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Session 1: Eugenics Narrative and Reproductive Engineering

- **Diane Paul (U Mass Boston) Genetic Engineering and Eugenics: The Uses of History**
- **James Lennox (Pittsburgh) Commentary***
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* This commentary was unavailable at the time of posting these proceedings but will be posted separately on the same site

Genetic Engineering and Eugenics: The Uses of History

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1. Introduction

This essay explores contested uses of history in arguments about the social value and morality of human genetic engineering. Virtually every discussion of issues in this domain (indeed, in human genetics generally) flags eugenics as a primary concern. Of course, many questions having little or nothing to do with eugenics are also raised by the prospect of modifying the genome either to treat disease or to enhance physical, mental, or behavioral characteristics. For example, critics charge that such modifications may involve serious and unknown risks (both to the immediate progeny and future generations), that they are based on naively reductionist scientific assumptions, and that they will replace more efficient and equitable approaches to improving health and well-being. But no charge is leveled more persistently or passionately than the claim that these interventions constitute or promote a new eugenics. For example, anti-biotechnology activist Jeremy Rifkin asserts: “Genetic engineering technologies are, by their very nature, eugenic tools” (1998, 116). Like most commentators on the subject, he takes for granted that to accept such a characterization of the technologies is ipso facto to condemn them.

A striking feature of these discussions is the frequency with which history is invoked by the participants. The typical analysis of social and ethical issues in human genetic engineering -- irrespective of whether its perspective is optimistic or gloomy -- is accompanied by a historical sketch of the eugenics movement. Critics and enthusiasts alike apparently feel compelled to provide a summary description of past efforts to control human heredity. Even more striking, given the authors' disparate agendas, is that they tell essentially the same story. The central characters in these narratives are usually Nazis, though other racists sometimes make cameo appearances, and the featured policies are typically negative (that is, aimed at preventing or discouraging some people from reproducing), as well as legislatively mandated and coercively enforced. The exemplar is compulsory sterilization.

Why are the accounts so ubiquitous and uniform? One reason is banal. Commentators on social and ethical issues in this area feel the need to say something about the history of eugenics, if only to demonstrate that they are aware of it and sensitive to its implications (whatever they are). But most commentators, few of whom are historians, probably know much about this history. Indeed, the virtual interchangeability of so many of their accounts suggests that authors often learn what they do from reading each other. The similarity is in any case not explained by the fact that there is only one history to relate, with the authors simply faithful to the facts. For these accounts are highly selective. As we will see, there is more than one possible (and legitimate) narrative of efforts to biologically transform humanity.

Moreover, the features selected would seem to have less relevance to the issues raised by human genetic engineering than those consistently ignored. Hardly anyone now worries that parents will be forced by the state to engineer their progeny. The concern is rather the opposite: that individuals responding to social norms of health, attractiveness, intelligence, and so forth will want to alter the characteristics of their offspring, and even demand the right to do so. In this perspective, decisions are more likely to be driven by the market than mandated by the state. Brian Appleyard explains: “This is the eugenics that happens when the state is specifically excluded from reproductive decisions. It is the eugenics of the free market,

and results inevitably from a combination of the current quasireligious faith in the absolute virtues of unfettered markets and the rapid growth of genetic knowledge. The whole point is that we are about to be deluged with offers of choices” (1998, 84). Andrew Kimbrell similarly writes: “We no longer have Nazi or racial eugenics. We have instead a ‘commercial’ eugenics peddled by clinics and biotechnology companies” (1997, 147). Or as Rifkin succinctly put it: “The old eugenics was steeped in political ideology and motivated by fear and hate. The new eugenics is being spurred by market forces and consumer desire” (1998, 128). This eugenics, variously labelled “back-door” (Duster 1990), “homemade” (Wright 1990), “laissez-faire” (Kitcher 1996), “do-it-yourself” (Morton 1998), “private” (McEwen), and “user-friendly” (Rifkin 1998), is thought especially hard to counter. Mae-Wan Ho expresses a common view when she asserts (1999, 222): “Genetic discrimination and eugenics are being privatised and depersonalised and are therefore much more insidious than the state-sanctioned forms, because they cannot be effectively opposed.”

The view that eugenics now arises from our increased capacity to choose the kind of children we want, and thus will be very difficult to resist, was first articulated by Rollin Hotchkiss in the 1965 essay in which he coined the term “genetic engineering.” Hotchkiss noted that a eugenics requiring governmental action was no longer acceptable, but that the interventions made possible by advances in molecular biology “could be practiced in private and in secret on individual genes of individual persons.” He also presciently observed: “It will be much more difficult to regulate, and legislation *against* it will seem like the same invasion of personal rights that legislating *for* eugenic measures appears to be” (1965, 198). The association of a new eugenics with choice was actually a common theme in the writings of early molecular biologists, who were generally enthusiastic about the potential of their science to improve humanity, and only later taken up by critics. But today, both supporters and skeptics generally agree that the prospect of the state coercing parents to genetically modify their offspring is unlikely. Indeed, genetic manipulations are entering clinical practice in the context of the nearly unregulated fertility industry. As a consequence of the de facto ban on federally-funded embryo research, no federal laws regulate what services may be offered or monitor their efficiency or safety. As molecular biologist Lee Silver approvingly notes: “IVF and its associated protocols will provide access to the genetic material within the embryo. And it is through the ability to read and alter genetic material within the embryo that the full force of IVF will ultimately be felt.” Although fertility clinics now principally serve infertile couples, they are rapidly expanding, and at some point “are bound to reach a point where the pent-up demand from infertile couples is satisfied. When this point is reached, if not sooner, some will go looking for new customers” (2000, 58, 60). (Like Silver, philosopher Gregory Pence is pleased with the lack of regulation. He attributes the “rapid, creative innovation” in assisted reproduction to the federal funding ban, since research in fertility clinics was not hampered by the NIH or by the local IRBs whose approval would have been required for proposals receiving federal funds [200b, 74]).

Given general agreement that a new eugenics will be consumer-oriented, why do both enthusiasts and critics tell a historical story that emphasizes the heavy hand of the state? And are there more illuminating alternatives? The standard narratives focus our attention both on coercive means and negative ends. (These are related, since positive eugenic policies, which encourage some types of people to have more children, ordinarily require the cooperation of the subjects) Negative measures are aimed at preventing further deterioration, not at creating something new. Yet much of the worry about human genetic engineering focuses on its more ambitious possibilities -- especially the potential to transform human nature. As Barbara Katz Rothman notes: “When you are not selecting *against*, but selecting *for*, the issue changes” (2001, 203). The standard narratives ignore a utopian strand in the history of biologically-oriented thinking about our nature that would seem much closer in spirit to contemporary prophecies, practices, and concerns than do accounts of the movement for immigration restriction or compulsory sterilization. Thus J.B.S. Haldane’s *Daedalus* and the critiques it inspired, have obvious relevance to the ambitions of some enthusiasts for human genetic engineering (and those who find those ambitions repugnant). Indeed, with its scathing critique of what would come to be called the “wisdom of repugnance” argument against tampering with our nature, *Daedalus* could serve as a manifesto for today’s utopian geneticists. But as it is not part of the traditional history of eugenics, few modern utopians or their critics are likely to know it.

Moreover, the conventional narratives point to a moral that is not necessarily the one that critics wish to draw. Implying that a principal wrong of eugenics was its use of coercion, their obvious moral is the need to be wary of any interference with reproductive decision-making. As we will see, that libertarian message is happily embraced by enthusiasts for all forms of human genetic engineering. But many of the critics see a need for regulation or even outright prohibition of these technologies (or particular uses of these technologies). Thus the narratives that are told and the lessons the tellers wish to teach are often at odds.

A brief roadmap to what follows: Part two sketches an alternative history of plans to biologically transform humanity. This history incorporates utopian elements and takes into account that not all such plans were coercive. Part three analyzes the uses of history in current debates. It delineates the interests that both enthusiasts and critics have in constructing a narrative that features racist individuals and coercive practices, and briefly explores how the critics resolve, or at least manage, the resulting tensions.

2. Alternative Narratives

Biological Utopians: Galton, Wallace, Spencer

In its modern form, eugenics was a stepchild of Darwin's theory of evolution by natural selection. On Darwin and his contemporaries' reading of his theory, selection led to the constant improvement of plants and animals. But in respect to the human species, nature's intentions had been thwarted. In modern, civilized societies, selection had apparently ground to a halt. As a consequence of medical, sanitary, and charitable measures, the weak in mind and body were no longer being effectively culled from the human stock. At the same time, the least capable were producing the largest families. Thus the best were being swamped by the worst. If mental and moral traits were inborn, and civilization becoming increasingly complex, the future was ominous.

The effects of artificial civilization would thus have to be countered by artificial selection. This process could take the form of negative measures intended to prevent or at least discourage mental defectives and other undesirables from breeding or positive measures intended to encourage breeding by those superior in intellect, talent, and character. Among negative measures, segregation or sterilization of the unfit were considered most effective since they did not require the cooperation of the subjects. As one commentator noted, "it is almost impossible to make human beings improve their breed" (Davis 1934, 275). But the dissemination of birth control information and devices was a negative measure that did depend on cooperation. The eugenic rationale was that middle-class women already had access to contraception, whereas poor women (assumed to be hereditarily inferior) were unable to limit their births. Eugenicians assumed that the poor would do so, for their own social, economic, and health reasons if they could. It was only necessary to provide them with the tools.

But a negative approach could only achieve so much. While preventing further deterioration, negative measures could not create what Charlotte Perkins Gilman in her 1899 *Women and Economics* called "the ever nobler forms of life toward which social evolution tends" (quoted in Kline 2001, 12). Eugenicians with more ambitious goals thus generally favored a positive approach. Among them was Francis Galton, who wrote that: "The possibility of improving the race of a nation depends on the power of increasing the productivity of the best stock. This is far more important than that of repressing the productivity of the worst" (1909, 24). According to Galton, humans were enormously varied in their inborn capacities and dispositions; by breeding from those who are good-tempered, brave, intelligent, and muscular, we can not only stem degeneration, but create a new breed. As only recently evolved apes, we were not well fitted to modern conditions of life; our instincts constantly failed us (1865, 324). If we really wanted to improve, eugenics would have to become a new religion, and active efforts made to encourage "the best to marry the best" and to have children; these measures would include provision of dowries for gifted young women and of attractive houses at low rents to "exceptionally promising young couples" (1909, 25, 28, 32). Were this done, the average standard would be raised to the level necessary for the operations of a modern society and, through the intermarriage of those with the same rare and similar talents, a whole new race, superior to us in physical, mental, moral, and temperamental qualities, would ultimately develop. "Men and women of the present day," predicted Galton, "are, to those we might hope to bring into existence, what the pariah dogs of the streets of an Eastern town are to our own highly-bred varieties" (1865, 166).

Unlike the politically conservative Galton, Alfred Russel Wallace considered himself a socialist. Denouncing eugenics as officious meddling by a “scientific priestcraft” (1912, 77), he initially counted on selection, working on groups, to transform human nature. Reasoning that tribes and nations with the most intelligent, foresighted, and altruistic individuals would prevail in inter-group struggle, humans would ultimately become so perfect in their mental and moral faculties that the earth would be converted from a place of misery to a new Eden. In 1864, a year before Galton published “Hereditary Talent and Character”, Wallace wrote that while the human physique will probably not change, human mentality “may continue to advance and improve until the world is again inhabited by a single homogeneous race, no individual of which will be inferior to the noblest specimens of existing humanity” (1864, 26). He went on to describe the resulting paradise:

Each one will then work out his own happiness in relation to that of his fellows; perfect freedom of action will be maintained, since the well balanced moral faculties will never permit any one to transgress on the equal freedom of others; restrictive laws will not be wanted, for each man will be guided by the best of laws; a thorough appreciation of the rights, and a perfect sympathy with the feelings, of all about him; compulsory government will have died away as unnecessary (for every man will know how to govern himself”)....(1864, 26).

A few years later, Wallace concluded that natural selection did not after all operate on humans, whose evolution must therefore be guided by a higher power. But he never abandoned his vision of a transformed biologically-rooted human nature. He instead promoted a different mechanism to bring this about: an equalization of resources (including abolition of inheritance) that would unleash the power of sexual selection. Inspired by Edward Bellamy’s utopian socialist novel *Looking Backward*, Wallace (along with many social radicals on both sides of the Atlantic) concluded that, if wealth were equalized, women would choose mates not for their money but for their mental and moral qualities. According to Wallace: “The idle and the selfish [men] would be almost universally rejected. The diseased or the weak in intellect would also usually remain unmarried; while those who possessed any tendency to insanity or to hereditary disease, or who possessed any congenital deformity would in hardly any case find partners, because it would be considered an offence against society to be the means of perpetuating such diseases or imperfections” (1890, 60). As a result, the race would spontaneously improve and, ultimately, we would all become noble creatures.

Wallace was forced to leave school at the age of fourteen to earn his own way in the world. He found rampant capitalism appalling. Scientifically, he was a “neo-Darwinian,” who rejected the Lamarckian principle of inheritance of acquired characteristics. The contrast in social background and worldview with Herbert Spencer, a classical Liberal, who championed *laissez-faire* individualism and was a leader of the “neo-Lamarckians” in Britain, could hardly have been greater. But Wallace noted that the general argument of his 1864 essay was inspired by a reading of Spencer’s works, especially his *Social Statics*. Indeed, Wallace’s admiration for Spencer was so deep that he named his first son after the philosopher. That act becomes more intelligible when one considers the similarity in their visions.

In Spencer’s view, unfettered economic competition would act as a spur to improvement. Competition functioned to make creatures work harder, thus exercising their organs and faculties. The mental powers, skills, and traits of character fostered by this struggle would be transmitted to future generations, resulting in constant material and moral progress. Ultimately (and inevitably) the evolutionary process would produce a perfect society, characterized by stability, harmony, peace, altruism, and cooperation. Spencer’s description of the features of this utopia is remarkably similar to the one Wallace assumed would result from the equalizing of economic conditions: Land would be held in common, women would have the same rights as men, government would become superfluous, and ultimately disappear.

Biological Utopians: Haldane, Muller, Bernal, Trotsky

All these schemes -- artificial selection, sexual selection, Lamarckian adaptation -- required time. By the 1920s, some scientists were becoming impatient. Spurred both by scientific developments and the

Bolshevik revolution, they begin to speculate about the possibility of speeding-up the process of improving the human race. The first off the mark was J.B.S. Haldane, whose *Daedalus, or science and the future* (1923) and its 1927 sequel "The Last Judgment," inspired many others to imagine how science might transform nature, including human nature, both for the better, as in J.D. Bernal's *The World, the Flesh, and the Devil* (1929) or the worse, as in Bertrand Russell's *Icarus, or the future of science* (1924), and Aldous Huxley's *Brave New World* (1932).

In *Daedalus* (which ostensibly incorporates excerpts from an undergraduate student essay on the influence of biology on history written 150 years hence), Haldane disparages the eugenics movement as crude in its methods, and frustratingly slow, but predicts that its aims will be achieved in a different way (1923, 35). Mass production of individuals with exceptional qualities will occur through directed mutation and especially ectogenesis (*in vitro* fertilization), which will largely replace motherhood as a source of babies. "Now that the technique [of ectogenesis] is fully developed," writes the undergraduate, "we can take an ovary from a woman, and keep it growing in a suitable fluid for as long as twenty years, producing a fresh ovum each month, of which ninety per cent can be fertilised, and the embryos grown successfully for nine months, and then brought out into the air" (1923, 41). The student notes that in some countries there was strong opposition, "intensified by the Papal Bull 'Nunquam prius audito', and the similar fatwa of the Khalif, both of which appeared in 1960," but in Britain, ectogenesis became universal (1923, 41-42). The separation of sexual love from reproduction allowed for a vastly more thoroughgoing selection. And a very good thing it did, since civilization would otherwise have gone to the dogs. "The small proportion of men and women who are selected as ancestors for the next generation are so undoubtedly superior to the average that the advance in each generation in any single respect, from the increased output of first-class music to the decreased conviction for theft, is very startling", the student writes, and he goes on to add: "Had it not been for ectogenesis there is little doubt that civilization would have collapsed within a measurable time owing to the greater fertility of the less desirable members of the population in almost all countries" (1923, 42).

Mark Adams notes that the "Last Judgment," extends the account to the far future. Whereas *Daedalus* only looks ahead 150 years, "The Last Judgment" imagines that life on earth has been destroyed -- the result of humans' inability to envision the future. However, through 10,000 years of controlled evolution, a small group is bred with the physical and psychological characteristics required for colonization of Venus (which had to be made habitable through the eradication of all its own life forms). The new race of Venusian humans in turn sped up selection to the point where it could colonize other more distant planets and eventually other galaxies. This vision inspired Olaf Stapledon to write the influential *Last and First Men* (Adams 2000, 463-68).

Although Haldane predicts that the final result of scientific advance will be "the subjugation of the dark and evil elements" in our soul, he has little to say about what these are, and how humans of the future might be different. Nor is there any effort at moral assessment. Indeed, in Haldane's view, "we must learn not to take traditional morals too seriously" -- for our values ultimately adapt to the science (1923, 46, 49). In passages strikingly reminiscent of contemporary claims that we object to genetic engineering only because we instinctively (and irrationally) distrust all technologies that are new, Haldane insists that every invention initially strikes us as indecent and unnatural: "The chemical or physical inventor is always a Prometheus. There is no great invention, from fire to flying, which has not been hailed as an insult to some god. But 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 had not previously heard of their existence, would not appear to him as indecent and unnatural" (1923, 36). But in time, these same inventions come to seem completely natural; what began as a perversion ends "as a ritual supported by unquestioned beliefs and prejudices" (1923, 37).

Daedalus created a sensation, selling almost 15,000 copies in the UK its first year, and eliciting very diverse responses (Turney 1998, 102; Adams 2000, 462). Perhaps the most prominent critic was philosopher/ mathematician Bertrand Russell, whose *Icarus* appeared in the same series. (*Icarus* had been taught to fly by his father, *Daedalus*, and was killed when he flew too near the sun). The chief point of Russell's short book was "that science will be used to promote the power of dominant groups, rather than to make men happy" (1924, 5). When it came specifically to eugenics, Russell argued that reproductive

decisions would ultimately be made by officials to serve their own interests. Thus governments would first acquire the right to sterilize individuals and use this power “to diminish imbecility, a most desirable object” (1924, 49). But over time, the program would likely be expanded to include rebels of all kinds (with opposition to the state taken as proof of imbecility) and school failures (resulting in a probable increase in the general intelligence and a decline in intelligence that was extraordinary).

Russell also notes that eugenicists in any case have more ambitious aims -- not just to eliminate the undesirable types but to increase the desired ones. This is the more serious worry, for in the end, individuals will be bred for characteristics that appeal to officialdom rather than to the geneticists. When scientists imagine that one exceptional man might sire a legion of children by many mothers, they commit the fallacy of imagining that the program “would be administered as men of science would wish, by men similar in outlook to those who have advocated it,” and Russell remarks that women who advocated female suffrage similarly envisaged that “the woman voter of the future would resemble the ardent feminist who won her the vote; and socialist leaders imagine that a socialist State would be administered by idealistic reformers like themselves.” But these are all delusions since any reform, once achieved, is administered by ordinary people. Thus, if eugenics ever reached the stage where “it could increase desired types, it would not be the types desired by present-day eugenicists that would be increased, but rather the types desired by the average official” and these would likely be “a subservient population, convenient to rulers but incapable of initiative” (1924, 51-52). Russell later elaborated this critique in his longer 1931 book, *The Scientific Outlook*, a key source for Aldous Huxley’s 1932 profoundly pessimistic *Brave New World*, which links Haldane’s ectogenesis to a system of mass production (Turney 1998, 102, 114).

For the geneticist H.J. Muller, who greatly admired Haldane, ectogenesis represented an ideal solution to the problem of improving the human race, but he was not willing to wait for the procedure to become practical. Like Galton, he considered the need for improvement dire given that life was becoming ever more complicated, requiring “an intelligence ever higher, a cooperation ever more whole-souled, thoroughgoing, and better organized” (1935, 37). (Muller was even more concerned with cooperativeness than intelligence since he agreed with Russell’s claim that an increase in knowledge without an corresponding increase in social motivation spelled disaster). Fortunately, the Bolshevik triumph provided a favorable opportunity to intervene. In *Out of the Night: A Biologist’s View of the Future* (1935), Muller explained that improvement could be accomplished through the mass insemination of women with the sperm of men superior in intellect and fellow-feeling. (Although first published in 1935, the book was written in 1925). Such a program of mass selection would rapidly raise the level of the population. Right now, if we only had the will, it would be possible to so “order our reproduction that a considerable part of the very next generation might average, in its hereditary physical and mental constitution, half-way between the average of the present population and that of our greatest living men of mind, body, or ‘spirit’ (as we choose). At the same time, it can be reckoned, the number of men and women of great though not supreme ability would thereby be increased several hundred fold” (1935, 113). But this is only the immediate result. Eventually, pace Galton and Wallace, evolution “will reach down into the secret places of the great universe of its own nature and, by the aid of its ever-growing intelligence and cooperation, shape itself into an increasingly sublime creation” (1935, 125).

An even more extreme transformist vision was articulated by the Marxist crystallographer J. D. Bernal. Bernal took the practice of ectogenesis for granted, and assumed it would result in a greatly increased lifespan and intelligence. Those individuals with especially powerful intellects would be plugged into an elaborate network of other superior beings. Ultimately, consciousness itself would likely “vanish in a humanity that has become completely etherealized, losing the close-knit organism, becoming masses of atoms in space communicating by radiation, and ultimately perhaps resolving itself entirely into light” (1929, 57). This world-mind would then be in a position to manipulate (and experiment upon) other lesser beings. Bernal equably considers the possibility that the human race will split in two, with a higher race that consists of scientists, who will also eventually become rulers with “the means of directing the masses in harmless occupations and of maintaining a perfect docility under the appearance of perfect freedom” (1929, 72, 89; on Bernal and other scientific Marxists, see Wersky 1988).

It might be noted that the idea of a world divided into rulers who constitute a biological elite and the ruled who constitute a biological underclass stretches back to Plato’s *Republic*, whose Guardian class would be

constantly purified through selection, and the elite restricted from breeding with civilians. (On Greek eugenics generally see Galton 1998). But it also extends to the present. The controversial German philosopher Peter Sloterdijk, whose *Regeln für den Menschenpark* (1999) anticipates a division of humanity into genetic engineers and the genetically engineered (zookeepers and animals in the “human zoo”) often prompts comparisons with Hitler. But Sloterdijk’s vision is actually much closer in spirit to that of Plato or Bernal. That is also true of Princeton molecular biologist Lee Silver, whose *Remaking Eden* is a kind of free-market analogue to *The World, the Flesh, and the Devil*. Silver asks: “Why not seize the power?” (1997, 277). Noting that we now control children in all kinds of ways, he suggests that using genetic engineering to this purpose is no different in principle from sending them to computer camp or an expensive college or providing all kinds of other advantages that we now accept (see also Silver 2000, 60). Bluntly conceding that the result will be to increase inequality, he predicts that in the distant future the species will break into two, the “gen-rich” and the “normals.” Although the former “can trace their ancestry back directly to homo sapiens, they are as different from humans as humans are from the primitive worms with tiny brains that first crawled along the earth’s surface” (1997, 292-3).

Haldane, Bernal, and Muller (at the time he wrote *Out of the Night*), were all scientists but their transformist vision was shared by other Marxists. That this should be is not perhaps surprising. While avoiding attribute-rich characterizations of human nature, Marxists assume that there are needs and capacities that flow from our natural condition, but also that in exercising these capacities, we transform ourselves. According to the young Hegelians (including Marx), we make ourselves, and not just metaphorically. In transforming nature, we also transform our capacities and sensibilities. That vision is strikingly expressed by Leon Trotsky in *Literature and Revolution*. After reshaping the physical world, Trotsky writes, “Man at last will begin to harmonize himself in earnest...The human species, the coagulated *homo sapiens*, will once more enter into a state of radical transformation, and, in his own hands, will become an object of the most complicated methods of artificial selection and psycho-physical training. This is entirely in accord with evolution...The human race will not have ceased to crawl on all fours before God, kings, and capital, in order later to submit humbly before the dark laws of heredity and a blind sexual selection!” (1924, 254-5). (Trotsky, like many Marxists in the 1920s, greatly admired Darwin). In a passage reminiscent of Wallace or Spencer, Trotsky predicts that: “Man will become immeasurably stronger, wiser, and subtler; his body will become more harmonized, his movements more rhythmic, his voice more musical. The forms of life will become dynamically dramatic. The average human type will rise to the heights of an Aristotle, a Goethe, or a Marx. And above this ridge, new peaks will rise” (1924, 256).

In The Aftermath Of World War II

Following the Second World War, visions of biological transformation fell from favor. Although the orientation of Nazi eugenics was overwhelmingly negative (the major exception being the Lebensborn program, which encouraged both married and unmarried women of superior Aryan stock to bear children of SS officers), such visions seemed uncomfortably close to the National Socialist aim of creating a master race. Indeed, in the U.S. at least, there was a backlash against the hereditarian assumptions on which any kind of eugenics, positive or negative, necessarily depends (Nelkin and Lindee 1995, 33-34). However, it is unlikely that many scientists changed their minds about the importance of genes to differences in human mentality and behavior, and within a decade, there were new calls to control human reproduction. The resurgence of interest in eugenics -- still unembarrassedly called that -- was fueled by a number of post-war anxieties that included advances in medical treatment and the prospect of a population explosion. Of greatest importance was the threat of long-term genetic damage resulting from increased exposure to radiation (see Paul 2002; Beatty 2001; Condit 1999, 65-81).

Many geneticists in the 1950s believed that radiation-induced mutation presented a new threat to the human race. This peril was vigorously publicized by Muller, whose 1947 Nobel Prize for the discovery of the mutagenic properties of X-rays allowed him now to speak with new authority. In his 1949 Presidential address to the newly-founded American Society of Human Genetics, Muller argued that the human species was deteriorating under an ever-increasing “genetic load” of deleterious mutations. In his view, this burden was attributable both to expanded medical and military uses of radiation, especially atmospheric nuclear

testing, and therapeutic advances in medicine, which allowed individuals who would once have died before childbearing to survive and reproduce. New radiation-induced mutations, added to the already-high load, would be increasingly difficult to accommodate, and ultimately threaten our viability as a species (Beatty 2001). To counter this threat, Muller urged a less casual attitude toward the use of ionizing radiation. He also hoped that technological advances would make it possible to survey genotypes and identify the most burdened individuals, who he assumed would voluntarily refrain from reproducing. In this version of eugenics, the enemy is no longer a group, such as Slavs or the feeble-minded, but mutation, which can and does affect everyone (Beatty 2001). As Muller himself put it, “none of us can cast stones, for we are all fellow mutants together” (1950, 169). His plan is socially-neutral. It represents what sociologist Barbara Katz Rothman, in a different context, has called the new “microeugenics,” which concerns the genes of individuals, in contrast to the old “macroeugenics,” which concerned groups of people (2001, 217).

Although Muller’s warnings about the dangers of increased mutation had an enormous impact, their implications were essentially conservative: the need to reduce exposure to radiation and for some form of negative eugenics that would rely on individuals’ sense of genetic responsibility. But the warnings also had an impact more directly related to human genetic engineering. Although Muller did not view the genome as sacred, he certainly considered it a precious possession, which obligations to future generations required us to protect. For environmentalists, the idea that we had a duty to prevent the degradation of our genome proved useful in the campaign against overuse of chemical mutagens, especially pesticides. The more cherished the genome, the greater the strength of the case for protecting it against environmental insult. The link is particularly evident in *Silent Spring* where Rachel Carson, citing Muller, writes of the need to protect the “genetic heritage” of humankind, characterized as “a possession infinitely more valuable than individual life” (p. 208). According to Carson, the “genome is a sacred possession,” which we must preserve (1962, 208, 216). Ironically, given Muller’s view that the human genome could stand considerable improvement, his writings nourished the view, later turned against genetic engineering, that humans share a common genetic heritage, which it would be wrong to modify.

In the 1960s, discussion of positive eugenics was prompted by developments in molecular biology, which made it appear that more precise and direct genetic interventions were on the horizon. In 1965, Rollin Hotchkiss’s “Portents for a Genetic Engineering” warned of various dangers and difficulties on the horizon, but also portrayed efforts to improve humanity as both inevitable and, given both our physical and mental imperfections, ultimately desirable (Hotchkiss 1965; see also Wright 1994, 123). Four years later, Cal Tech molecular biologist Robert Sinsheimer termed genetic engineering a “new eugenics.” Like Hotchkiss, Sinsheimer emphasized that this eugenics would be accomplished by individuals acting voluntarily in their own interests. Although his prophecy was inspired by cutting-edge science, it harked back in spirit to Haldane and the Muller of *Out of the Night*. “The new eugenics,” he claimed, “would permit in principle the conversion of all of the unit to the highest genetic level. The old eugenics was limited to a numerical enhancement of the best of our existing gene pool. The horizons of the new eugenics are in principle boundless—for we should have the potential to create new genes and new qualities yet undreamed” (1969, 13). As Daniel Kevles had noted, that prediction occurred before the development of recombinant DNA technology, which promised to overcome the difficulty of isolating specific human genes, which could then in principle be identified and replicated (1985, 267).

Throughout the 1960s and ‘70s, the morality of genetic engineering was heatedly debated. (Indeed, it is hard not to feel that virtually everything there is to say about the ethics of cloning, etc. was said then). In this period, the Methodist Paul Ramsey became the leading critic of the new field of genetic engineering, and the Episcopalian Joseph Fletcher one of its foremost champions. The two theologians disputed the ethics of a wide variety of existing or potential genetic manipulations, including cloning. In arguing against positive interventions, Ramsey argued that a Christian will find “elements in the nature of man which...should be withheld from human handling or trespass” (1970, 31-32)¹. But in Fletcher’s view, there was nothing sacrosanct about human nature. “The accusation that the new biology is trying to create a ‘master race’ is fair enough,” he wrote, “if it means that a people with fewer defects and more control over

¹ It is interesting that Ramsey favored negative eugenics, which was then much less controversial, noting that in the Christian tradition, having children was never regarded as a selfish prerogative, and suggesting that we needed to develop an ethics of “genetic duty” (1970, 56-59).

the crippling accidents of 'nature' are better able to master life's ups and downs. Most of us would want to belong to the master race in that sense. Mastery in the sense of good health and inheritance is sanity" (1974, 13).

The morality of tampering with human nature was also debated in secular circles. Critics condemned such interventions as "playing God," a phrase popularized by Ted Howard and Jeremy Rifkin's 1977 book, *Who Shall Play God?* (1977; on the history, see Peters 1997, 186-7, n. 27). Rifkin has consistently called for the "resacralization of nature," which he considers "the great mission of the coming age" (Rifkin 1983a, 252). As Ted Peters notes, this ethic makes no appeal to Christian or Jewish theological principles (according to which it is the Creator and not the creation that is sacred), and Rifkin himself writes from a naturalist or vitalist position (1997, 117). Indeed, it seems that many who condemn "playing God" are not theists, and what is meant by the phrase is not always clear; much ink has been spilled trying to sort out the various usages. Most often, when the phrase is not employed literally, it seems to be a shorthand way of charging scientific arrogance; that is, as a protest against the readiness of some people, who are necessarily fallible, to make decisions with potentially irreversible consequences for us all. In any case, it caught on among both religious and secular critics of genetic engineering (and biotechnology more generally), and with it, the concept of an inviolate, because sacred, human nature. Physician/bioethicist Leon Kass, author of the "wisdom of repugnance" argument, was perhaps the most prominent advocate of the view that human nature is sacrosanct. Noting that biological engineering was gathering power, he warned that it would bring new opportunities for eroding "our idea of man as something splendid or divine, as a creature with freedom and dignity. And clearly, if we come to see ourselves as meat, then meat we shall become" (Kass 1972, 53)²

On June 16, 1980, in the case of *Diamond v. Chakrabarty*, the U.S. Supreme Court ruled that a genetically altered organism -- in this case, an oil-digesting microbe -- could qualify for patent protection as a novel "manufacture" or "composition of nature" (a decision followed in 1988 by the Patent and Trademark Office's award of a patent on a transgenic mouse which made whole animals, other than humans, patentable). In his amicus brief before the U.S. Supreme Court in the *Chakrabarty* case, the biotechnology critic and Rifkin associate Ted Howard asserted, a la Leon Kass: "To justify patenting living organisms, those who seek such patents must argue that life has no 'vital' or sacred property... But once this is accomplished, all living material will be reduced to an arrangement of chemicals, or 'mere compositions of matter'" (quoted in Kimbrell 1997, 225).

Rifkin's anti-materialist argument clearly struck a responsive chord with religious groups, especially Southern Baptists (Peters 1997, 12-13, 117). The alliance he formed with Christian and Jewish leaders resulted in a statement critical of *Chakrabarty* issued by the heads of the National Council of Churches, the U.S. Catholic Conference, and the Synagogue Council of America. It called for a reexamination of patent laws on grounds that new life forms could not have been anticipated by those who wrote the laws, and also noted that the challenges to "the fundamental nature of human life and the dignity and worth of the individual human being" went far beyond patents. One of those threats was said to be the prospect that an "individual or group" will control life forms for the purpose of improving people. "History has shown us that there will always be those who believe it appropriate to 'correct' our mental and physical structures by genetic means, so as to fit their vision of humanity. This becomes more dangerous when the basic tools to do so are finally at hand. Those who would play God will be tempted as never before" (Randall et al., 1983, 96; Kaiser 1980).

² A brief aside on an interesting paradox: To worry about genetically changing human nature is necessarily to assume that it is malleable--that we have or at least someday may have the capacity to genetically alter "essential" human characteristics. Thus as Allen Buchanan and colleagues have recently noted, once we make this assumption, we can no longer assess genetic interventions by their conformity with our (fixed) nature. Questions about whether it is morally permissible or even required to genetically intervene to change our nature can not be settled by appealing to human nature since "consonance with a fixed human nature cannot be the touchstone for what is just or moral if there is no such thing" (Buchanan et al. 2000, 87, 93). (For a similar point, made in relation to J.B.S. Haldane's scientific utopianism, see Ezrahi 1995, 76).

The alliance, later extended to other religious groups, has proved both durable and effective. Thus in 1983, Rifkin persuaded fifty-eight religious leaders to sign “The Theological Letter Concerning Moral Arguments Against Genetic Engineering of the Human Germline Cells”, which opposed human germline engineering (Rifkin 1983b), and in 1995, he organized the “Joint Appeal Against Human and Animal Patenting”, signed by 180 leaders representing over eighty religious groups. At the press conference announcing the one-paragraph statement, Rifkin stated: “By turning life into patented inventions, the government drains life of its intrinsic nature and sacred value” (Boston Globe, May 19, 1995; Stone 1995; Peters 1997, 116).

Thus beginning in the 1980s, the issue of justice become inextricably tangled with the issue of eugenics -- now understood to be wrong because our DNA is sacrosanct. Of course this position was challenged, and not only by enthusiasts for human genetic engineering. Thus the psychiatrist/bioethicist William Gaylin asserted: “I not only think that we *will* tamper with Mother Nature, I think Mother wants us to” (1983, 53). Perhaps the strongest challenge came from philosopher Jonathan Glover. In *What Kind of People Should There Be?* (1984), Glover attempted to separate different strands in the discussion about the desirability of modifying human nature through genetic engineering, arguing that there were good reasons for caution, especially the risk of irreversible disasters, but also bad ones, particularly the claim that human nature is inviolate. In Glover’s view, our nature left a lot to be desired. He wrote: “Preserving the human race as it is will seem an acceptable option to all those who can watch the news on television and feel satisfied with the world. It will appeal to those who can talk to their children about the history of the twentieth century without wishing they could leave some things out. When, in the rest of this book, the case for and against various changes is considered, the fact that they *are* changes will be treated as no objection at all” (1984, 56).

3. Contemporary Worries And The Uses Of History

As late as 1980s, the pros and cons of human genetic engineering were generally argued on the merits. That is, critics contended variously that the enterprise was too risky, or the underlying scientific assumptions too reductionist, or the consequences for biodiversity dire, or that existing social inequalities would be exacerbated, or alternative approaches to disease usurped. Some argued that tampering with the genome was wrong because God -- and others that evolution -- knew best. But it was rare to oppose human genetic engineering on the grounds that it constituted eugenics, at least without further argument. Indeed, many writers took for granted that human genetic engineering either was or would lead to some kind of eugenics -- the question was whether it would be the good or bad kind. That the label, in itself, did not necessarily condemn is reflected in the fact that many enthusiasts were unembarrassed to call genetic engineering a “new eugenics.” Critics thus had to explain what they thought was wrong with a eugenics that relied on individual choice.

Today, the situation has changed. Notwithstanding recent efforts by some philosophers to spur a real discussion about what, if anything, is intrinsically wrong with eugenics, in popular and even most academic discourse, to the label a practice “eugenics” is thereby to denounce it. There is thus little felt necessity to identify the specific offence(s). But there are many possible candidates, and it is often difficult to tell which are assumed. (Since some are mutually inconsistent, the answer can not be all; on this point see Tännsjö 1998). However, the histories that typically accompany these discussions imply that one of the worst wrongs is coercion.

If an evil of the eugenics movement was its use of compulsion, the obvious lesson would seem to be the need for freedom from interference with reproductive decisions. Thus the statement on “Eugenics and the Misuse of Genetic Information to Restrict Reproductive Freedom” issued by the American Society for Human Genetics (1999, 337) discusses immigration restriction, anti-miscegenation, and coercive sterilization laws, and concludes with a condemnation of all efforts “to restrict reproductive freedom based on genetic information.”³ The moral that people should be free to reach their own reproductive goals in whatever ways they want is frequently drawn. This use of history is clearly illustrated by the Swedish

³ The same statement specifically approves laws barring cousin marriages reflecting a common line of demarcation: What we disapprove is eugenics, what we approve is not

libertarian philosopher Torbjörn Tännsjö, who writes: “The important thing to learn from history is that society should not meddle with our reproductive decisions. This does not only imply that no one should be compelled to have an abortion or become sterilised. It implies too that no one should be stopped from becoming a parent in the way he or she sees fit. The use of techniques for assisted reproduction should not be regulated by political authorities (nor by doctors). The decisions about prenatal diagnosis, in vitro fertilization, egg donation, preimplanatory diagnosis, and so forth, should be placed in the hands of prospective parents. The doctors should server the needs of those prospective parents. The politicians should allow the doctors to do so” (1998, 247-8).

As Jean Elshtain notes (1998, 187-8), the whole world of human reproductive technology has “been surrounded by the halo of ‘rights.’” Boosters and skeptics both invoke rights, though of course different ones. Thus the Council on Responsible Genetics has issued a “Genetic Bill of Rights” that asserts: “All people have the right to have been conceived, gestated, and born without genetic manipulation” (Genewatch, April 2000, 3). At the same time, enthusiasts such as John Robertson (1994), Leroy Hood (Stock and Campbell 2000, 80) or Lee Silver (1997, 2000) argue that we all have the right to seek to achieve our reproductive goals, however we define them. (This usually translates to the claim that we have the right to any procedure we can afford). The new and prospective technologies are said to allow not just infertile couples, but gay couples and single adults to reproduce children that share their genes -- thus fulfilling their reproductive desires (see Silver 2000, 58). The principle of respect for autonomy trumps any other value; it is what demarcates today’s reproductive opportunities from the bad coercive eugenics of the past. According to Gregory Pence (2000a, 113; see also Pence 2000b):

Some day soon, when the opportunities arise, we will see the wisdom of allowing parents maximal choice about their future children. This is not state-controlled eugenics (which attempted to take away such choices from parents) but its opposite. If a child can be given an extra decade of life by an artificial chromosome, or 50 percent more memory through a therapy in utero, then I personally would feel *obligated* to give my future child such benefits. I believe that my child would be grateful to have been deliberately given such a benefit.

Others might disagree and choose not to do so for their children --a decision I would respect. What I fail to understand is how other people-- or the federal government--could think it just to prevent me from benefiting my future children in this way, e.g. by a ban on such enhancements (perhaps from a misplaced concern for equality and social justice). I see no difference between such a ban and a similar ban on parents sending their children to computer camps in the summer: both are intended to better children, both will be done most by people with money, and both are not the business of government.

Perhaps these quotations (which could be multiplied) are sufficient to illustrate the interests that are served for genetic engineering enthusiasts in telling a tale that equates eugenics with racism and compulsion and stars jack-booted Nazis. These are two. First, it allows the enthusiasts to sharply demarcate human genetic engineering from eugenics--to emphasize discontinuity. It allows them to say, in effect, “we are obviously not Nazis, so this history has nothing to do with us.” Indeed, if eugenics is equated with coercion, it allows the enthusiasts to claim either that human genetic engineering is not eugenics at all or that it is eugenics of a benign sort. (Both moves are made). Second, this tale is easily deployed in support of an anti-regulatory agenda. According to a report in Genetic Crossroads (April 1, 2001, 3), Severino Antinori, the Italian fertility specialist who with Panos Zavos plans to attempt human cloning, observed that Josef Mengele “the Nazi torturer, was a ‘government doctor’ and that this represented an argument against legislation or regulation” The moral of the tale has been perhaps most succinctly summarized by James Watson: “The state should stay out of it” (Stock and Campbell 2000, 90).

Critics, on the other hand, have an interest in stressing continuity between the bad eugenics of the past and current (and prospective) reproductive technologies. For them, the histories serve to associate these technologies with people and practices that we today find odious. Commenting on a position paper issued by the Council on Responsible Genetics, Ted Peters (1997, 150) remarks: “The structure of this argument is that because germline modification can be associated with eugenics, and because eugenics can be associated with Nazism, it follows that we can associate proponents of germline enhancement with the Nazis and, on this ground, should reject it.” Certainly these histories arouse strong emotion, which is at

least in part their point. So both critics and enthusiasts have (disparate) interests in selecting the most abhorrent features in the history of eugenics.

But critics do not want to draw the same anti-regulatory moral (except in relation to coerced sterilization and abortion). For them, eugenics that is consumer-oriented and user-friendly is not thereby benign. As noted earlier, the reasons why are not always clearly articulated. But a number of issues recur with some frequency. Without any attempt to rank or evaluate them, much less to be exhaustive, some principal areas of concern are:

1. The implications for justice. Freeman Dyson's comment that "market-driven applied science will usually result in the invention of toys for the rich" (1995, 62) nicely expresses the sentiment of many skeptics. Genetic engineering will be expensive. One-sixth of Americans have no health insurance, and standard policies do not pay for high technology reproductive services, which will be available only to individuals with costly private insurance or the wealth to pay for them (Frankel and Chapman 2000, 36-37). The effect will inevitably be to widen already immense social inequalities.

Some believe that the elite will become a genetic aristocracy -- smart, attractive, artistic, musical, athletic, resistant to disease, etc. Scenarios sketched by enthusiasts such as Lee Silver and Peter Sloterdijk (writing in the tradition of Bernal) have sometimes been taken up by critics, who predict that we will segregate into different castes and eventually different species. Thus Dyson warns that, in the absence of regulation, human germline engineering "could cause a splitting of humanity into hereditary castes" (cited in Techno-Eugenics Email Newsletter, June 12, 2000, 4). Others believe that such scenarios rest on false assumptions about the contribution of genes to differences in human mentality and behavior. Their concern is rather that the emphasis on genes will result in a shift away from more effective medical, social, and environmental means to improve human health and well-being. (In a rather bizarre reversal of the usual distributive argument, James D. Watson argues that we owe it to disadvantaged people to develop genetic engineering technologies [Stock and Campbell 2000, 79-80]).

2. Who would decide what will be offered? A closely related concern is that decisions about what enhancements to offer would be made by and thus embody the values of scientists and biotech entrepreneurs (see Darnovsky 2001a; 2001b, 1). In the words of Ruth Hubbard and Elijah Wald, they would become the "self-appointed arbiters of human excellence" (Hubbard and Wald, 1999, 116).

3. The impact on parent-child relationships. The concern here is that the parental desire to have a certain kind of child or as Barbara Katz Rothman suggests, a particular kind of parenting experience, will reduce the child to an artifact, and distort parent-child relations (2001, 204-5; see also Eshtain 1998, 184-85). Critics ask what will happen when after all the effort and money expended to produce a child designed to certain specifications, the result disappoints? And they worry about the psychological impact on the children, who may feel even more constrained by parental expectations than they do now (Darnovsky 2001b, 13; Frankel and Chapman 2000, 31-32).

4. Assumptions about human worth. Some critics object to any judgment that some genes are better than others. For example, Robyn Rowland writes: "Whichever way it is organised, through legislation or 'choice', the outcome of eugenicist attitudes means selecting humans of value and non-value..." (1998, 93).

5. The impact on attitudes about disability. Many critics think that these technologies foster an unhealthy preoccupation with perfection, thus fostering prejudice against people with disabilities (e.g. Silvers, Wasserman, and Mahowald 1998; Parens and Asch 2000; Saxton 2001; Andrews 2001, 97-106; for a different viewpoint see Buchanan et al. 2000, 266-88). It is often noted that this category will include all of us who live long enough, and that it is therefore in our own best interest to acknowledge its inevitability and our consequent reliance on networks of support. Hubbard and Wald comment that, "all of us can expect to experience disabilities--if not now, then some time before we die, if not our own, then those of someone close to us" (1999, 31; see also Kaplan and Saxton 1999, 6). (For an interesting discussion of the implications of our inevitable temporary or permanent dependence on others see MacIntyre 1999).

If these are serious problems, they would seem to call for curbs on consumer sovereignty. But straightforward calls to limit procreative liberty in the service of other values are rare among political progressives, even within the disability-rights movement. The entanglement with abortion politics has made intellectually-honest discussions of solutions terribly difficult. In the U.S., access to abortion has been defended on the grounds that women have an absolute right to control their own bodies, and on those grounds, the procedure is permitted for any reason at all. To argue that some genetic grounds should not be respected, or that other reproductive choices should be barred, is implicitly to limit the scope of the principle that underpins the right to abortion. Marcy Darnovsky writes that: “Advocates of women’s health and choice will need to develop a voice for women’s reproductive rights that is firmly pro-choice and firmly opposed to the modification of human beings” (2001b, 14). But if “firmly pro-choice” implies that reproductive autonomy is an absolute right, those demands would seem to be inconsistent.

A common move made in response to this dilemma is to implicitly suggest that choices about the use of genetic technologies are not really autonomous, that women are not after all “free to choose” (a phrase that often appears in scare quotes). In typical passages, David King (2001, 175) writes that: “structural factors and social pressures guarantee that allowing parents a ‘free choice’ results in a systematic bias against the birth of genetically disabled children that can only be called eugenic,” while Ruth Hubbard and Elijah Wald (1999, 27) suggest that norms about reproductive responsibility convert “the so-called choices of future parents, especially of mothers, into obligations to make a socially approved choice.”

The point that women are pressured by economic circumstances and social expectations to make certain choices is well-taken. The provision of reproductive genetic services implies that some conditions are insupportable, and the success of such programs is often measured by the extent of reduction in the births of children with expensive disorders (for a summary of the evidence see Paul 1998). Genetic counseling in practice (as opposed to theory) is sometimes directive (Michie et al. 1997). The costs of caring for a severely disabled child are large, and the fate of the child after the parents are no longer able to provide care sources of great anxiety even in systems with national health insurance. There do exist social norms regarding what constitutes reproductive responsibility, attractiveness, and health; social attitudes about gender, sexual orientation, and race; and views about what life is like for disabled people and their families (e.g. Saxton 2001, 11). But these considerations are far more germane to the realm of prenatal diagnosis than to genetic engineering. There are no economic pressures at least to design one’s offspring.

Of course social norms will influence individual decisions in respect to human genetic engineering, and some attitudes and opinions will be superficial or wrong. That is inevitable. The way the discussion often goes, there is a strong implication that a choice influenced by social expectations or trends is not free -- as though a world in which people were not influenced by the views of their family, communities, and larger society were somehow possible (and desirable). Thus Gregor Wolbring writes that “there is no free choice and autonomy regarding eugenic practices: the decisions are all embedded in the society surrounding the person” (1999, 10). But as feminists in particular have stressed, our choices -- including reproductive choices -- are always embedded in a social context, which inevitably includes the expectations of others. (For a sensitive anthropological account of reproductive decision-making see Rapp 2000). It will not work to implicitly define an “autonomous” decision as one independent of social norms. On this understanding, no decision could possibly count as free. The real issue is not that autonomy in reproductive decision-making is a fiction but that respect for autonomy need not trump every other value. Acknowledging this is the first step toward a candid discussion of how best to exercise some kind of social control over technologies now being developed and used in a regulatory vacuum.

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Commentary on Diane Paul

Jim Tabery

How are we to tell the history of eugenics? Traditionally, the emphasis has focused on the travesties of negative eugenics forced on both individuals and races. Historical accounts cite incidents of segregation, sterilization and euthanasia, all utilized to emphasize the problematic results of state-sanctioned elitism. The problematic or interesting component, depending on which way you wish to see it, of the history of eugenics is that the narratives can be and have been utilized to justify often opposing perspectives in the current debate concerning genetic engineering. As Dr. Paul has pointed out to us today, critics and enthusiasts alike tell similar eugenic tales *but stress different features* in order to either associate or disassociate current biological technologies from the previous history. How is this same history being utilized for opposite ends?

I will leave the above question for the commentary by Dr. Lennox. My interest is in the suggestion provided by Dr. Paul for potentially avoiding the problem: Namely, perhaps historians should offer a different history. Genetic engineering is generally not considered to offer the same threat as classical, negative eugenics. The fear of coercion or state-sponsored interference is no longer the danger; rather, the common concern is that a breed of positive eugenics will emerge driven by the free market. In light of this reality, Dr. Paul suggests that the history of eugenics which should bear most directly on this issue is not the history of negative eugenics but the history of positive eugenics. The second portion of Dr. Paul's paper today offers a brief examination of this history. Many preeminent biologists, such as Haldane, Muller, Galton and Bernal, dreamed of utopian societies emerging in accord with artificial selection for desired traits. If we want to understand the history of ideas leading up to modern genetic engineering, Dr. Paul seems right to direct us towards an investigation of this narrative and away from a tale of the Nazi Third Reich.

My concern with this program, though, is that the shift in historical focus will neither shed any new light on the debate concerning genetic engineering if the principle of autonomy is the contested issue, nor avoid the original problem. Different and often opposing perspectives will still be able to use the same narrative to justify their position.

To understand these two points take one of Dr. Paul's examples: Haldane. In the 1920s, Haldane publicly supported a program of positive eugenics. Dr. Paul has provided us with some wonderful quotes from his work *Daedalus*. But this position changed quite radically for Haldane over time. For example, in 1942 (20 years after *Daedalus*), Haldane wrote in *New Paths in Genetics*:

Eugenists wish to improve races, not only by eliminating comparatively rare defects, but by increasing the frequency in the population of bearers of desirable qualities. Here the geneticist can as yet at least offer much less advice, for two reasons. In the first place, desirable qualities are much less clearly defined than many undesirable qualities. And they are much more influenced by environment... Second, it is far from clear what qualities are desirable. So far eugenical propaganda has been written almost entirely from the point of view of the well-to-do class. (Haldane 1942, 36-37)

A decade later, in *Everything Has a History*, Haldane devoted a section of his book to "Difficulties of Positive Eugenics", writing:

Another possibility is that we shall control our evolution and choose the wrong path. If I had had to pick hopeful ancestors for a rational and skillful animal from past faunas I doubt if I should ever have got the right answer between the Pennsylvanian and the Miocene. I should certainly have picked *Struthiomimus*, a Cretaceous reptile like an ostrich, standing on its hind legs, but with arms in place of wings. I am equally sure that I should go wrong today. Dr. H.J. Muller has suggested a method for the

radical improvement of the human race, involving the wide-spread use of artificial insemination. I guess that if I were made eugenic world dictator I should have one chance in a hundred of choosing the right path. Dr. Muller is ten times as good a geneticist as I, so he might have a one chance in ten, but not, I think, much more. (Haldane 1951, 287)

Let me now return to my two original points based on what we've learned from Haldane. First, the intentions of those preaching classical positive eugenics were no different from those endorsing negative eugenics. The goal was still the well-being of society, not the availability of reproductive options for prospective couples. As Dr. Paul points out, this interest does not emerge until molecular biology takes shape. This fact is no historical breakthrough, but it must be emphasized because we have to be careful not to associate the history of classical positive eugenics and the practice of contemporary genetic engineering too closely together when the practitioners of each have different intentions in mind. The history of positive eugenics at first seems to be a better narrative for understanding genetic engineering because both programs are concerned with selecting for desired traits rather than eliminating unwanted characteristics. But Dr. Paul's presentation focuses primarily on the issue of autonomy and the avoidance of governmental coercion in the debate revolving around genetic engineering. I do not believe the history of positive eugenics will shed any more light on this discussion than will the history of negative eugenics. The bioethical issues and the historical issues are somewhat distinct here. There is the scientific development of molecular genetics from classical genetics. The practical evolution of classical positive eugenics (and the dreams of utopian societies) into contemporary genetic engineering. And then there is the contemporary considerations of the bioethical principle of autonomy, but there is no narrative to take the principle of autonomy back into the older discussion of classical positive eugenics beyond the origins of molecular biology. Interests in autonomy and the problems of state-sponsored coercion were neither endorsed nor criticized. They simply were not there.

What I think the history of positive eugenics will do for the current debates about genetic engineering will be to provide fodder for the issue about the naivety or the strength of biological reductionism, an issue Dr. Paul alludes to but does not discuss in any detail. The second important feature to draw from the passages by Haldane centers directly on how Haldane's perception of positive eugenics turned head over heels in just two decades, as oppose to, say, Muller, who remained loyal to the program of artificial insemination until his death. In the last century, our conceptions of heredity have been on a roller-coaster ride through strict genetic determinism and complex genetic-environmental interactions. Some biologists who have lived through many of these peaks and troughs have, in light of these changes, altered their perspectives on how this scientific information should be used. Others have stood by their initial beliefs. Haldane and Muller are good examples of this phenomenon. But the fact that there were these diverse conceptions of classical positive eugenics means that different contemporary positions on the use of genetic engineering will again be able to *stress different features or different figures* in the history to support their own agenda. The switch from support to condemnation by Haldane could be used by critics to suggest biologists are always apt to reinterpret how scientific knowledge should be utilized. While the staunch support of positive eugenics by Muller could be used to endorse genetic engineering. But notice now that the issue is no longer on the debate concerning autonomy; rather, the history pertains to the accuracy of biological prediction and interpretation.

My conclusion, then, comes in two points: First, I do not see how the history of positive eugenics will shed new light on our understanding of genetic engineering if we are interested in the issue of autonomy. And second, what the history will shed light on is the diverse, often conflicting, sometimes shifting perspectives of the positive eugenics program by past biologists. My fear is that this history will also be prone to multiple interpretations by conflicting positions on contemporary genetic engineering. The capitalist and the socialist, the pessimist and the optimist, the critic and the enthusiast will all have a historical narrative of positive eugenics to tell to support their own position.

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