

The power of heredity and the relevance of eugenic history

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INTRODUCTION

This journal is celebrating its 20th anniversary, and those who have subscribed since the beginning may remember reading its first issue. Perhaps they also remember the day, only a few weeks later, when the cover of *Time* magazine displayed a double helix entwined around a caduceus, as the gateway image to a special theme issue on the future of medicine. The subhead announced the focus of the articles inside: “How genetic engineering will change us in the next century.” There were articles about the race to map the human genome, using DNA to solve crimes, genetic privacy, gene therapy, cloning, and more. But compared with the excitement and hope conveyed by most of the futuristic reportage, one piece stood out as dark and foreboding. It was titled “Cursed by Eugenics,” and it was introduced by a dramatic assertion: “A belief that human intelligence could guide evolution led the world to concentration camps.”¹

What need was there, some readers may have asked, to dampen the excitement that swirled around all things genetic by invoking memories of Dachau and Auschwitz and the dreaded word *eugenics*? Surely those long vanquished images of evil were irrelevant to the medical wonders genetic research was delivering, and could only delay the conquest of disease by genetic medicine. A reader in this journal’s anniversary year might ask the same questions. This article is an attempt to give some reasoned answers.

It is worth reviewing what this journal had to say about eugenics two decades ago. Had a skeptical reader of *Time* consulted the first issue of this journal she might have left with suggestions of how hard it is to disentangle the field of genetics from the troubling history of eugenics. Leaders in medical genetics demonstrated that difficulty in their own words.

In his 1998 presidential address to the American College of Medical Genetics (ACMG), Reed Pyeritz directed his listeners’ attention to the “intellectual forefathers” of his field, including Francis Galton, who coined the term *eugenics*, and is the acknowledged godfather of what was known as the “science of good birth.” Pyeritz listed threats to the profession of medical genetics including “genetic determinism,” and warned that “we can never overlook the fear that the concepts of genetic

manipulation... and eugenics can engender.” He also understood that the historical face of eugenics was often masked by financial concerns, and cautioned that “economic issues will potentially drive application of genetic information and technologies.”² A later president of the ACMG, speaking in a similar vein, said: “The worst accusation that can be leveled against modern human genetics and medical genetics is that they are eugenic.”² But by then, the call for attention to eugenic history had already been raised by others in the field of medical genetics.³

The details of that history were widely available both to scholars and the public by 1998, and emphasis by genetic counselors on nondirective counseling had occurred, to some extent, in reaction to it.⁴ Historians like Mark Haller and Kenneth Ludmerer wrote important monographs on the topic in the 1960s and 1970s.^{5,6} As early discussions to analyze the entire human genome took place, Daniel Kevles’ *In the Name of Eugenics* appeared in serial form in the *New Yorker*, and was published as a single volume soon thereafter.⁷ By the time the human genome had been sequenced in 2001, several dozen books had been published about eugenics, detailing its pervasiveness in the United States and its worldwide impact. And the budget for the Human Genome Project itself had provided funding for ethical, legal, and social implications (ELSI) research, which supported a significant body of scholarship on eugenics.⁸ Twenty years later, what has the medical genetics community learned about eugenics?

WHAT WAS EUGENICS?

The standard account of eugenics begins with the definition the English gentleman Francis Galton gave to the word in an 1883 essay.⁹ He explained the Greek roots of his coinage for the new “well born” science, which he wished to focus toward the goal of “improving the stock” of future generations. Galton’s aspirations took a practical turn in 1904 when he funded a fellowship at the University of London that matured into the Galton Chair of Eugenics. Galton’s writings had a powerful impact on those who took up the banner of eugenics in the years before he died in 1911, and in less than two decades, the word he invented to describe this new field of study had spread, with his ideas, around the globe.

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This description of eugenics is fine, as far as it goes, but we should not make too much of the Galtonian beginnings of all things eugenic, or of how that word found expression in England, where it first appeared, and America, where it has been the focus of an avalanche of study. Even in the United States it is difficult to describe all the things that eugenics meant to the public within a time frame that spanned the entire twentieth century. As for other countries, recent scholarship has revealed many international versions of eugenics that stand in contrast to the strands of thought we have become familiar with in the United States.¹⁰

Eugenics was a many-sided concept that became concrete in a variety of ways, from political movements to voluntary social programs. In general, it was forward looking, and signaled a hopeful progress. To some it meant educating pregnant women to prepare them for raising “well born” babies.¹¹ To others, like the writer who claimed eugenics as “a higher branch of Hygiene,” it was little more than a cultural cliché.¹² Some things done the name of eugenics, to borrow Kevles’ title, were innocuous. But at the same time, eugenic advocacy delivered some of the darkest policies of the twentieth century. The feature of eugenic history that draws general condemnation today is contained in the body of coercive laws that were adopted as an expression of eugenic ideology.

EUGENIC LAWMAKING

The idea that people had a moral duty to cultivate a healthy lineage and choose mates wisely had been common for centuries. What made eugenic advocacy unique in America was that it focused less on individual initiatives, and more on the role of government. Eugenists advocated for governmental interventions including laws and policies that would give the state direct influence over procreation.¹³ Most medical geneticists are now well aware of how this enthusiasm for employing the new tools of study such as pedigree construction, family studies, and intelligence testing eventually led to an extensive body of laws in the United States, and many also know that most laws resulting from eugenic lobbying focused on sexuality and reproduction.

Several of the earliest laws criminalized marriage and sexual relations among the “epileptic, imbecile or feeble-minded.”¹⁴ Thirty-two states passed laws between 1907 and 1937 prescribing state mandated eugenical sterilization to prevent the birth of people deemed “defective” or “socially inadequate.”¹⁵ Those laws stood alongside 40 “eugenic marriage” laws that required tests for sexually transmitted diseases (STDs) as a condition of marriage.¹⁶ Laws prohibiting interracial marriage, a vestige of the colonial era, were revised to include a new, scientific gloss with biological definitions of “race” during the eugenics era. The entire US system of legally mandated racial segregation was bolstered by eugenic thinking.¹⁷ The 1924 federal law restricting immigration to the United States by means of an ethnic/national quota system was also designed by leaders in eugenics to prevent the “pollution” of American bloodlines.¹⁸ One of the more

seductive messages of eugenics in the United States was its promise of a world in which taxes would disappear if problem people—criminals, the disabled, and the poor—were no longer born.^{19,20}

At least 16 different countries emulated the American eugenics laws that sanctioned sexual sterilization. In the early 1930s, laws involving racial/ethnic restrictions on marriage, immigration restriction, and sterilization of “defectives” provided models for Germany that Hitler’s regime applauded, copied, and embellished upon. The goal was to eliminate people with disabilities, or ethnic or religious groups like Jews or the Roma/Sinti, homosexuals, or political dissidents.

As a consequence of its association with the genocidal intentions of the Nazis, the term *eugenics* has become an all-purpose slur. It evokes images of pogroms and gas chambers and highlights the memory of coercive sterilization policies around the world. It suggests myriad other acts of bigotry, from ethnic quotas for immigration policies, to American apartheid of the Jim Crow era.

But the average person who used the word *eugenics* in the first third of the twentieth century had yet to hear such sentiments. She would likely have been able to name neither Galton nor the specialized meanings with which the term *eugenics* carried as it entered our national vocabulary. People became comfortable using the word *eugenics* not because of its intellectual pedigree, nor in relation to events that came decades later, but because so much of what it meant to them fit neatly within ideas they already held. Eugenics can be understood better not merely as a hate-filled political ideology, but as a continuous strain of thought tied to the underlying, and always powerful idea of heredity. How we think about heredity drives the imaginative power of genetic science today, and it also makes up a critical variable that fuels fears about potential misuses of that science. That idea preceded Galton’s formulation of the word *eugenics*, and has survived the relatively new historical scrutiny of eugenics that began in earnest only in the 1970s. Eugenics also appealed to many people who supported it as part of a broader movement to reform America in the face of massive social dislocations that occurred amidst increased urbanization, industrialization, and immigration.

THE CONTINUITY OF HEREDITARIAN IDEAS AND EUGENICS AS REFORM

One old idea that became embedded within common understandings of eugenics is captured by words like *breeding*, *generation*, and *reproduction*. It is an historical commonplace that 1920 marks the year in which the US Census first showed a trend of increasing urbanization, with almost as many people living in cities as those living on farms. Most people born before that date lived around domestic animals, whose cycles of mating and birth were in evidence daily. They understood animal husbandry, and needed no new language to see the analogy between controlled “stock breeding” in their flocks and herds, and the same activity in humans. The “culls” in a herd were not allowed to reproduce; prize winning

livestock were valued for their expected progeny. The limits to control in the human sphere were obvious—forced marriages were clearly neither desirable nor feasible—but just as obvious were the expected benefits of choosing marriage partners carefully. These realizations were invoked by advocates who sought to exert governmental influence to change what many people judged to be perilous demographic trends and to control the results of human “matings,” particularly among the “dangerous classes.”²¹

Hereditarian thought did not need to be scientific, and was often no more than popular wisdom, repeated by the scientifically untrained and medically unsophisticated. In the early twentieth century, it required no understanding of the newly publicized laws of Mendel, or the most modern pedigree studies for most people to realize that sayings like “the apple does not fall far from the tree” or “like produces like” reflected notions that might apply to humans. Those sentiments were even suggested to many by Bible verses that traced the sins of sons to those of their fathers. And since the time of the Revolutionary War, long before Darwin, Mendel, or Galton, Americans had heard about the power of heredity from their physicians. For example, pioneering colonial physician and signer of the Declaration of Independence Benjamin Rush said:

It is possible that the qualities of body and mind in parents, which produce genius in children, may be fixed and regulated; and it is possible that the time may come when we shall be able to predict with certainty the intellectual character of children, by knowing the specific intellectual faculties of their parents.¹³

Decades after Rush’s death, his hereditarian ideas echoed in the work of Orson Fowler, whose fame as an advocate of phrenology is well documented. Fowler’s 1844 work *Hereditary Descent: Its Laws and Facts Applied to Human Improvement* made hereditarian sentiments popular in the United States for over two decades. People had absorbed ideas about the power of heredity long before Herbert Spencer would translate Darwin’s premises of natural selection into “Social Darwinism,” and Galton, while acknowledging the importance of Darwin’s work, credited it primarily with giving him the motivation to “pursue many inquiries which had long interested me... clustered round the central topics of heredity, and the possible improvement of the human race.”¹³ Galton’s abiding interest in heredity, like a great deal of what we associate with eugenics, was part of the intellectual landscape of English-speaking scientists long before the term *eugenics* was heard. Before Galton’s naming of the field, anxiety about heredity had also played out in a theory of “degeneracy” that functioned to explain social decay.²² Many thought the human race was in decline, as the toll of bad living and bad behavior accumulated in the “germ plasm”—that mysterious repository of heredity—within the body.

Another reason the eugenic ideal was powerful was that it provided a shorthand for talking about methods of social

improvement, and suggested biologically based solutions to social problems—an efficient avenue for reform. In the United States, it was common to see people who called themselves *eugenicists* participating in campaigns to outlaw prostitution, eradicate sexually transmitted disease, prohibit alcohol, and give the vote to women. Others in the movement concentrated on cleaning up the milk supply, or eradicating environmental toxins that poisoned mothers and their babies, elevating levels of infant morbidity and mortality. Still others emphasized empowering women to make prudent partner choices, or expand access to birth control. Many encouraged marriages among the healthy and prosperous, while discouraging parenthood among the poor, the disabled, or those thought too likely to fail at healthy parenting.

Books promoting industrial reforms, new methods of education, urban revitalization, and reform of the criminal law and courts routinely had chapters on eugenics.²³ John Harvey Kellogg promoted “biologic living” as eugenics.^{24,25} Doctors like Chicago’s W.A. Evans wrote daily columns syndicated in US newspapers for two decades on “How to Keep Well” that routinely answered “questions pertinent to hygiene, sanitation, and prevention of disease,” and were liberally sprinkled with encouragement to think of health in terms of eugenics.²⁶ And Dr. Harvey W. Wiley, father of the 1906 Pure Food and Drug Law, fought for a safer, healthy environment while simultaneously supporting eugenic marriage laws and sterilization.²⁷ The language that made up the “eugenic metaphor”¹⁷ was expansive enough to bolster programs of reform even within discourse that did not emphasize heredity.

EUGENICS, MEDICINE, AND GENETICS

As early as the seventeenth century it was commonplace for doctors in asylums to connect familial mental health problems with heredity, and life insurance companies began to use what appeared to be inherited family insanity as a disqualification for coverage. As one scholar has noted, “mid- and late-Victorian discourses of hereditary criminality, alcoholism and pauperism were grafted onto this much older medical tradition.”²⁸

Physicians were among the first to champion eugenics as a social movement and political strategy. One surgeon invoked the promise of halting problematic heredity as a motive in deploying a new surgical technique. In his pioneering description of vasectomy, Albert Ochsner argued that “a very large proportion of all criminals, degenerates and perverts have come from parents similarly afflicted.” Vasectomy would eliminate such people.²⁹

Prominent surgeon and eugenic philanthropist J. Ewing Mears also wanted to use scientific surgery to eliminate “perverts and degenerates, idiots, imbeciles, epileptics and the vicious insane.” Said Mears, “The members of our profession are not only the conservators of the public health, but are, or should be, in every sense the promoters of the public good.”³⁰

Harvey Jordan, who would become the Dean of the University of Virginia Medical School, told the 1912 First

International Congress of Eugenics that “the future medical curriculum must include a course in sound eugenics.” “Physicians,” he said, “could be the most potent factors in spreading, and giving proper direction to, the eugenic propaganda.”³¹ William Welch, a father of medical education, was on the first board of directors of the Eugenics Record Office,³² and physicians like Michigan’s Victor C. Vaughn joined dozens of other leaders in medicine who were enthusiastic supporters of eugenics from the beginning.³³ All the eugenics laws, particularly those involving marriage restriction and sterilization, were widely championed by physicians. At least 12 different doctors were legislative sponsors of sterilization laws, and many other laws had doctors as their chief lobbyists.³⁴

For decades, scientists as well as the public identified genetics with eugenics. The *Journal of Heredity*, flagship journal of the American Genetic Association, began its publication history in 1910 as the *American Breeders Magazine: A Journal of Genetics and Eugenics*. Its pages were filled with articles about eugenics, and it was edited for 40 years by a man known for his “enthusiastic advocacy of eugenics.”³⁵

As late as 1932, when the Third International Congress of Eugenics met in New York City, at least one third of its attendees went on to meet the next week in Ithaca, New York, at the Sixth International Congress of Genetics. C. C. Little, long active among leaders in eugenics, presided as Chairman of the Executive Council and Secretary-General of that genetics conference.³⁶ Geneticist Thomas Hunt Morgan, the legendary investigator of *Drosophila*, was a member of the first board of directors of the Eugenics Record Office. Though he left that post early and later became a pointed critic of eugenics,³⁷ he was still publicly associated with the movement even as he won the first Nobel Prize for his work in genetics in 1933. Newspapers across the country announced the award given for his “Discoveries of Eugenic Functions of Chromosomes.”³⁸ Few geneticists in the early years of that field completely avoided connections to policies and sentiments that carried the adjective *eugenic*, a term that had a positive resonance for some time both among the public and the scientific community.

WAS EUGENICS MERELY PSEUDOSCIENCE?

Despite the engagement of physicians and geneticists with eugenics, it is common to condemn eugenic thinking by labeling it “pseudoscience.” This tired slur has been used to signal a distance from ideas that have fallen out of favor, past due presumptions that we have supposedly left behind. But for more than half the twentieth century, physicians and scientists across the country joined universities, politicians, religious leaders, and presidents to endorse eugenics, which they confidently defended as “fact not fad.”³⁹ Journals no less prestigious than *Science* published regular articles that reported on eugenic meetings,⁴⁰ or described curricula that could be used to teach basic genetics, including eugenics, “the application of genetic principles to race improvement.”⁴¹

Scholars described how “the field of eugenics... rests upon genetics in cooperation with every branch of science which concerns heredity and environment of the individual.”⁴² Articles on eugenics appeared regularly in medical journals like *JAMA* or the *New England Journal of Medicine*, and were also constant fare in state and regional medical journals.

In their scientific writings, some eugenists were just as careful crediting the dual impact of nurture and nature as any prudent geneticist today. For example, Charles Davenport, dean of American eugenists, who is often accurately condemned for his public embrace of biological determinism, said this in his famous text *Heredity in Relation to Eugenics*: “With few exceptions, the principle that the biological and pathological history of a child is determined by the nature of the environment and the nature of the protoplasm may be applied generally.”⁴³ The problem with the worst expressions of eugenics was not merely that it depended on an understanding of genetics that was limited or simplistic. To state that conclusion another way, the most notorious interventions that relied on a eugenic motive were not simply a matter of faulty scientific conclusions on the part of eugenists. Discriminatory laws, coercive reproductive interventions, and in the most extreme cases, genocide, would have been wrong even if the science they relied upon had been sound.

Attempts to effect a divorce from the past by charging our predecessors with “pseudoscience” is not new; even the eugenists used that term to tar their predecessors, the phrenologists.⁴⁴ Nevertheless, laws informed by eugenic theory in the United States and the most toxic expression of ideas that culminated in the Holocaust have provided a predictable focus for scholarly attention. Amplification of that work by journalists and popular writers has brought the word *eugenics* back into common parlance.

THE RELEVANCE OF EUGENICS TODAY

The historical linkage of eugenics with Nazi atrocities leaves the term with few supporters today. It also leads to the mistaken idea that the worst features of eugenics disappeared with the fall of the Third Reich. But for most of the twentieth century, we lived in a legal regime that embodied a eugenic value structure to justify state and federal legislation. Racially targeted marriage restriction legislation remained formally in place until the 1960s, while the eugenically tinged Immigration Restriction Act was not repealed until 1965. If we focus on a single metric such as the number of sterilizations that occurred, we actually see increases in some states after World War II, with some 23,000 operations recorded between 1943 and 1959. Most sterilization laws survived until at least the 1970s, with surgeries documented until at least 1979.⁴⁵ The legal vestiges of eugenics remained in place in the United States into the twenty-first century; the final law that allowed involuntary surgery as a state eugenic intervention was not repealed until 2013. Even more critically, the attitudes toward poverty, race, sexuality, and disability that provided the initial impetus for such laws were openly embraced for decades after

Hitler,^{46,47} and continue to be invoked as a justification for coercive reproductive interventions today.^{48,49}

Yet since the initiation of the Human Genome Project in the 1990s, the hype surrounding genetics has echoed the enthusiasm with which eugenic solutions were embraced a century ago. In the 1920s we heard claims that “eugenics would abolish cancer in two generations,”⁵⁰ and similar claims about genetics are not unusual today. Despite an abundance of criticism of those claims by scientific experts, widespread popular attention to genetic science has led to a resurgence of language that can be accurately described as “genetic essentialism” or “genetic determinism.”⁵¹ Critics highlighting this trend have noted that the scientific community has often been complicit with commercial interests or public media in repeating this language.⁵² Today, direct-to-consumer marketing of genetic services provides regular reminders of how powerful, and how misleading, such language can be.⁵³ Every new development in medical genetics gives rise to even more hyperbole that echoes the rhetoric of eugenics, implying that the science of heredity will soon fix not only all our medical problems but our social problems, as well. The concerns of leaders in medical genetics 20 years ago sound prescient today.

Just as the eugenics movement gave rise to widespread advertising, with claims of “eugenic motorcars,”⁵⁴ eugenic corn,⁵⁵ and eugenic clothing,⁵⁶ today the advertising world uses heredity and genetics to sell products, and DNA as the signal of genetic determinism is embedded in our culture—more than ever before. In years past, we would say that success was in our bloodline, but now, the evidence is everywhere, from corporate advertising promising “a vehicle that has emotionally charged DNA and unquestionable pedigree” (Land Rover),⁵⁷ to “mobile is in our DNA” (Twitter),⁵⁸ to “We are all explorers. It’s in our DNA” (NASA),⁵⁹ to “Bleeding Yankee Blue: Baseball: It’s in our DNA” (New York Yankees).⁶⁰

While no serious geneticist today would argue that human biology, human morality, or all of human behavior is entirely driven by genetics, there is nevertheless a serious imbalance in the public understanding of the power of heredity and the role genetics plays. This may be the result of the extraordinary attention given to genetics in the popular press for almost three decades, which has made genetics part of our language. But references to traits controlled by “a gene for” everything from industriousness, to criminality, to obesity, and intelligence, demonstrate that the power of hereditary thinking is still with us, and some scientists continue to increase public confusion by using imprecise language in reference to topics such as race and population genetics.

CONCLUSION

I have not focused on all the newest technologies from which some people regularly infer that the specter of eugenics is alive and well. I have not discussed the very real issues of discrimination against people with disabilities, or the ethically problematic questions raised by the increasing technological

precision of prenatal genetic diagnosis, or how some believe that gene editing technologies like CRISPR are the road to “designer babies” or other enhancement fantasies that play out within futuristic dystopic scenarios. I intentionally deemphasize the use of *eugenics* as a pejorative, unless it is referring directly to historical reference points, rather than using the word as a synonym for *Nazis*, or *racism*, or *discrimination*. Although I do not favor the ever-present commercial genetic exuberance, it does not help routinely to call that trend *eugenics* either. We should debate the ethical issues that arise in reference to all those new technologies, but we have plenty to be concerned about that fits more directly into patterns that mimic our troubled history of eugenics, without using that term indiscriminately to describe every new phase of genetic research.

The history of eugenics is important to understand today because despite its beginnings in nineteenth century England as a new term signaling heredity, eugenics had an enormous policy impact in America. It achieved dramatic success in the United States because it appealed to two different sides of the American temperament. First, it incorporated an idea of progress that goes all the way back to Tocqueville and came, over time, to include a boundless optimism about the future, and a kind of utopianism that celebrated the use of science and technology to eradicate social problems. The other, the dark side of the American psyche, fed on currents of American thought that were here at the country’s founding and have not been banished yet: a long smoldering nativism that clings to the idea of a necessary white majority; racial exclusionism, originally related to a legal regime of slavery, and all the vestiges of it that persist.

This line of bigotry extends toward the disabled and the poor, and is fed by a toxic and contradictory brand of individualism that claims we are born as we will remain, fixed by the heredity our parents bequeathed to us at birth. From this perspective our flaws cannot be repaired by reform measures, yet we are nevertheless responsible for our position in the world; we embody the result of the bad bets cast on our behalf in life’s lottery.

These attitudes were what fueled the most horrific uses of eugenics in the twentieth century. The contemporary relevance of eugenics to the medical genetics community is not simply that we have new technologies that make eugenics possible, but because as a country we continue to nurture ancient prejudice that is focused on the least powerful people in our society, and we regularly attempt to blame them for all of our (and their) problems, and claim those problems are controlled by heredity.

Lately we have seen public displays of contempt for the disabled, and a chorus of hate for people who violate conventional sexual norms. We hear daily about the need to eradicate social welfare programs that are focused on addressing crime, poverty, and disease, and the nation’s attention is now focused on an open campaign to amplify the rhetoric of decay and fear to justify closing the borders against people whose presence could threaten the majority white

demographic balance. We also hear the old mantra: all of this must be done to make us safe in future generations and lower our taxes today. Because all these strains of thought remain a part of our current social and political landscape, I think eugenics continues to be worth our attention as a field of historical study, and should be of particular concern to those who are the guardians of genetic expertise.

Many people contributed to the most harmful eugenic policies of the past, and among them were experts in medical genetics. And while the medical genetics community today need not bear the moral burden of defending the entanglement of genetics and eugenics in the twentieth century, it does have an obligation to recognize and understand that entanglement, which in some ways has never really ended.⁶¹ Medical geneticists cannot ignore the seductive idea of heredity, and must reflect on how it was used in the past as well as the role it plays in scientific discourse, popular culture, and political trends today. Experts in medical genetics, who more than any other group should understand the science of heredity, share the most responsibility also to understand how easy it is to misuse that science, whether or not we describe its misuse as eugenics.

DISCLOSURE

The authors declare no conflicts of interest.

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