

extensive disease, mortality, and birth-rate statistics for white and colored populations in the United States. And with the advent of the new science of eugenics, Darwin's theory of natural selection would take racial science in a dangerous new direction.

The Progressive Science of Eugenics

At the turn of the twentieth century, American scientists embraced a theory known as eugenics, which held that intelligence and other personality traits are genetically determined and therefore inherited. This scientific theory about heredity, coupled with Progressive Era reforms, produced a campaign to remedy America's social problems by stemming biological degeneracy. The eugenicists advocated the rational control of reproduction in order to improve society's mental, moral, and physical health through selective breeding. In reality, eugenics enforced social judgments about race, class, and gender cloaked in scientific terms.

The founder of eugenics, English scientist Sir Francis Galton (Darwin's half cousin), became interested in heredity after reading *The Origin of Species*.²⁹ Although the idea of improving the quality of humans, as well as plants and animals, through selective breeding was not new, Galton was the first to popularize an actual eugenics program. In 1883, Galton coined the word *eugenics*—from a Greek root meaning “good in birth”—to “express the science of improving stock” by giving “the more suitable races or strains of blood a better chance of prevailing speedily over the less suitable than they otherwise would have had.”³⁰ Galton replaced the Darwinian reliance on natural selection for the inevitable extinction of inferior groups with an argument for affirmative state intervention in the evolutionary process. “What Nature does blindly, slowly, and ruthlessly, man may do providently, quickly, and kindly,” he proposed.³¹

Galton's theories were grounded in a belief in the genetic distinctions among races as well as individuals. His eugenicist approach adopted the prevailing scientific model that man was divided into different races marked by distinctive physical and psychological features: “The Mongolians, Jews, Negroes, Gipsies, and American Indians severally propagate their kinds; and each kind differs in character and intellect, as well as in colour and shape, from the other four.”³² Like most scientists of the time, Galton reserved the most disparaging description for black people, emphasizing their “strong

impulsive passions, and neither patience, reticence, nor dignity,"³³ as well as their intellectual inferiority. "The number among the negroes of those whom we should call half-witted men, is very large," Galton wrote in his 1892 treatise, *Hereditary Genius*.³⁴

Galton's eugenicist ideas found fertile ground in America. In the early 1900s, the descendants of northern European settlers were consolidating their hold on commercial and political power in America. They sought to maintain control over an exploited workforce of Southern black sharecroppers and urban factory workers from southern and eastern Europe. Believing that the new immigrants were reproducing faster than they were, native Anglo-Saxons became gripped by a fear of "race suicide." Now, far from believing that blacks and other inferior races were biologically destined to become extinct, whites feared their growing numbers.

Whites were also pathologically obsessed with preserving their racial purity, claiming that sexual relations with blacks would produce a degenerate mongrel race. An intense nativism led to vicious race riots across the country. These attacks, primarily of whites against blacks and natives against immigrants, often ended in dozens of deaths. Thirty-eight people were killed in a race riot in Chicago in 1919. Meanwhile, gruesome lynchings terrorized black citizens in the South.

Eugenics provided a forward-thinking scientific framework to justify whites' efforts to preserve social order in the midst of this turmoil. Concepts about race, in turn, provided a theoretical framework for eugenicist logic. European and American scientists had for over two centuries developed an understanding of races as biologically distinct groups, marked by inherited attributes of inferiority and superiority. Racial science predisposed Americans to accept the theory that social characteristics were heritable and social structure was biologically determined. Eugenicists easily latched on to race as an integral element of their ideology. Moreover, the chattel slavery and Jim Crow systems that violently enforced racial classifications paved the way for the dehumanizing programs that implemented eugenicist ideology. Forced sterilizations, eugenicists' favorite remedy for social problems, were an extension of the brutality inflicted on black Americans. Slaveholders' total dominion over the bodies of enslaved Africans—including ownership of enslaved women's wombs, which they exploited for profit—provided an early model of reproductive control.³⁵

Imposing sterilization as a solution for antisocial behavior had long been

practiced in the castration of black men as punishment for rape, beginning during slavery. The territorial legislature of Kansas passed a law in 1855 making castration the penalty for any Negro or mulatto who was convicted of rape, attempted rape, or kidnapping of any white woman.³⁶ In 1913, the Kansas legislature authorized sterilization of state inmates. Around that time, a Texas physician, Dr. Gideon Lincoff, advocated castration as a deterrent to crime by using an anecdote about a "vicious, disobedient, drunken Negro" who was suspected of rape: "After discovering that he had impregnated an idiot white girl, three men went into the field where he worked and castrated him. Less than two years later I heard his mistress say that he had become a model servant."³⁷ The mutilation of lynching victims' bodies by white mobs, often involving castration of black men, served as entertainment for many residents of Southern states. This long history of sanctioned torture inflicted on black bodies prepared Americans to accept the compelled sexual surgeries performed by state officials on people deemed genetically unfit.

Eugenics was mainstream, and it was financed by the nation's wealthiest entrepreneurs, including the Carnegie, Harriman, and Kellogg dynasties. Johns Hopkins biologist Raymond Pearl observed that, by 1912, "eugenics was catching on to an extraordinary degree with radical and conservative alike."³⁸ The growth of eugenics as legitimate science owes much to the efforts of Harvard-trained biologist Charles Davenport. As an associate professor at the University of Chicago, he convinced the Carnegie Institute to establish a center for the experimental investigation of eugenics in Cold Spring Harbor, New York, in 1904. With the financial backing of railroad heiress Mrs. E.H. Harriman, Davenport added a Eugenics Record Office to his research station six years later. In an October 10, 1910, letter, Davenport reported to Francis Galton, "There has been started here a Record Office in Eugenics; so you see that the seed sown by you is still sprouting in distant countries."³⁹

Darwinian biology and Mendelian genetics, which understood heredity as a matter of quantitative probability, had generated a concept of race as a geographical population rather than a human essence. Eighteenth-century racial typologists grouped human beings into natural kinds that could be distinguished by observing their outward traits. Scientists at the turn of the twentieth century modernized the concept of biological race by defining it as groupings of geographical populations that differed according to their likelihood of inheriting certain physical and behavioral traits. Eugenists

used race to group European populations according to ability, intelligence, and moral character. In the early 1900s, southern and eastern Europeans were considered a racial threat by whites of Anglo Saxon origin. Dressing up racial typologies in the new scientific garb of heredity, Davenport assigned particular behavioral traits to different races of immigrants. He observed that Poles were "independent and self-reliant though clannish"; Italians were prone to commit "crimes of personal violence"; and "Hebrews" fell "intermediate between the slovenly Serbians and Greeks and the tidy Swedes, Germans, and Bohemians."⁴⁰ Davenport advocated preventing the reproduction of bad stock through a selective immigration policy, discriminating marriages, and state-compelled sterilizations.

Davenport's Cold Spring Harbor project supplied the burgeoning American eugenics movement with scientific support. It trained and dispersed over 250 field workers, published the *Eugenical News*, and disseminated bulletins and books about the reduction of hereditary degeneracy.⁴¹ Davenport reported his early findings in his widely read book *Heredity in Relation to Eugenics* (1911). As Davenport conducted scientific research, eugenics became the vogue across the country. Ordinary Americans attended lectures, read articles in popular magazines, and participated in Better Babies contests. Those devoted to propagating eugenics joined organizations such as the American Eugenics Society, the American Genetics Association, and the Human Betterment Association. The *Reader's Guide to Periodical Literature* listed 122 articles under Eugenics between 1910 and 1915, making it one of the most referenced topics in the index.⁴² At most American colleges, courses on eugenics were well attended by students eager to learn how to apply biology to human affairs.

Meanwhile, Harry Hamilton Laughlin, superintendent of the Eugenics Record Office and an active public lobbyist for the movement, turned biological theory into public policy. In 1914, he prepared a two-volume report that proposed a schedule for sterilizing 15 million people over the next two generations, as well as a model sterilization law to accomplish this plan.⁴³ The defective "10 percent of our population," Laughlin claimed, "are an economic and moral burden on the 90 percent and a constant source of danger to the national and racial life." It is estimated that 65,000 persons were involuntarily sterilized under eugenicist statutes passed in thirty states.⁴⁴

Like the racial typologists of prior centuries, eugenicists developed scientific methods for testing their claims. Paralleling the development of eugenic

theory was the acceptance of intelligence as the primary indicator of human value. Eugenicists claimed that the IQ test could quantify innate intellectual ability in a single measurement, despite the objections of its creator, Alfred Binet.⁴⁵ The introduction of "mental tests" at the turn of the century to measure intelligence replaced physical measurements, such as cranial capacity, as the means of determining human inferiority and superiority. Intelligence testing was the ideal instrument for distinguishing the fitness of stocks because it provided "a seemingly objective, quantifiable measure that could be used to rank genetically transmitted ability," writes Rutgers psychology professor William H. Tucker.⁴⁶ Psychologists used the tests to demonstrate that blacks and recent immigrants from southern and eastern Europe were intellectually inferior to Americans of Anglo Saxon or Scandinavian descent.

Eugenic science went hand in hand with Jim Crow laws, official disenfranchisement of blacks, and the entrenchment of formal racial segregation—all Progressive reforms intended to strengthen the social order.⁴⁷ On a single day in March 1924, the Virginia legislature passed two laws that jointly promoted the state's eugenicist and racist agendas. The first, "An Act to provide for the sexual sterilization of inmates of state institutions in certain cases," authorized the forced sterilization of people confined to government asylums because they were deemed to be "feeble-minded." The second half of Virginia's eugenicist scheme was the Racial Integrity Act, which banned interracial marriage. Both focused on controlling reproduction as a means of maintaining the racial order, and both acts would eventually end up in the U.S. Supreme Court.

Six months after the passage of the sterilization statute, the Virginia Colony for Epileptics and Feeble-minded approved the sterilization of a seventeen-year-old girl named Carrie Buck. Buck, the daughter of an allegedly feeble-minded woman, was committed to the colony by her foster parents when she became pregnant as a result of rape by their nephew.⁴⁸ Her court-appointed guardian, in cooperation with the colony's superintendent, appealed the order as a test case challenging the new law. The case made its way to the U.S. Supreme Court. Noting that her sexual depravity was "a typical picture of the low-grade moron," Harry Laughlin testified in a deposition that Buck belonged to the "shiftless, ignorant, and worthless class of anti-social whites of the South." The colony also submitted testimony that her daughter, Vivian, was mentally below average. In its 1927 decision *Buck*

v. Bell, the Supreme Court upheld the statute.⁴⁹ Rejecting arguments that the Virginia sterilization law violated Buck's equal protection and due process rights, Justice Oliver Wendell Holmes explained the state's interest in preemptively sterilizing people with hereditary defects: "It is better for all the world if, instead of waiting to execute degenerate offspring for crime, or let them starve for their imbecility, society can prevent those who are manifestly unfit from continuing their kind." Holmes, himself an ardent eugenicist, gave eugenic theory the imprimatur of constitutional law in his infamous declaration, "Three generations of imbeciles are enough." He imposed his social judgment condemning Carrie Buck for being poor and pregnant in a disguise of scientific authority.

The Racial Integrity Act required the racial classification of every person at birth and made marriage between whites and anyone with a trace of Negro ancestry a crime. It expressed eugenicists' worry that sexual intermingling between blacks and whites would deteriorate the white race. Over half the papers presented at the Second International Congress of Eugenics in 1921 concerned the biological and social harms caused by marriages between people from different racial groups. Walter Ashby Plecker, the Virginia registrar of vital statistics, was charged with maintaining racial integrity by zealously enforcing the antimiscegenation law. In a letter to Laughlin dated June 18, 1931, Plecker expressed his fears about the genetic contamination caused by intermarriage: "I would feel somewhat easier about the matter if I thought that these near-whites would not produce children with negroid characteristics. I have never felt justified in believing that in some instances the children of mulattoes are really white under Mendel's Law."⁵⁰ Plecker selectively rejected scientific tenets that conflicted with his beliefs about racial difference. In 1967, the Virginia statute—a lingering artifact of eugenics—would be struck down by the landmark Supreme Court decision *Loving v. Virginia*.

Laughlin's 1922 survey, *Analysis of America's Melting Pot*, studied the ethnic background of the institutionalized population in order to demonstrate that recent immigrants made up a disproportionate share of the nation's socially degenerate members. Laughlin's conclusion that "the recent immigrants (largely from southern and eastern Europe), as a whole, present a higher percentage of inborn socially inadequate qualities than do the older stocks," helped persuade Congress to pass a 1924 law severely restricting immigration.⁵¹ The Johnson-Reed Act, which set numeric quotas for immigration from nations worldwide, not only introduced the concept of the illegal alien,

who was denied any legal rights in the United States, but also defined this disqualification in racial terms.⁵²

A year after Laughlin's survey was issued, a new edition of the popular book *The Passing of the Great Race*, by New York eugenicist Madison Grant, appeared. Grant, resident anthropologist of the American Museum of Natural History, similarly warned that the Nordic stock in America was threatened by racial intermixture with blacks and inferior immigrant groups, which inevitably produced children of the "lower" type. Portraying inferior stocks as public enemies, he described racial intermarriage as a "social and racial crime of the first magnitude."⁵³ *The Passing of the Great Race* was a bestseller, with four editions and numerous reprints published between 1916 and 1923. The *Saturday Evening Post* praised its reflection of "recent advances in the study of hereditary and other life sciences" and recommended it as a book that "every American should read."⁵⁴ Legislators quoted passages from the book during congressional debates on immigration restrictions, and President Theodore Roosevelt commended it as "the work of an American scholar and gentleman," stating that "all Americans should be immensely grateful to [Grant] for writing it."⁵⁵ Grant was regarded as an important scientist, while his detractors were labeled "Bolsheviks and Jews" who were biased against scholarly investigation of racial difference.

Grant intended readers to learn the central political lesson of eugenic science: that egalitarian social programs are incapable of improving society. As Ellsworth Huntington concluded in his commentary in the *Yale Review*, Grant demonstrated a "lesson of biology . . . that America is seriously endangering her future by making fetishes of equality, democracy, and universal education."⁵⁶ Eugenacists' motto was "Nature knows no equality."⁵⁷ These scientists argued that inequality is natural: the unequal conditions in which people live are dictated by nature and trying to change them is folly. So, too, 1950s segregationists described integration as a political ideology that disrupted the natural separation of races and threatened white citizens' freedoms. "Integration represents darkness, regimentation, totalitarianism, communism and destruction," declared Robert "Tut" Patterson, founder of the Citizens Council Association, an organization of white businessmen dedicated to preserving white supremacy.⁵⁸ Nobel Prize-winning scientist James Watson expressed this sentiment when he told a London newspaper in 2007 that he was "inherently gloomy about the prospect of Africa" because "all our social policies

are based on the fact that their intelligence is the same as ours—whereas all the testing says not really.”⁵⁹

Watson's remarks were considerably less socially acceptable in 2007 than they would have been in 1925. Shortly after his comments were made public, Watson was asked to resign his position as chancellor of Cold Spring Harbor Laboratory—the same laboratory that had once housed the Eugenics Record Office. By the 1940s, eugenics had been discredited both as bad science and as an excuse for racial hatred. American eugenicists who had initially supported the German sterilization law were shamed by its connection to the Nazi Holocaust.⁶⁰ After World War II, a central project of racial scientists became to explain why their investigations of intrinsic racial difference had nothing to do with racism.

The End of Racial Science?

The Carnegie Institute rescinded its support for eugenic studies at Cold Spring Harbor in 1939, and Harry Laughlin resigned as secretary of the Eugenics Record Office in 1941, marking the end of eugenics as an official social program in most of the United States. Beyond U.S. eugenics, the horrific outcome of Nazi racial science also generated a powerful challenge to the belief in the biological basis of race. Renowned scholars such as Columbia anthropologist Franz Boas and his prestigious cast of students, including Margaret Mead, Otto Klineberg, Ruth Benedict, Ashley Montagu, and Melville Herskovits, had demonstrated scientific errors in eugenicists' theories about inherited traits. Raised in a German Jewish home, Boas began teaching at Columbia University in 1896. Within three decades, he and his students had established anthropology as a respected discipline focused on studying culture instead of race.

On July 18, 1950, the *New York Times* ran a front-page story, “No Scientific Basis for Race Bias Found by World Panel of Experts.”⁶¹ That day, the United Nations Educational, Scientific, and Cultural Organization (UNESCO) issued a landmark “Statement on Race,” drafted by an international committee of experts, declaring that race “is not so much a biological phenomenon as a social myth.” The committee emphasized that human populations share most of their traits, meaning that “the likenesses among men are far greater than their differences.” Rejecting the Nazi idea that some races are superior to

others, the UNESCO statement concluded that biological science demonstrated "the unity of mankind."

The UNESCO committee included scholars from multiple disciplines who were well known for their classic books contesting traditional views on race: Columbia University anthropologist Ashley Montagu, author of *Man's Most Dangerous Myth: The Fallacy of Race*; black sociologist E. Franklin Frazier, author of *Black Bourgeoisie* and *The Negro in the United States*; English humanist Aldous Huxley, author of *Brave New World*; Swedish economist Gunnar Myrdal, author of *An American Dilemma: The Negro Problem and Modern Democracy*; and geneticists Theodosius Dobzhansky and Leslie Dunn, whose 1946 book *Heredity, Race and Society* exposed the genetic fallacies underlying racial classifications.⁶² In the 1930s, Dobzhansky and Dunn had joined five other Columbia professors to found the University Federation of Democracy and Intellectual Freedom, dedicated to ridding science of Nazi ideas about race.

The first UNESCO statement was met with a firestorm of criticism from physical anthropologists and geneticists who accused the drafters of allowing their political agenda to distort their scientific claims about race.⁶³ The following year, a modified UNESCO committee—this time staffed entirely by physical anthropologists and geneticists—issued a revised "Statement on the Nature of Race and Race Differences." Although the second committee unanimously rejected "the racialist position regarding purity of the races and the hierarchy of inferior and superior races to which this leads," it also made clear that scientists could continue to study innate differences between races without being racists. While the original committee insisted that there were no racial differences in mental traits, the 1951 statement conceded that "it is possible, though not proved, that some types of innate capacity for intellectual and emotional response are commoner in one human group than another." In addition, the 1951 statement repudiated the link the first committee made between biological theories of race and social inequality: "We wish to emphasize that equality of opportunity and equality in law in no way depend, as ethical principles, upon the assertion that human beings are in fact equal in endowment." This distinction enables scientists to research inherent racial inequalities while avowing allegiance to the legal and moral principles of human equality. Both UNESCO statements disclaimed the practice of ranking races. But neither document abandoned the concept of biological race altogether. Instead, both statements took issue with race as

an *ideological* doctrine of inferiority that was responsible for deadly social conflicts. They distinguished the Nazis' ideological use of race for repressive purposes from the scientific use of race for legitimate research.⁶⁴

At the same time UNESCO issued its statements on race, the NAACP was waging a legal campaign to overturn segregationist state policies. The federal government, now engaged in international competition with the Soviet Union over the spread of communism, felt pressure to reduce blatant racial discrimination in order to gain allegiance from developing nations breaking free from colonial rulers.⁶⁵ In the 1954 landmark case *Brown v. Board of Education*, a unanimous U.S. Supreme Court held that public school segregation violated the Constitution because "separate educational facilities are inherently unequal." In rejecting the long-held separate-but-equal doctrine, the Court relied heavily on empirical data collected by the NAACP's expert, Kenneth Clark, showing that segregation caused psychological harm to black children. Clark's heartbreaking experiments that showed black children a white doll and a black doll and asked them, "Which is the nice doll?" no doubt ranks with Newton's apple as one of the best-known scientific studies.

Clark's use of science in the service of racial equality and the gains in black freedom of the 1960s were met by a political backlash that claimed scientific legitimacy. Carleton Putnam, longtime chairman of the board of Delta Airlines, published *Race and Reason: A Yankee View* in 1961, opposing the *Brown* decision on both anthropological and ideological grounds, with a fair share of hysteria about the debilitating effects on white civilization of mixing with inferior Negro genes. Endorsed by a lead review in the Books for Lawyers section of the American Bar Association Journal, *Race and Reason* kept open the debate about the scientific basis for integration accepted by the Supreme Court.⁶⁶ The following year, *The Origin of Races*, by Carleton Coon, a University of Pennsylvania professor and the president of the American Association of Physical Anthropologists, claimed once more to provide definitive proof that human races had separate origins. Coon identified five major races in hominid fossils and, based on cranial capacity, theorized that each had evolved toward modern *Homo sapiens* separately and at different rates—Caucasoids (Europeans) and Mongoloids (Asians) advanced the fastest, while Congoids (Africans), Capoids (the Bushmen of South Africa), and Australoids (Australian aborigines and nearby island populations) fell behind. "The length of time a subspecies has been in the sapiens state," Coon

postulated, determined "the levels of civilization attained by some of its populations."⁶⁷ (With today's more advanced knowledge of human ancestry, this theory would position Africans as the superior subspecies.)

Coon fought an academic battle opposing the revolution in anthropology instigated by the likes of Boas and Montagu. His theory on the origin of races was circulated widely by the media and provided fodder for Putnam and other segregationists. Nonetheless, when the physical anthropologists called a special meeting at their convention in 1961 to censure Putnam's book, Coon resigned his post as president.

Later, Berkeley psychologist Arthur Jensen, Harvard psychologist Richard Herrnstein, and Nobel laureate William Shockley, a Stanford physicist, argued that since genes determined intelligence and intelligence determined social achievement, racial inequality resulted from blacks' cognitive inferiority. The combination of black people's lower IQ scores and higher birth rates, they warned, rendered public programs not only futile for improving blacks' socioeconomic status but a threat to the nation's welfare. "Is there a danger that current welfare policies, unaided by eugenical foresight, could lead to the genetic enslavement of a substantial segment of our total population?" Jensen asked in his 1969 *Harvard Educational Review* article, "How Much Can We Boost IQ and Scholastic Achievement?" Twenty-five years later, Herrnstein and Charles Murray of the American Enterprise Institute rehashed the claim that social disparities stem from the higher fertility rates of genetically less intelligent groups in their controversial bestseller *The Bell Curve*.

Despite some scientists' use of genetic science to promote segregationist ideals, the horrors of Nazi science, the civil rights movement, and the emerging science of population genetics all raised hopes for a scientific consensus rejecting the typological meaning of race. In 1964, *The Concept of Race*, edited by Ashley Montagu, gave a platform for ten of the nation's preeminent biologists and anthropologists to propose replacing scientifically useless racial taxonomies with a more accurate account of human variation. One of the contributions, "On the Nonexistence of Human Races," by University of Michigan anthropologist Frank B. Livingstone, optimistically predicted:

Just as Galileo's measurements and experiments paved the way for Newton's laws of motion, which totally replaced the Aristotelian laws of motion concerned as they were with describing the nature of bodies and their "essences," our newer genetic knowledge and the measure-

ment of gene frequencies will replace the studies on the nature or essence of race and the mathematical theory of population genetics will replace the Linnaean system of nomenclature.⁶⁸

Although Livingstone adhered to the nonexistence of human races, many biologists and anthropologists were interested in using population genetics to study race, not invalidate it. These scientists "merely believed that race needed to be reformed and refined in the wake of abuses by the eugenicists, white supremacists, and Nazis," observes sociologist Jenny Reardon.⁶⁹ By demonstrating the utility of population analysis to understanding how races were formed, leading evolutionary biologists convinced their peers to accept population genetics as the discipline's cutting-edge method. At a 1950 gathering of 129 scientists in Cold Spring Harbor, Joseph Birdsall, a physical anthropologist at UCLA, argued that "problems of human evolution and racial differentiation are essentially population problems. And their solutions will be advanced by borrowing techniques of analysis from the vigorous field of population genetics."⁷⁰ A growing view within biology, anthropology, and genetics was that the old racial categories derived from externally visible traits could be upgraded with scientific research on genetic differences that lay beneath the skin.

For many scientists, then, the emerging civil rights ethos did not make racial science untenable. Rather, it made it imperative for scientists to detach their study of biological race from societal racism. It was not the blatantly racist theorizing of Carleton Coon and his ilk that left its mark on today's racial science. Scientists who openly spew racial defamation risk being swiftly ushered out of the limelight, like James Watson. The imaginary wall more liberal-minded scientists erected, separating racial science from racial politics, became critical to the scientific validation of race in a post-civil rights culture that espouses racial equality.

Nevertheless, it is important to note that eugenics never really went away. While mainstream geneticists increasingly condemned what they referred to as "eugenics' excesses," North Carolina's eugenic sterilization program actually *expanded* after World War II and continued until 1974.⁷¹ An investigation by the *Winston-Salem Journal* in the 1990s uncovered records documenting decisions by the Eugenics Board of North Carolina, a panel of five bureaucrats who enforced the state's 1929 eugenics law (revised in 1933) authorizing compulsory sterilization for epilepsy, disability, and feeble-mindedness. The

program gained momentum when the North Carolina Human Betterment League, formed in 1947 by hosiery magnate James G. Hanes and others in Winston-Salem's elite, joined with Dr. Clarence Gamble, Bostonian heir to the Proctor & Gamble fortune, and local members of the medical community to launch a massive publicity campaign promoting sterilization to improve the state's mental fitness.

Scientists at Wake Forest University School of Medicine also played a key role. Dr. C. Nash Herndon, chair of the department of medical genetics at the university's medical school, helped to promote the state's involuntary sterilization program by serving as president of the Human Betterment League and issuing academic reports advocating eugenics. He also conducted his own eugenic studies with funding from Wickliffe Draper, a wealthy segregationist. Draper was so committed to the merger of Jim Crow and eugenics that he traveled to Germany in 1935 to attend a Nazi eugenics conference. After supporting Herndon's research with two grants in the 1950s, Draper donated \$100,000 to the school, solicited by the medical school dean, on the condition that the school promised not to advocate interracial marriage and consider teaching students about therapeutic sterilization. Other faculty members performed involuntary sterilizations on patients at state hospitals, with and without authorization from the Eugenics Board.⁷²

In all, the program counted close to eight thousand victims. During the eugenics era, a majority of those sterilized were white. But in the program's final decade, the target shifted to poor black women. Social workers supervising welfare caseloads were empowered to petition the Eugenics Board for orders sterilizing their clients. The board approved 95 percent of the petitions it received, acting largely out of social prejudice against the women it ordered to be sterilized. In 1965, a social worker told Nial Cox, a pregnant teenager living at home, that her family would lose government aid unless she was sterilized. A doctor performed the surgery because she was black, on welfare, and had had a baby out of wedlock. The program ordered sterilizations of two thousand children, including a ten-year-old boy who was castrated.

Governor Mike Easley and Dr. William Applegate, dean of Wake Forest's medical school, apologized after the *Journal's* revelations in 2003. But eugenicist philosophy continues to make its way into state and federal reproductive, welfare, and immigration policies.⁷³ Republican congressman Mark

Kirk of Illinois (elected in 2010 to fill the Senate seat vacated by Barack Obama) stated on the House floor during deliberations over a 2007 foreign family-planning provision that slowing the rate of growth of Mexico's population would "reduce the long-term illegal immigration pressure on America's borders."⁷⁴ Like eugenicists of old, Kirk argued for fixing a social problem by reducing the fertility rates of people believed to embody it. In reality, birth rates in Mexico have dropped over the last twenty-five years to 2.5 children per couple, very close to the 2.1 birth rate in the United States. But what really matters was the lawmaker's message: America can solve its immigration crisis by decreasing births of undocumented immigrants.

The Final Chapter?

The Human Genome Project was supposed to finally put an end to the biological definition of race. The idea of creating a map locating all the genes in the human body began circulating as early as 1985. By October 1990, the Human Genome Project was official. The National Institutes of Health (NIH) and the Department of Energy authorized \$3 billion to be spent over fifteen years on an international venture involving Great Britain, France, Japan, China, and Germany to sequence the entire human genome. The U.S. government's research was headed by a fitting national figure—the ubiquitous James Watson, the geneticist who won a Nobel Prize for discovering DNA's double helix structure, who was then serving as director of the National Human Genome Research Institute. When Watson abruptly resigned his post in 1993, Francis Collins, an accomplished physician and molecular geneticist, accepted President Bill Clinton's invitation to assume leadership of the research institute and the genome project. The genome initiative became a race to the finish in 1998 when Craig Venter, who had defected from a government post to become chief scientist at the private firm Celera Genomics, threw down the gauntlet by promising to complete the genome map and release it to the public in three years.

To understand what it means to map the entire human genome, it is helpful to start with the biological unit being mapped: our genes. Genes are conceived as segments of a six-foot-long molecule called deoxyribonucleic acid, or DNA, that encodes instructions for making proteins. Each nucleus of the trillions of cells in the human body contains two copies of twenty-three

DNA strands, one from each parent, composing forty-six chromosomes. Although each cell has a complete set of DNA, only the portions that are important to the cell's particular function are activated.

How does one gene differ from another? DNA is composed of four kinds of units called nucleotides—adenine, cytosine, guanine, and thymine (A, C, G, and T)—that are strung together like beads on a necklace in different combinations. The sequence of these nucleotides functions like a code using four different letters that are arranged in an infinite variety of spellings. The cell uses part of the DNA code to help determine what sequence of amino acids to build into a protein and another part to help determine when and where to turn on or off a protein. Each person's genome—the complete set of DNA—is distinguished from someone else's by the precise chemical composition of the DNA making up their genes. The Human Genome Project identified the 20,000 to 25,000 genes in human DNA, sequenced the 3 billion base pairs that make up human DNA, and stored all this genetic information in databases.

On June 26, 2000, President Bill Clinton, flanked by Francis Collins and Craig Venter, marched into the East Room of the White House to unveil a working draft of the genomic survey. "Without a doubt, this is the most important, most wondrous map ever produced by humankind," Clinton proclaimed. The genome project was cheered as the Holy Grail that would disclose all the secrets of human life. It was supposed to reveal what it means to be human. Perhaps the most pressing question to be answered was, Is race real? During the 1990s, debates on race had once again permeated scientific circles. Every major scientific journal featured research studies, special issues, editorials, and commentaries on the scientific validity of race. What would mapping every human gene tell us about the biological basis for racial categories? Would scientists discover that race is written in our DNA?

That all three of the chief figures at the White House ceremony pronounced on the issue of race shows the intensity of the angst surrounding these questions. Their conclusion was unanimous: the Human Genome Project revealed that the human species cannot be divided into biological races. President Clinton famously announced, "I believe one of the great truths to emerge from this triumphant expedition inside the human genome is that in genetic terms, all human beings, regardless of race, are more than 99.9 percent the same."⁷⁵ Collins ended his remarks by saying, "I'm happy that today the only race that we are talking about is the human race." Venter reported

that Celera Genomics had sequenced the genomes of three women and two men who identified as Hispanic, Asian, Caucasian, and African American and found that "there's no way to tell one ethnicity from another." He bluntly declared, "Race has no genetic or scientific basis." The Human Genome Project confirmed what many leading biologists and anthropologists had concluded several decades earlier: race is a social and not a biological category. The project validated a shared humanity that many people had long known without the need for genetic evidence.

Clinton's announcement that human beings, regardless of race, are 99.9 percent genetically identical suggests an obvious question. Can't the 0.1 percent of genetic makeup that people do not share encompass important racial differences? "After all, dogs and wolves are nearly identical at the genetic level, but the difference between a dog and a wolf is huge," a man pointed out at a conference I attended not long afterward.

This 99.9 percent sound bite, commonly deployed to debunk the biological meaning of race, is not enough to prove that race is not biological. Human beings share a majority of their estimated 22,000 genes with other mammals. As fellow primates, chimpanzees are extremely close to humans: we share 98.7 percent of our genes. Humans are also 90 percent genetically the same as mice. So bearing genetic similarity does not mean there are no important differences. With more than 3 billion nucleotide pairs in the human genome, even a 0.1 percent difference can be consequential. Still, as species go, *Homo sapiens* stand out as remarkably homogeneous. There is less genetic variation in the entire human race than in a typical wild population of chimpanzees. This means that what matters to understanding human genetic variation is not only the amount of genetic difference but what the differences are and how they are expressed and distributed.

While it is true that the 0.1 percent of human genetic difference is meaningful, it does not mean that human genetic difference is organized by race. The genetic variation found in the human species is not grouped in discrete, genetically distinct units scientists can identify as races. To the contrary, human genetic diversity occurs in a continuum that cannot be partitioned by clear boundaries and that crosses what are commonly considered racial lines. Consider how, in the United States, people with any amount of African ancestry are grouped together in one race. Yet the greatest amount of genetic diversity in the world exists in sub-Saharan Africa. *Homo sapiens* originated in Africa and remained there for almost 200,000 years before

spreading relatively recently throughout the rest of the globe, about 70,000 or 80,000 years ago. African populations vary the most because most of human genetic diversity evolved in Africa, and groups living there had more time to accumulate genetic differences. The people who migrated from Africa and dispersed throughout the globe carried in their genomes only a portion of variants found in the ancestral inhabitants. "From a genetic perspective," writes anthropologist Deborah Bolnick, "non-Africans are essentially a subset of Africans."⁷⁶

In fact, the entire range of human variation for some genetic traits can be found on the African continent.⁷⁷ A person from the Congo, a person from South Africa, and a person from Ethiopia are more genetically different from each other than from a person from France.⁷⁸ This seems astonishing because we are so used to focusing on a tiny set of physical features, especially skin color, to assign people to racial categories. It turns out that the genes contributing to these phenotypic differences represent a minute and relatively insignificant fraction of our genotypes and do not reflect the total picture of genetic variation among groups.⁷⁹ What's more, these phenotypic differences do not even fall neatly into the categories known as races. Rather, the physical features are "discordant" among groups—they are assorted randomly and do not come assembled in racial packages. "Sub-Saharan Africa is home to both the tallest (Maasai) and the shortest (pygmies) people, and dark skin is found in all equatorial populations, not just in the 'Black race' as defined in the United States," writes Richard S. Cooper, a physician epidemiologist at Loyola University.⁸⁰ And most genetic variation is found *within* any human population.⁸¹

How can it be that there is more genetic difference among people within each race than between races? Imagine a white congregation worshipping one Sunday morning at a Lutheran church while a black congregation worships at a Baptist church across town. Our racial habits might lead us at first to view everyone within each church as alike and the two congregations as very different. But think more carefully: each and every person at the Lutheran service is unique and genetically different from every other congregant, especially if they come from different families. Any two unrelated people in the pews have millions of genetic differences, contributing to (though not determining) their looks, personalities, and health.⁸² The same is true for every single person at the Baptist church. And those millions of genetic differences that set each parishioner apart as a unique human being, whether

black or white, are greater than the differences that separate the black and white congregations. The more significant differences between the two churches—in overall health and wealth, in the neighborhood where each is located, in the songs sung during service—stem from social, not biological, causes.

By the late 1990s, many American biologists, led by Harvard evolutionary geneticist Richard Lewontin, agreed that “no justification can be offered” for continuing the biological concept of race.⁸³ The American Anthropological Association endorsed this view in a 1997 statement: “genetic data also show that, no matter how racial groups are defined, two people from the same racial group are about as different from each other as two people from any two different racial groups.”⁸⁴ But this pronouncement came under attack when new genomic technologies permitted analysis of gene clustering on a global scale. In 2003, British statistician and evolutionary biologist A.W.F. Edwards faulted Lewontin for basing his conclusions on simple comparisons of individual genes rather than a more complex structure of correlated gene frequencies. While Lewontin compared a relatively small number of specific points on the DNA molecule, or loci, in different populations, Edwards recommended looking at small frequency differences across many loci to detect population structure. Lewontin, Edwards charged, had mounted “an unjustified assault on human classification, which he deplored for social reasons.”⁸⁵

Edwards was proposing that geneticists should examine the question of human genetic difference at the level of gene clusters instead of in terms of individual genes. But Edwards did not refute Lewontin’s main claim: that there is more genetic variation within populations than between them, especially when it comes to races. Lewontin did not ignore biology to support his social ideology; he was not making an ideological claim. To the contrary, he argued that there is no biological support for the ideological project of racial classification.

Another reason why human genetic difference defies racial classification is that there are no genetic boundary lines that mark off a handful of large, discrete groups. The genetic differences that exist among populations are characterized by gradual changes across geographic regions, not sharp, categorical distinctions.⁸⁶ Groups of people across the globe have varying frequencies of polymorphic genes, which are genes with any of several differing nucleotide sequences. Molecular biologists can use the frequency of alternate alleles, or versions of genes, to trace the geographic ancestry of

populations. But they can't draw a line where one set of gene frequencies stops and another begins. Furthermore, these differences are a matter of frequencies of certain gene mutations, not the absence or presence of genotypes.⁸⁷ There is no such thing as a set of genes that belongs exclusively to one group and not another. The *clinal*, or gradually changing, nature of geographical genetic difference is complicated further by the migration and mixing that human groups have engaged in since prehistoric times. Race collapses infinite diversity into a few discrete categories that in reality cannot be demarcated genetically.

Did the portrait of genetic unity and diversity unveiled by the Human Genome Project finally put an end to the biological concept of race once and for all? Would genomic science usher in an understanding of human variation devoid of antiquated racial classifications? The story I tell next reveals just the opposite: scientists are using advanced genomic theories and technologies to create a new racial science that claims to divide the human species into natural groups without the taint of racism.