our humanness that, when the first posthuman seeds begin to sprout, we will know them. But could the Neanderthals have imagined, let alone invented, a Cro-Magnon? During the period that the two species co-existed, was the superiority of the one so readily apparent to the other?29

“I will die before I give you power over me,” cries a scornful Narcissus to the lovelorn Echo.30 She was accursed by the gods to forever have the last word but never the first. Arrogant, unloving Narcissus was made captive to his own reflection, pining away for his perfect self until he was released by death and transformation. Entranced by the human genome, we, too, are transfixed by the mirror in the water, longing for treasures just within and beyond our reach. But while we may succeed in molding ourselves into images ever more pleasing to our own eyes, we are ensnared, like Narcissus, in a highly myopic enterprise. Our self-designing ways will take us just so far, but the source of that fateful evolutionary jolt, that spark of reinvention, is yet unknown—- the one that will truly transform us, propel us through the looking glass and out of the sphere of the human.

All That We Need to Know

Writing at the tail-end of the 20th century Lee Silver proclaimed that we “have tamed the fire of life,”31 and seized the power to control human destiny. And while he marveled at the ease

29 Neanderthals and humans are believed to have cohabited parts of the earth until the Neanderthal extinction about 30,000 years ago. Some biologists also report genetic evidence of interbreeding between Neanderthals and non-African humans. Nicholas Wade, Signs of Neanderthals Mating With Humans, N.Y. Times, May 6, 2010.
31 SILVER, supra note at 15.
with which the human genome yielded up its secrets, each disclosure seems to herald yet more mystery. Contrary to what we may have believed, the role of single genes is dwarfed by the "multifaceted feedback loop between and among genes and their environment." At present, despite Silver’s rampant optimism, the human and posthuman worlds appear to be divided by a river of genetic complexity.

When the first completed draft of the human genome map was announced in 2000, scientists foresaw a revolution in genomic medicine. The ensuing decade has produced a “flood of discoveries of disease-causing mutations in the human genome,” but not the “cornucopia of new drugs” anticipated by experts. A few ‘targeted’ cancer drugs, designed to inhibit the effects of gene abnormalities that induce tumor growth have entered the market. But identifying the genes involved in disease is only the initial step in the long process of drug development. What is more, linking specific genes to diseases reveals “only a fraction of the genetic risk” of actually becoming ill. At Boston’s Brigham and Women’s Hospital a medical team collected over a hundred genetic variants associated with heart disease. Knowing the variants, however, had no impact on predicting heart disease among the 19,000 women who were monitored by the team for 12 years. It turns out that the “old-fashioned method of taking a family history was a better guide.”

While the public is eager for genetic enlightenment on everything from disease risk to personality traits, zeroing in on the role of single genes will not illuminate complex behaviors.

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32 Id. at 248.
33 Shannon, supra note at 274.
34 Wade, A Decade Later, Gene Map Yields Few New Cures, supra, note .
35 Id.
37 Wade, A Decade Later, Gene Map Yields Few New Cures, supra, note .
38 Id.
like intelligence, shyness, depression, homosexuality, alcoholism and aggression.\textsuperscript{39} There is no ‘smart gene,’ and, though we may be able to select against below average intelligence,\textsuperscript{40} “[n]ormal cognitive functioning . . . is almost certainly orchestrated by many subtly acting genes working together, rather than by single genes operating in isolation.”\textsuperscript{41}

Environmental factors play a crucial part in gene expression, and “the more we lift the lid on the genome, the more vulnerable to experience genes appear to be.”\textsuperscript{42} Neuroscientist James Fallon, whose ancestors include Lizzie Borden and eight others accused of murder, is a case in point. After submitting to a PET scan, Fallon discovered that he has the brain pattern of a “born killer.”\textsuperscript{43} Like many psychopaths, he exhibits “low activity in the orbital cortex, the region of the brain believed to be involved with ethical behaviors, moral decision-making and impulse control.”\textsuperscript{44} Secondly, Fallon has the high-aggression version of a gene associated with violence. What has saved him from a sure route to the gallows is the absence of a third feature common to psychopaths, a history of child abuse. Fallon no longer subscribes to genetic determinism, believing instead that genetic predisposition can be overcome by environmental factors, like a happy childhood.

Environmental stressors like child abuse can, in turn, be neutralized by one’s genetic makeup. A study in New Zealand explored the activity of the MAOA (monoamine oxidase A)
gene in young men. Those with highly active MAOA genes who were abused as children were “virtually immune to the effect of maltreatment”\textsuperscript{45} and exhibited no anti-social behavior. Those with low-active MAOA genes and who were maltreated were much more prone to anti-social and criminal behavior. Genes are “implacable little determinists, churning out utterly predictable messages,” says Ridley.\textsuperscript{46} But they depend on external cues that switch them on and off. Thus, they are also devices that glean information from the environment, and respond and adapt accordingly. Genes, concludes Ridley, “are the mechanisms of experience.”\textsuperscript{47}

Exploring the means by which the external world communicates with our genes is a fascinating, relatively new area of study. In remote Northern Sweden, a land of fluctuating seasons of crop failure and overabundance, Dr. Lars Olov Bygren learned that alterations in gene activity could be passed to future generations without a single change in the DNA sequence. Boys who, in one winter went from famine to feast, from near-starvation to gluttony, produced sons and grandsons with diabetes and shorter life spans than the progeny of those who had suffered a poor harvest.\textsuperscript{48} These changes, inherited by at least two generations, were not genetic, but epigenetic. The epigenome is “an array of chemical markers and switches” lying along the length of the double helix.\textsuperscript{49} Interpreting signals from the environment, the epigenome modulates a gene’s expression by “turning it off or on, dampening it or making it louder.”\textsuperscript{50} This process, known as DNA methylation, can affect several generations but does not constitute evolution. Yet, what we eat, what we smoke, the toxins to which we are exposed in our lifetimes

\textsuperscript{45} RIDLEY, supra note at 267.
\textsuperscript{46} Id. at 248.
\textsuperscript{47} Id.
\textsuperscript{49} Watters, supra, note .
\textsuperscript{50} Cloud, supra note .
“can work their way into the germ line and echo far into the future,”51 affecting generations not yet conceived.

Faulty DNA methylation patterns are found in many types of cancer and, possibly, inflammatory and neurodegenerative diseases as well as diabetes.52 Environmental feedback can alter one’s epigenome in the course of one’s life span, as brain development in newborn rats is shown to improve through maternal nurturing.53 Unlike genetic mutations, epigenetic changes are potentially reversible, responsive to, among other things, certain nutrients and vitamins. In order to promote genetic health, biologists are pondering the feasibility of “lifelong ‘methylation diets,’”54 that are fitted to an individual’s genetic makeup.

For some scientists, the technologies of in vitro fertilization (IVF) and pre-implantation genetic diagnosis (PGD) comprise the “cutting edge of human biological change.”55 According to a recent Swedish study, however, test-tube babies show an elevated risk for childhood cancer, are often born prematurely, and often suffer breathing problems at birth.56 Additional research found that IVF babies are at greater risk for diabetes and obesity later in life.57 Once again, defective DNA methylation and epigenetic changes may be the cause. These errors could also be passed to the children of IVF babies and “spread through the human gene pool.”58 Since this type of study data is often obtained when infertile couples undergo IVF procedures, biologists

51 Watters, supra note .
52 Id.
53 Id.
54 Id.
55 Simonstein, supra note  at 652.
56 Lindsey Tanner, Test-tube kids’ cancer risks may be higher due to genes, SF Chronicle, Jul 19 2010 at A3.
58 Id.
must determine whether changes in gene expression are due to the IVF technology itself or the epigenome of the parents. That infertile couples have higher rates of epigenetic changes than the rest of the population might explain the reason for their infertility.

A single individual possesses, not one epigenome, “but a multitude” of them, and their “markers and patterns are different in every tissue type in the human body.” Compared to the intricacies of mapping the epigenome, the human genome project was “a piece of cake.”

Human intervention in genetic destiny requires a defter touch than we can muster at present, notably on the issue of what to keep and what to throw out. The rating of genes as desirable or undesirable is short-sighted and potentially harmful to succeeding generations. These so-called “undesirables may be neutral or even beneficial in a different genetic background,” and culling them arbitrarily ignores the role of randomness. Natural selection, says Stephen Jay Gould, seems “brutal and inefficient” because it works by process of elimination. “You get to goodness by eliminating the bad,” he explains. “Why don’t you just go to good? The problem is, you don’t know what good is.” Introducing a degree of randomness allows a system to sort through various adaptations and select the best ones. This is precisely what transhumanists like Stock and Silver wish to avoid. Rather, they seek to make “conscious,

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60 Leake, supra note .
61 Watters, supra note .
62 Id.
64 The Spice of Life: An Interview with Stephen Jay Gould, supra note .
65 Id.
highly specific choices”66 about the genetic structure of their children and “inject [these] preferences”67 into future generations.

Apportioning the Goods

Despite serious technical hurdles, and the philosophical quandaries engendered by the new eugenics, “the mood of enthusiasts for human genetic engineering is buoyant, not gloomy.”68 We will develop eugenics procedures because, as Troy Duster has noted, the “inexorable march of technology” dictates that “[o]nce the machinery is erected. . . .it will be used.”69

How it will be used, and for whose benefit, has excited much speculation. That genetic enhancement is still more firmly rooted in the realm of science fiction than in reality has not dimmed the intensity of the debate. Indeed, with respect to new technologies, science’s habit of presenting us with “moral surprises”70 is strong inducement against passivity and neutrality. Nicholas Agar reminds us that, prior to the actual use of cloning and the atomic bomb, the public viewed them with indifference or disbelief. As a result, Hiroshima and Dolly (the first successfully cloned sheep) arrived “morally unannounced.”71 In contrast, genetic enhancement has fostered such outpourings of euphoria and dysphoria that, by the time it arrives in the flesh, many of its moral dimensions will already have been examined.

66 STOCK, supra note at 110.
67 Id.
68 Diane B. Paul, Genetic Engineering and Eugenics: The Uses of History, in BAILLEE & CASEY, supra note at 125.
69 TROY DUSTER, BACKDOOR TO EUGENICS, 122 (2003).
71 Id.
The new eugenics’ guiding principle is procreative liberty. According to John Robertson, American legal traditions of parental autonomy and reproductive freedom “appear to support a presumptive liberty right to obtain and use genetic information in making reproductive decisions.”

A series of renowned yet still controversial cases, from Griswold v. Connecticut to Planned Parenthood of Se. Pa. v. Casey provides the basis for Robertson’s belief. The Supreme Court’s first, tentative foray into reproductive rights, however, occurred in Skinner v. Oklahoma, concerning a law to forcibly sterilize convicted felons. Declaring the statute unconstitutional on equal protection grounds, Skinner included language that seemed to enshrine procreation as “one of the basic civil rights of man.” This reference appears only in dicta and, in any case, is “unilluminating” in its failure to define the boundaries of the purported liberty. Carter Dillard has observed that our common understanding of reproductive rights is “remarkably imprecise in specifying what behavior, exactly, the right is protecting.” The Supreme Court, in Griswold and its progeny, exhibited far more force and clarity in elucidating the right to avoid procreation.

Griswold invalidated a state law barring the dissemination or use of contraceptives. Limiting its scope of protection to married persons, the Court concluded that the Constitution “created various zones of privacy, of which marital privacy was one.” In refusing to countenance state intervention in matters of marital privacy, the Court was rejecting “invasion of

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73 381 U.S. 479 (1965).
75 316 U.S. 535 (1942).
76 316 U.S. 541.
77 CARL WELLMAN, MEDICAL LAW AND MORAL RIGHTS, 122 (2005).
the marital ‘space,’ not the interference with procreative decisions per se.” Eisenstadt v. Baird\textsuperscript{81} extended the right to avoid procreation beyond the confines of marriage. As in \textit{Griswold}, the Court determined procreative autonomy to be highly personal in nature. It also enlarged the privacy shield to encompass reproductive decision making: “If the right of privacy means anything, it is the right of the individual, married or single, to be free from unwarranted governmental intrusion into matters so fundamentally affecting a person as the decision whether to bear or beget a child.”\textsuperscript{82} Judicial treatment of abortion rights in \textit{Roe v. Wade}\textsuperscript{83} established a link between constitutional protections and bodily integrity.\textsuperscript{84} Though not without limits, the right to an abortion is situated in “the right to do with one’s body as one pleases.”\textsuperscript{85} \textit{Casey} conjoined bodily integrity with personal autonomy. A rule requiring spousal notification of an abortion was held invalid, not because it physically burdened a wife’s abortion rights, but “because it infringed upon her decisionmaking capabilities.”\textsuperscript{86}

In \textit{Griswold} through \textit{Casey} the Supreme Court forged “a Fourteenth Amendment fundamental liberty-right to avoid conception when having sex and, if pregnancy has occurred, the right to terminate the pregnancy up until viability.”\textsuperscript{87} But piecing together fragments of bodily integrity and personal autonomy does not promote a grand design of reproductive liberty. It can also be argued that, in this line of cases, the Supreme Court “does no more than imply in

\textsuperscript{81} 405 U.S. 438 (1972).
\textsuperscript{82} 405 U.S. 453.
\textsuperscript{83} 410 U.S. 113 (1973).
\textsuperscript{84} Cohen, supra note at 1155.
\textsuperscript{85} 410 U.S. 154.
\textsuperscript{86} Bruno, supra note at 147; 505 U.S. 898.
dicta that a broad procreative right is somehow protected by vague notions of privacy.”

The decision to procreate is quite different from the choice to avoid it. Laws prohibiting contraception or abortion “involve a lack of countervailing state interest,” whereas choosing to procreate “affects the prospective child and the society into which it is born.”

Thus, the spectrum of procreative liberty does not fit neatly into the substantive due process framework.

Assisted reproductive and genetic enhancement technologies radically reconfigure concepts of parenthood, biologically and legally. Robertson acknowledges the Court’s restraint in handing out new fundamental liberties. In his view, however, where coital reproduction is impossible, “it would be surprising if the Court did not grant protection” to technologies designed to overcome coital infertility and genetic disease. Negative procreative freedom, asserts Robertson, the right to avoid reproduction “and to engage in it without state interference” is expansive enough to shelter personal discretion in the use of reproductive and genetic enhancement technologies.

The choice of “whether to bear or beget a child” implicates privacy matters deserving of the highest constitutional deference. And, if the “right to avoid reproduction for any reason” assumes the “right to avoid reproduction for a particular reason,” prospective parents are, by extension, entitled to use information and technology to select the characteristics they deem

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88 Dillard, supra note at 17.
89 Id. at 19.
90 Cohen supra note at 1139. Cohen posits that these new technologies demand an unbundling of the rights of non-parenthood, “a right not to be a gestational parent, a right not to be a genetic parent and a right not to be a legal parent.” Id. at 1140.
91 Robertson, Procreative Liberty in the Era of Genomics, supra note at 454.
92 Id. at 453.
94 Robertson, Genetic Selection of Offspring Characteristics, supra note at 427. (emphasis in original).
95 Id.
desirable in their offspring. Moreover, constitutional protection of parental autonomy confers the right to provide one’s child with the best possible chance for a happy and successful life. If parents are allowed to expand their children’s capabilities through “special tutors, music camps, orthodontia, rhinoplasty and even the administration of exogenous human growth hormone to increase stature,” then they are permitted to define and control the traits of their offspring through genetic enhancement.

This grounding in freedom and personal choice animates what Agar calls liberal eugenics. He predicts that the use of enhancement techniques will “dramatically enlarge reproductive choice,” as future parents genetically improve their embryos in ways that “correspond with their conception of good life.” The role of the state would be limited to promoting the development of enhancement technologies and educating prospective parents as to their possible effects. Buchanan, et al concede that, in time, the state may assume “stewardship of the gene pool in the interests of future generations,” but, in general, they endorse a governmental eugenics policy of “benign neglect.” As they see it, parental interests

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96 Id. Robertson classifies this right as a negative one, a right against interference by public or private entities rather than a positive right to access genetic enhancement resources. Id. at 427 n.27.
97 Id. at 436. See, e.g., Wisconsin v. Yoder, 406 U.S. 205, 210 (1972) (upholding the right of Amish parents to educate their children in accordance with life in the Amish community); Prince v. Massachusetts, 323 U.S. 158, 156 (1944) (affirming that the “custody, care and nurture of the child” rest primarily with the parent.)
98 Id.
99 AGAR, supra note at 6.
100 Id.
101 Id. at 5.
102 ALLEN BUCHANAN et al, FROM CHANCE TO CHOICE, 342 (2000).
103 Id.
are so closely aligned with those of their children that individual freedom, not state intervention, will ensure “the propagation of genes conducive to human well-being.”

The discourse on liberal eugenics is all very high-minded, utopian and not a little disingenuous. When James Watson declares that he wants to use genetic engineering to rid the world of stupid children and “ugly girls,” his candor is almost refreshing. Legal traditions aside, the right to define and fulfill our reproductive goals means “the right to any procedure we can afford.” Reprogenetics, as it is currently envisioned, relies on expensive procedures like PGD and IVF. Until these techniques become cheaper, the entrance to utopia will be barred to most of us by income eligibility requirements. Buchanan et al have meticulously analyzed the problem of distributing eugenic resources in accordance with fairness and liberal democratic principles. They wonder how to “square the pursuit of genetic health and enhancement with the requirements of justice.” In the end, they conclude that we have “no general obligation. . . .to engineer equality,” and that disparate genetic assets are not inconsistent with “a society governed by principles of justice.” Dov Fox, on the other hand, finds liberal eugenics to be distinctly illiberal in its distribution scheme. Promoting the genetic health of the public is, in his mind, the responsibility of government and the taxpayer. He contends, “A truly liberal eugenics does not leave it to parents to decide whether to enhance offspring for natural primary

104 Id.
106 Paul, supra note at 141.
107 BUCHANAN et al, supra note at 57.
108 Id. at 321.
109 Id.
goods, it makes these genetic practices a matter of public decision-making and collective obligation.”

To be fair to the liberals, Fox’s hearty approval of state paternalism is anathema to those familiar with the history of previous eugenics movements. During an inglorious period, from the late 19th century to the 1970s, America was sorely troubled by what it saw as a noxious human element, both foreign and domestic, invading its population. Thirty-two states presided over programs aimed at sterilizing the unfit and the undesirable, performing more than 65,000 surgeries from 1907 until 1979. Targeted individuals included the marginal, the institutionalized, the mentally ill, and those regarded as unintelligent, promiscuous, or tainted with criminality or laziness. In varying degrees, eugenics programs flourished worldwide, culminating in the Nazi atrocities. After World War II, Americans rushed to disassociate themselves from eugenics practices, at least in terms of how they presented them in public discourse. Appearing sixty years later, Agar’s liberal eugenics explicitly rejects “authoritarian eugenics,” elevating personal choice over state-imposed views of “what counts as a good human life.”

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111 Id. at 24. Fox’s list of primary goods, although not exhaustive, includes “absence of disability, resistance against disease, physical mobility and coordination, visual and auditory perception, short- and long-term memory, verbal and spacial reasoning, general cognitive capacity, and certain behavioral characteristics such as reflectiveness, impulse control, novelty seeking, and the capacity to abide adversity.” Id. at 11.
112 Id. at 8.
114 Stephanie Yu Lim, Protecting the Unborn as Modern Day Eugenics, 18 Health Matrix 129 (2008).
115 AGAR, supra, note at 5.
117 AGAR, supra, note at 5.
118 Id.
Rather than risk identification with Hitler, postwar eugenicists did not disappear but chose to pursue their platform “in other guises.” 119 Mary Ziegler describes how, from 1950 until the late 1960s, eugenicists seized upon notions of population control, directing their efforts at the “socially inadequate” 120 who were “unable to make the right reproductive decisions themselves.” 121 Perceiving an “illegitimacy crisis,” 122 eugenicists demonized unwed mothers, especially those on public assistance. Various states, among them Mississippi, Maryland, Georgia, Delaware and Massachusetts, sought ways to achieve eugenics objectives “without resorting to compulsory sterilization.” 123 Their solution was to criminalize illegitimacy, a measure regarded as respecting free choice because it gave notice of the conduct to be condemned and punished. 124 Organizations like the Population Council and Human Betterment also trumpeted reproductive freedom, striving to convince the poor that sterilization would improve their economic lot. 125 Human Betterment volunteers were trained to approach women immediately after delivering babies, a time when they were thought to be most receptive to the idea of sterilization. 126 For a while, at least, this strategy proved productive. 127

Whether by subterfuge or coercion, the eugenics ideology succeeded because “it was driven at least as much by hope as it was by hate.” 128 Early eugenicists were enthralled by

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121 Id.
122 Id. at 326.
123 Id. at 330.
124 Id.
125 Id. at 343.
126 Id. at 342.
127 Id.
128 PAUL LOMBARDO, THREE GENERATIONS, NO IMBECILES 278 (2008).
Darwinian principles and Mendelian genetics, eager to use these ‘powerful new tools’\textsuperscript{129} not just to purge the ‘bad seeds’ from the gene pool,’\textsuperscript{130} but to ameliorate suffering and cure social ills.\textsuperscript{131} In similar fashion, we look to PGD to protect our progeny from genetically-linked conditions like Down’s Syndrome, Huntington’s disease, Tay Sachs, cystic fibrosis and sickle cell anemia. But as we learn to detect more and more genetic disorders, prenatal selection “as a form of public health intervention”\textsuperscript{132} brings us ever “closer to eugenics.”\textsuperscript{133} In assessing the health of embryos we must distinguish among conditions that are “mild, severe and lethal”\textsuperscript{134} as well as between those that are “early and late onset.”\textsuperscript{135} People with disabilities have no great cause for optimism,\textsuperscript{136} as “[a] less than perfect child may be considered a burden to society, a burden that society is less willing to carry when there are ways to avoid disabilities.”\textsuperscript{137} Improving our genetic diagnostic capabilities will most certainly reduce birth defects, “but only by eliminating the children along with them.”\textsuperscript{138} This poses no dilemma for the transhumanists. They believe we are morally obligated to advance the cause of reprodogenetics, to deliberately choose “smarter, healthier, and longer-lived children.”\textsuperscript{139}

\textsuperscript{129} Larson, supra note at 57.  
\textsuperscript{130} Yu Lim, supra note at 129.  
\textsuperscript{131} LOMBARDO, supra note at 278.  
\textsuperscript{132} Laurens Landeweerd, Prenatal Diagnosis and the Trouble with Eugenics, 30 Law and Human Genome Review 40 (2009).  
\textsuperscript{133} Id.  
\textsuperscript{134} Id. at 42.  
\textsuperscript{135} Id.  
\textsuperscript{136} BUCHANAN, et al, supra note at 328.  
\textsuperscript{137} Landeweerd, supra note at 38.  
\textsuperscript{139} Aviad E. Raz, Eugenic utopias/dystopias, reprodogenetics, and community genetics, 31 Sociology of Health & Illness 608 (2009).
Troy Duster has observed that social orders survive by persuading their members that existing systems of social stratification are legitimate. Liberal eugenics perceives no injustice in “the pure fact of inequality.” Some parents are able to give their children every advantage while others cannot. The posthumanists, however, are unabashed elitists. “Until now . . . we often have had to pretend that we are all the same,” crows Gregory Stock, as if equality ever meant any such thing. Lee Silver predicts that embryo selection will accentuate the widening gap between rich and poor. Health and happiness will grace the rich while heart disease, increased cancer risk, hypertension, obesity, alcoholism and mental illness will be “left to drift randomly among the families of the underclass.” In Silver’s future world, the GenRich will comprise “a modern-day hereditary class of genetic aristocrats,” while the Naturals subsist in segregated social milieus. Naturals are laborers and low-paid service workers who send their children to public schools. Eventually, they will plod their way to species separation, losing their ability to cross-breed with the GenRich. Ultimately, the two species will have “as much romantic interest in each other as a current human would have for a chimpanzee.”

Unfortunately, Silver didn’t plan on the emergence of Raymond Kurzweil’s cyborgs, computer-enhanced humans of prodigious intelligence and longevity. “Technological evolution is a continuation of biological evolution,” explains Kurzweil. The GenRich have reason to be very afraid, what with having to battle these formidable man/machines for supremacy. Cross-breeding will, most likely, be out of the question.

140 DUSTER, supra note at 8.
141 BUCHANAN, et al, supra note at 320.
142 SILVER, supra note at 225.
143 Id. at 4.
144 Id. at 7.
Affirming the use of enhancement through procreative liberty rights does not resolve the ambivalence aroused by reprogenetics.\(^{146}\) For Michael Sandel, the genomics revolution induces “moral vertigo,”\(^{147}\) a threat to our appreciation of children, not as entities to be designed, but as gifts.\(^{148}\) Leon Kass fears for the fate of our souls.\(^{149}\) Jurgen Habermas, George Annas and Francis Fukuyama argue that “human nature is intrinsically valuable and therefore ought not to be tampered with.”\(^{150}\) Habermas decries the disappearing boundary between “the organically grown and the technologically made.”\(^{151}\) Further, the genetic programming of one being by another destroys the symmetry and moral equality of the relationship, especially between parent and child.\(^{152}\) The adolescent who discovers his genetic traits were pre-selected by his parent suffers an assault on his “subjective mode of existence.”\(^{153}\) On an existential level, “we subordinate our being a body to our having a body.”\(^{154}\) Stock rightly acknowledges that the use of genetic enhancement will create “gulf between generations.”\(^{155}\) Combined with increasing reliance on “laboratory-mediated conception”\(^{156}\) and the possible development of an artificial

\(^{146}\) JOHN ROBERTSON, CHILDREN OF CHOICE 42 (1994).
\(^{148}\) Id. at 45-46.
\(^{149}\) Kass avers that “the wisdom of repugnance” may be the last line of defense against human commodification, the “only voice left that speaks up to defend the central core of our humanity. Shallow are the souls that have forgotten how to shudder.” Leon R. Kass, The Wisdom of Repugnance, 20, New Republic, Jun 2, 1997.
\(^{152}\) Id. at 63-64, 51.
\(^{153}\) Id. at 53.
\(^{154}\) Id. at 54.
\(^{155}\) STOCK, supra, note at 162.
\(^{156}\) Id. at 185.
these technologies radically revise not just concepts of parent and child, but of ancestry.

Gregory Stock dismisses the reprogenetics critics as “bio-Luddites.”158 And though their arguments seem eloquent and reasonable, they rest on fragile notions of human inviolability. “If human evolution has taught us anything,” says Robert Proctor, “it is that there is no essence of humanity, no fixed and final form.”159 To James Watson, the idea of humanity as sacrosanct and unalterable is “just plain aura, up in the sky---I mean, it’s crap.”160 Insisting that human nature is inviolate and then agonizing over the morality and justice of changing it is paradoxical: “Consonance with a fixed human nature cannot be the touchstone for what is just or moral if there is no such thing.”161

Still, the prospect of genetic engineering unsettles us. Irreversible decisions over the genetic design of the unborn are “always presumptuous.”162 We are “caught between an overwhelming anticipation of what that knowledge will enable us to do and a nagging dread that hidden in that future is the moment of our self-destruction.”163 And, like a Greek chorus commenting on events that have already occurred, the ethicists warn us “to avoid what seems inevitable.”164

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157 SILVER, supra note at 56.
158 STOCK, supra note at 6.
159 Robert N. Proctor, Human Recency and Race, 249, in BAILLEE & CASEY, supra note .
160 Brave, supra note .
161 BUCHANAN, et al, supra note at 93.
162 HABERMAS, supra note at 90.
164 Id.
James Watson asks, if we can genetically improve humanity, “[W]hy shouldn’t we do it? What’s wrong with it? Who is telling us not to [do] it?” Well, in terms of governmental constraints, apparently no one. Genetic testing and the fertility industry are largely unregulated, despite calls for tighter control from “lawyers and legal academics.” Yet, even while acknowledging that some infertile couples may have epigenetic defects that produce unhealthy children, commentators like Kerry Lynn MacIntosh vehemently oppose governmental intrusion on their procreative right. In MacIntosh’s view, restrictions on access to assisted reproductive technologies “on the ground that the resulting children might suffer from health problems are eugenic in character and bear more than a passing resemblance to the sterilization laws of the twentieth century.”

Reproductive freedom, so exalted in liberal eugenics, is based upon the assumption that parents act in their children’s best interests. Once granted, this liberty will be hard to rein in, even when it may prove detrimental to its intended objects. A parent, in choosing her child’s genetic traits, may be “given to experimentation,” or prone to expressing her preferences through “egocentric intervention.” Freedom, in its truest sense, encompasses these eventualities, along with the right to act contrary to one’s own interests. As long as this is so, the liberal eugenicists must know that there will always be a chance of trouble in utopia. The

165 Brave, supra note  .
166 Id.
167 MacIntosh, supra note  at 44. According to John Robertson, “(i)t has been a standard refrain in discussions of ART (assisted reproductive technology) to bemoan the lack of regulation and even call for a centralized system of regulatory control.” John A. Robertson, Commerce and Regulation in the Assisted Reproduction Industry, 85 Tex. L. rev. 665, 699 (2007), cited in MacIntosh, supra note  at 44, n. 118.
168 MacIntosh, supra note  at 137.
169 Id. at 136-7.
170 HABERMAS, supra note  at 51.
171 Id.
Underground Man reminds us that the right to desire what is “positively harmful and stupid” is “the greatest benefit on earth.” \(^{172}\) “I find it somehow unseemly to love only well-being,” he continues. “Whether it’s a good thing or a bad thing, smashing things is sometimes very pleasant.” \(^{173}\) Of course, in a perfectly eugenic world, a psychically flawed creature like the Underground Man would not exist. Nor would his creator Dostoyevsky, the epileptic. \(^{174}\)

The act of “[m]oralizing human nature”\(^{175}\) is not equivalent to “listing what ought and ought not to be done to humans,” but “a form of self-understanding.” \(^{176}\) Posthumanists perceive a moral obligation to perfect humanity while “bio-Luddites”\(^{177}\) claim we must desist. In the end, the question will be decided, not by abstract moralisms, but by who and what we are when this technology comes alive.

**Listening to Star Trek**

Pursuant to the logic of Greek mythological curses, genetic enhancement may be just the technology we deserve. Diane Paul asserts that “all of our choices are embedded in a social context”\(^{178}\) and impinge on the lives of others. Respect for the desires of family community and society suggests that reproductive autonomy “need not trump every other value.” \(^{179}\) But an altruistic future does appear to be where we are headed. Unlike the old eugenics, which sought to purify populations by weeding out the unwholesome, genetic enhancement is profoundly self-

\(^{172}\) FYODOR DOSTOYEWSKY, NOTES FROM UNDERGROUND, 36, (1972) (first published 1864).
\(^{173}\) Id. at 41.
\(^{174}\) Id. at 18-19.
\(^{175}\) Fenton, supra note 37.
\(^{176}\) Id.
\(^{177}\) STOCK, supra note 6.
\(^{178}\) Paul, supra note 145.
\(^{179}\) Id.
referential. Our choices and desires depend on what we, as individuals, deem valuable, attractive, and conducive to material success as well as to good health and longer life-span.

Sonia Suter has remarked upon our culture as characterized by an “atomistic conception of self-definition, in which the individual shapes herself without reference to others.”\footnote{Sonia M. Suter, \textit{Disentangling Privacy from Property}, 72 Geo. Wash. L. Rev. 737,772 (2004).} According to a study by researchers at the University of Michigan, today’s college students are “40 percent less empathetic than those of 30 years ago, with the numbers plunging primarily after 2000.”\footnote{Pamela Paul, \textit{From Students, Less Kindness for Strangers?} NY Times Jun 25, 2010.} The study’s authors speculate that “a millennial mixture of video games, social media, reality TV and hyper-competition have left young people self-involved, shallow and unfettered in their individualism and ambition.”\footnote{Id.}

Today’s communications technologies provoke behaviors that combine exhibitionism with voyeurism. Revealing one’s true self becomes a matter of performance, of pandering to an audience.\footnote{Peggy Orenstein, \textit{I Tweet, Therefore I Am}, NY Times Mag., Aug. 1, 2010 at 12.} Sherry Turkle, professor and researcher at M.I.T., found that, among young people, “the self was becoming externally manufactured rather than internally developed: a series of profiles to be sculpted and refined in response to public opinion.”\footnote{Id.} If, as Habermas believes, “there can be no love without recognition of the self in others,”\footnote{HABERMAS, supra note at 114.} we are fast becoming a very lonely crowd. Social activism and “concerns about justice and the re-tailoring of human institutions”\footnote{Winner, supra note at 404.} have morphed into narcissistic preoccupations with “achieving a revolution in the body.”\footnote{Id.}
In the late 1960s Captain James T. Kirk and the television series *Star Trek* inspired a whole generation to dream of worlds and galaxies far beyond our own. Now, nearly half a century later, we seem so ill-disposed to go anywhere. For many of us, the unfulfilled promise of space travel hovers like a reproach. Perhaps we have neither the bodies nor brains for space exploration. Freeman Dyson foretells of a new kind of human, rocketing off to build homes on the moons of Jupiter and across the universe.\textsuperscript{188} But the time we might have spent daydreaming is usurped by our hunger for virtual connections and vicarious stimuli. Instead of turning our sights toward distant galaxies, we turn ourselves inside-out on the internet and leave nothing to the imagination.

Neither the liberal eugenicists nor the transhumanists tell us where we are supposed to live while their genetic miracles are germinating. Nothing, so far, has distracted us from poisoning our atmosphere and ecosystems and making life inhabitable for numerous plants and animals that share this ‘blue planet.’\textsuperscript{189} Maybe we will construct alternative environments, and keep the organisms that we find gratifying and esthetically appealing. Having fully sequenced the dog genome, we can now design our pets in various colors and sizes, making them the “ultimate accessory,”\textsuperscript{190} like clothing and cars. For those who prefer their pets with an on/off switch, “robodog can sit up, beg, crawl and roll over on its side.”\textsuperscript{191} Captain Kirk and the crew of the U.S.S. Enterprise never suspected that the first ‘strange new world’ we encounter will be the one we have made for ourselves.

\textsuperscript{188} \textit{Id.} at 389.
\textsuperscript{189} \textit{Id.}
\textsuperscript{190} \textit{Pet Gazette, June/July 2010 at 14.}
\textsuperscript{191} \textit{Id.}
We are “the explorers and the explored,” proclaims Gregory Stock, and therein lies the problem. We have no idea of what it means to be greater than ourselves, and no compass to guide us. Stock advises us to “draw on history, religion and literature” to help us along our way, but these are only more of our reflections peering back at us. Commenting on the economics of cloning, Barbara Ehrenreich said, “it isn’t so much the 21st century technology we fear, as what will happen to that technology in the hands of 20th century capitalism.” Our futuristic reprogenetic visions are similarly trapped in ideologies from a soon-to-be bygone world. Stock likens the transhumanists to the Antarctic explorers, journeying toward the unknown. In our present culture, perhaps the act of genetic self-sculpting is what passes for courage. But we have been shaped by adversity, by travel and adaptation to faraway places, by challenges that test our deepest will to survive. And though we confront, and even try to tame the natural forces, we retain some awe and reverence for them. The real hubris of leaving our fate in the hands of imperfect humanity is in trusting that nature will so easily step aside. Then again, Eden was always God’s idea of paradise. The unruly mortals have never known quite what to do with it.

It is said that when the spirit of Narcissus crossed the river encircling the world of the dead, “it leaned over the boat to catch a final glimpse of itself in the water.” Wherever our species is going, and however we get there, this is the beginning of that one last look.

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192 STOCK, supra, note at 31.
193 Id. at 162.
195 HAMILTON, supra note at 88.