

2010

Racism, Eugenics, and Ernst Mayr's Account of Species

Ladelle McWhorter

Follow this and additional works at: <http://scholarship.richmond.edu/philosophy-faculty-publications>

 Part of the [Biology Commons](#), [Race and Ethnicity Commons](#), and the [Race, Ethnicity and Post-Colonial Studies Commons](#)

This is a pre-publication author manuscript of the final, published article.

Recommended Citation

McWhorter, Ladelle, "Racism, Eugenics, and Ernst Mayr's Account of Species" (2010). *Philosophy Faculty Publications*. 32.
<http://scholarship.richmond.edu/philosophy-faculty-publications/32>

This Post-print Article is brought to you for free and open access by the Philosophy at UR Scholarship Repository. It has been accepted for inclusion in Philosophy Faculty Publications by an authorized administrator of UR Scholarship Repository. For more information, please contact scholarshiprepository@richmond.edu.

Racism, Eugenics, and Ernst Mayr's Account of Species

Ladelle McWhorter

SPEP 2009, Arlington Key Bridge Marriott, Virginia

At his death at age one hundred in 2005, Ernst Mayr was hailed as the greatest evolutionary biologist of the twentieth century.ⁱ His definition of *species*, published in 1942 in *Systematics and the Origin of Species* and known as the “biological species concept,” is familiar to every tenth grader: “Species are groups of interbreeding natural populations that are reproductively isolated from other such groups.”ⁱⁱ That definition, together with Mayr's and Theodosius Dobzhansky's theory of speciation, enabled the integration of modern genetics and Darwinian evolutionary theory. In this paper I will argue that it imported racism into the heart of modern genetics as well.

In a classic 1963 essay, Mayr traces three meanings of the word *species*.ⁱⁱⁱ First is the Platonic: Individuals are instantiations of an unchanging type; species are durable types and the proper object of natural philosophy. Linnaeus—the eighteenth century Swedish naturalist who developed the system of classification of beings into genera and species still used in modified form today—believed in species in this Platonic sense and devised his taxonomy to delineate them. A second meaning of the term *species* was put forth by the nominalist Occam, who claimed that the names of taxa, like all universal or class concepts, are abstractions from experience of a number of seemingly similar individuals. Neither of these concepts of species is satisfactory, Mayr claims. On the one hand, the real world contains something more than unrelated particulars; all horses really are related in some way that accounts for their anatomical and functional similarities. But, on

the other hand, empirical scientists have little use for transcendent categories like Horse-ness. Modern biology required a better definition.

Mayr credits the eighteenth century naturalist Comte de Buffon with the idea that species can be distinguished consistently using empirical criteria. Buffon held that two classes of entity can be considered distinct species if cross-breeding is either: (1) impossible, (2) sterile, or (3) productive of sterile offspring. Morphological dissimilarity renders cross-breeding impossible in most cases; the issue of species difference only arose in classical natural history where morphological similarity made sexual contact possible. Buffon's criterion dealt with just such cases, erecting conceptual boundaries that were empirically grounded. Horses and asses are distinct species despite morphological similarities, Buffon held, because cross-breeding, where fertile, results consistently in sterile hybrids, namely, mules.

Mayr finds Buffon's account of species boundaries more than merely practical and empirically warranted; he finds it positively prescient, because it points to what he and his contemporary geneticists believed was a crucial evolutionary fact: Species comprise distinct gene pools; species are genetic populations. Horses and asses are not one species, because while there may be some genetic mixing in a few individuals (mules), across the two populations there is no intergenerational gene flow. Between species there are what Mayr and Dobzhansky called "reproductive isolating mechanisms," physiological or behavioral barriers to genetic mixing including such mechanisms as different estrus or hibernation or migration cycles, different courtship behaviors or mating calls, or different physical bases for sexual selection. In evolving species these mechanisms gradually stop gene flow from sibling populations and give subspecies a chance to become "good

species” (Mayr’s term, harking back to Darwin’s use of the phrase), that is, to establish separate gene pools. Hence, descriptions of species taxa entail descriptions of their reproductive isolating mechanisms.

Although Buffon’s assertion that species identification is a matter of interfertility won general acceptance by the nineteenth century, it did not settle the questions of either the essential nature or the origin of species. Like Occam, Buffon was a nominalist; in nature, he believed, there were only individuals, not classes.^{iv} And the question of origins was not one that greatly exercised most eighteenth century naturalists, even those who believed taxa were real entities, because most assumed divine creation and fixity.^v In the nineteenth century, however, as theology lost ground in science and the impact of the new discipline of geology began to be felt, the questions of the nature and origin of species became increasingly urgent.

Nowhere was that urgency felt more intensely than in the US with its “peculiar institution” of chattel slavery. The abolition movement became a political force by 1832, putting slavery’s proponents on the defensive as never before. For new rationales, they turned to science. Negroes were simply not fellow human beings, they argued, for Negroes and Caucasians were in fact distinct species. Whether that argument was plausible turned, in part, on the definition of *species*.

In 1843, Josiah Nott argued that Mulattoes were sterile hybrids like mules. Having worked for fifteen years as a physician to many Negroes (he served the wealthy families of Mobile, so he also treated their slaves), Nott claimed to have observed not only morphological differences between blacks and whites but also peculiarities in Mulattoes that rendered them less healthy, shorter-lived, and less fertile than Negroes and

Caucasians. In particular, he observed, mulatto women are “bad breeders and bad nurses—many of them do not conceive at all—most are subject to abortions, and a large portion of their children die at an early age.”^{vi} Each generation of mulattos is weaker and less able to procreate until, by the fourth, the line dies out. By thus bending Buffon’s criterion—progressively lessened fecundity rather than absolute sterility in the offspring—and by offering only anecdotal evidence, Nott made it appear that racial crosses met the definition of hybrid and, therefore, that Negroes and Caucasians could be considered different species. On the strength of this altered definition of *species*, between 1846 and 1850 most American scientists converted to polygeny. Thus was the concept *species* refashioned to serve as a tool for perpetuating racial oppression.

But in the 1860s, the theory of natural selection that Darwin propounded in *Origin of the Species* reopened the definition debate.^{vii} Some maintained—as did Darwin himself^{viii}—that the concept was meaningless. There are neither eternally fixed types nor distinct lines of descent. All life, no matter how morphologically or functionally distinct now, conceivably could be traced to a single germ line. Still, biologists needed some way to mark obvious differences and similarities between synchronically existing organisms, so the term *species* remained salient. The question became: How much difference (and of what sort) was sufficient to call a group of organisms a species distinct to others, including its own ancestors? Despite the title of his book, Ernst Mayr points out, Darwin never gave an account of speciation.^{ix} He argued that species must change, but he did not say when change amounts to the birth of a new species. In short, he never answered the question of the origin of species.

Regardless, Darwin's theory quickly took hold, and its consonance with prevailing notions of technological, intellectual, and moral progress frequently resulted in conflation of evolutionary modification with evolutionary advancement. Darwin himself sometimes spoke of adaptation as improvement, as if species were on a path to perfection, as if there were an ultimate standard against which their present state could be evaluated.

Natural selection, adherents agreed, was responsible for some amazing feats. Not only had it produced millions of organisms remarkable for their physiological adaptations to their environment, but it had even produced one animal able to vary its environment by conscious decision. Natural selection had produced the rational animal *Homo sapiens*, and *Homo sapiens* had produced "civilization." Civilization was a biological developmental outcome, a species character (to use the language of natural history).

Of course, enthusiasts acknowledged, this process was incomplete. Many members of the species were inadequately adapted to a civilized environment. Some groups—Africans, Pacific Islanders, indigenous peoples of North and South America—had never evolved sufficiently to produce a civilization, European and North American theorists believed, so it was unlikely they could adapt to its demands. But even among the "higher races," there were individuals who could not adapt—criminals, idiots, the mad, the degenerate, the chronically ill. Like the "lower races," these individuals were weaklings that natural selection must eliminate.

If allowed to. As the nineteenth century drew to a close and the new century commenced, fear began to settle over the Caucasian elite. Natural selection had brought the human species far, but was humanity *still* evolving, or was the very civilization that evolution had produced circumventing the evolutionary process? After all, technology

made it possible to save lives, allowing people with inferior traits to mature. And modern morality, expressed in charity toward the weak, enabled the defective to procreate. Humanity's evolutionary *avant garde* might find itself swamped by the rising tide of inferiority that its own intelligence and generosity had made possible.

One theorist who warned of these dire possibilities was Madison Grant. Civilization, Grant insisted in 1916, had evolved only under the harshest of environmental conditions where people were forced to innovate, reason, cooperate, and plan ahead or die. "The climatic conditions must have been such as to impose a rigid elimination of defectives through the agency of hard winters and the necessity of industry and foresight in providing the year's food clothing and shelter during the short summer.... Such demands on energy, if long continued, would produce a strong, virile, and self-contained race...."^x In Paleolithic times these conditions obtained, Grant believed, along the Baltic Sea. The race that evolved there gradually migrated northwestward to become the Nordics or Teutons. As they advanced in technological competence and overwhelmed less intelligent and less fit races, they spread farther, crossing the North Sea to populate the British Isles—in the process becoming the Anglo-Saxons—and then eventually crossing the Atlantic to become the Anglo-Americans. The evolutionary *avant garde* of the twentieth century were, therefore, the New England blue-bloodlines to which Grant himself belonged.

And the rising tide of inferiority was everybody else. Civilization could only be saved if that tide was stemmed, and that would require virile Anglo-Saxon resolve, for "[t]he laws of nature require the obliteration of the unfit...."^{xi} Aid to the poor, weak, and disabled was out of the question. Grant advocated sterilization for the criminal, diseased,

insane, and for those he termed “worthless race types,” meaning Jews, blacks, and indigenous peoples. Negroes were especially objectionable. “Negroes have demonstrated throughout recorded time that they are a stationary species, and that they do not possess the potential of progress or initiative from within.”^{xii} By whatever means necessary, they should be kept apart from Nordics to prevent corruption of Nordic bloodlines. Further, immigration should be restricted to keep out Eastern and Southern Europeans—members of the Mediterranean and Alpine races as distinct to the Nordic.^{xiii} Grant’s friend Lothrop Stoddard wholeheartedly agreed. “The admission of aliens should be regarded just as solemnly as the begetting of children, for the racial effect is essentially the same,” he wrote in 1920. “Immigration is thus, from the racial standpoint, a form of procreation, and like the more immediate form of procreation it may be either the greatest blessing or the greatest curse.”^{xiv}

In 1917, these influential men and their allies won passage of a new immigration law instituting literacy tests, caps on total numbers of immigrants, national quotas, and denial of entry in cases of penury, feeble-mindedness, moral degeneracy, and “constitutional psychopathy”—non-delusional insanity—the last effectively screening out anyone who did not conform to prevailing gender norms or admitted to homosexual desire. Further, any immigrant who, during the first five years of residence in the US, committed a crime or showed signs of any allegedly hereditary physical or mental defect could be deported. In 1924 further restrictions limited the annual number of immigrants to 150,000, apportioned by percentage of resident immigrants from each nation as counted in the 1890 census—pointedly before the massive influx of from Poland, Hungary, Russia, and Italy. The Immigration Restriction Act of 1924 made the US the most exclusive country

in the world. Its provisions, developed in the name of racial purity and Nordic civilization, remained in effect well past the mid-twentieth century.

The Anglo-Saxon race bore the genes that produced civilization. It could not allow those genes to be swamped by what Stoddard called the “rising tide of color” from outside the country, nor by degenerate, feebleminded defectives in inner cities and rural shanties. Just as the tide must be forced back with the dikes of immigration restriction, it must be stemmed from within by a set of laws and policies designed to segregate the unfit and, where necessary, insure their sterility. The dikes of racial segregation had to be strengthened. Likewise, the dikes of intellectual and moral segregation had to be erected and maintained.

In the 1910s state governments undertook population surveys to determine the extent of the “menace of the feebleminded” and made provisions to confine “it” in sex-segregated institutions and farm colonies. Hundreds of thousands were locked up for life in this effort to offset a perceived threat to natural selection and the evolution of the human species. But still the tides of inferiority rose. If civilization was to survive and advance, those most evolved must turn their technologies to the task of eliminating once and for all the defective genes that threatened to swamp their own. Eugenically alert physicians had been quietly sterilizing defectives in prisons, hospitals, and asylums since the 1880s, a practice that grew with the introduction of vasectomy and salpingectomy in the 1890s. In 1927 in *Buck v. Bell*, the US Supreme Court endorsed these eugenic measures. By 1972, the number of Americans legally sterilized without their consent would reach 65,000.^{xv} Thus were the enemies of the species eliminated and *Homo sapiens*’ evolutionary advance safeguarded and insured.

The Nazis took lessons from American eugenicists, basing their 1934 sterilization law on Harry Laughlin's 1922 Model Eugenic Sterilization Law.^{xvi} By 1937, they had sterilized 250,000 Germans and won the admiration of their American tutors. Soon thereafter they dispensed with the generational delay and began to eliminate defectives outright through eugenic "euthanasia."

Although no North American government ever enacted a policy of eugenic killing, the specter of "euthanasia" always haunted the eugenics movement. Given the assumptions animating it, adherents could not help but consider the possibility. In an address to the Medical Association of the State of Alabama in 1936, Dr. William Partlow reminded his audience that, "Until medical science improved social, public health and sanitary conditions, nature's survival of the fittest defended the human race against the dangers of degeneracy. Now that under the present order of a humane world, the weak are preserved as well as the strong, if we are to continue as a virile, upstanding race in body and mind, eugenics demands its share of study and attention or euthanasia may become a necessity."^{xvii}

But as Nazism became more widely understood in the US such measures lost appeal. The eugenics movement lowered its profile and changed its tactics. Frederick Osborn, a driving force in the transformation of eugenics through mid-century, warned eugenicists against speaking of species improvement in racial terms. "It would be unwise for eugenists to impute superiorities or inferiorities of a biological nature to social classes, to regional groups, or to races as a whole," he wrote in 1937.

Scientists are not at all sure that any races or social classes in this country are above or below others in biological capacity for developing socially

valuable qualities. But they are sure that even if there are differences between the average biological capacities of such groups, they are small compared to the much greater differences existing between individuals. Eugenics should therefore operate on a basis of individual selection. A program of selection of the best individuals and the best family stock, from every race and socio-economic class, will have wide scientific support.^{xviii}

Osborn enlarged upon this position in his 1940 book *Preface to Eugenics*, maintaining that eugenics is only viable in a democracy where individuals are respected.

The eugenics ideal recognizes that each human being is by his heredity unique. This uniqueness, which pervades every cell in his body, justifies respect for the individual. . . . Eugenics, in asserting the uniqueness of the individual, supplements the American ideal of respect for the individual. Eugenics in a democracy seeks not to breed men to a single type, but to raise the average level of human variations, reducing variations tending toward poor health, low intelligence, and anti-social character, and increasing variations at the highest levels of activity.^{xix}

The Nazis sought to breed a single type of person, conformity to one phenotypic ideal. But, ultimately, breeding programs of that sort are dysgenic, because they do not select for the variations that will really enable the human species to advance—strength, intelligence, and socially valuable conduct. We must renounce naïve, phenotypic racism, Osborn argued, concentrating instead on eliminating inferior genotypes and cultivating superior genotypes wherever they are found.^{xx}

It is commonly believed that eugenics and the dream of a purified master race died with Hitler; modern genetics stepped in, corrected the scientific misperceptions that had powered the race purification movement at the turn of the century, and by the 1930s thoroughly discredited eugenics as a pseudo-science. But the historical facts are less reassuring. The science Frederick Osborn appealed to in 1937 was not eugenics. It was genetics, the science of men like Thomas Hunt Morgan, Theodosius Dobzhansky, and Ernst Mayr. And when he claimed scientific support for his eugenic position, he knew what he was talking about. The project of eliminating defect through managed breeding was embraced by many geneticists, even while race-based discrimination was opposed. The preface to Osborn's 1968 book *The Future of Human Heredity* was written by Theodosius Dobzhansky, one of the greatest geneticists of the twentieth century. Dobzhansky acknowledged that "zealous proponents" had hindered the acceptance of eugenics as a practice. "And yet," he maintained, "eugenics has a sound core. The real problem which mankind will not be able to evade indefinitely is where the evolutionary process is taking man, and where man himself wishes to go. Mr. Osborn has for several decades been the clear-sighted leader of the eugenical movement in America, who strove to make the substance of eugenics scientific and its name respectable again."^{xxi} Geneticists of the highest rank did not reject eugenics after World War II. Seemingly purged of racism, eugenics was not only accepted but championed.

But how successful was that purge? Recall Mayr: "Species are groups of interbreeding natural populations that are reproductively isolated from other such groups."^{xxii} A species consists of a collection of individuals capable of fertile sexual contact with one another, a population with a single "gene pool." Combinations of DNA as they exist in individuals

can be reshuffled through sexual reproduction to create a new population of individuals, the next generation, but the gene pool itself remains intact.^{xxiii} Evolution affects not the individuals but the gene pool through mutation and genetic drift; natural selection acts on the pool, altering it over time. But as long as it remains isolated from other gene pools, successive populations are one distinct species.

It may be hard to see politics in Mayr's populations and pools. But consider his discussion of speciation. In order to be a "good species," a gene pool must dam itself off from alien flows. A species-in-the-making (a variety in process of becoming a "good species") must evolve "reproductive isolating mechanisms"^{xxiv}; it must erect barriers to fertile sexual contact with neighboring varieties.

There are empirical difficulties with this account of species. It renders asexual organisms non-specific. It may count morphologically distinct groups—such as red and black oaks—as one species, thus failing to square with taxonomic speciation.^{xxv} It makes identification of extinct species difficult by undermining morphology as a reliable indicator of speciation. But one of the most serious criticisms was raised by Hugh Paterson in 1976.^{xxvi} Everyone agrees, Paterson says, that speciation can occur when one species is split into two geographically separated areas for a long time. Different environments select for different alleles until the two groups are genetically and morphologically distinct. This is speciation in allopatry. But can speciation occur in sympatry—can one species become two distinct species within the same environment? Yes, say Dobzhansky and Mayr, because a subset of the species can evolve reproductive isolating mechanisms that dam off the gene flow from the parent species. Once these are in place, we have two gene pools and so two species. No, says Paterson, because the

processes of natural selection would never favor any trait that makes most offspring of the developing subgroup effectively sterile. Reproductive isolating mechanisms simply cannot evolve, he maintains, at least not as essential components of the process of speciation in sympatry. If they do evolve, they are incidental to the operation of natural selection in favor of other adaptive traits.^{xxvii} Furthermore, by making reproductive isolation an essential feature of speciation, adherents of Mayr's biological species concept import teleology into the theory of natural selection. Nature *wants* diversity of species they imply, because, as Dobzhansky puts it, "the living world has deployed itself to master a progressively greater range of environments and ways of living."^{xxviii} Speciation is life's way of colonizing new environments in a drive to conquer the planet. Paterson views this as an illegitimate assumption in a scientific theory. Life has no aims, he maintains. Nature does not select for diversity but for fecundity, the opposite of sterility; diversity occurs as a side-effect. Thus we cannot make intersterility an essential component of the definition of species.

Why, then, has the biological species concept reigned? The answer lies not in its biological value but in its social value; it is a reflection of a society in which Jim Crow racism was in full force, preoccupation with miscegenation was pervasive, and fears of hereditary degeneracy abounded. Racial segregation and immigration restriction, as well as eugenic institutionalization and sterilization of the "unfit," were all about damming the gene flow from suspect segments of the larger population in order to isolate the (straight, white, middle-class) sub-population reproductively to produce a "good species" exclusive of—to use the language of the day—Negroes, Asiatics, defectives, and perverts. The process of speciation as Mayr and Dobzhansky describe it is, precisely, the project of

twentieth-century eugenics. Even their fluid metaphors come from the prevailing eugenic discourse: Stoddard's image of the rising tide of color swamping the vessels of Nordic germ plasm is not far in the background, and his repeated calls for dikes to protect the Nordic race from contamination by its presumed inferiors might have been the prototype for the very concept of reproductive isolating mechanisms damming off foreign gene flows. DNA is not fluid. Twentieth-century geneticists' ubiquitous use of water metaphors was not descriptive; it was evocative of the eugenics discourses out of which genetics grew and to which it remained attached.

Eugenicists were trying to create a new (super)human species by managing sexual behavior and restricting sexual contact; geneticists thus imagined that all new species were created that way. Far from abandoning eugenics in the 1940s, then, biologists raised the basic principles of eugenic practice to the status of natural law, which they incorporated into the heart of their new disciplinary synthesis. What lesson should we draw from this story of biology's intimate relationship with eugenics?

Those who would seek to capture this history and contain it within the confines of the prevailing epistemology—about which I will speak momentarily with a nod toward the work of Michel Foucault and Isabelle Stengers and, thus, to Gilles Deleuze^{xxix}—have a couple of strategic options. One is simply to reject the claim that the biological species concept and the theory of speciation that it enables and in which it is embedded were ever adequately warranted, to lament the fact that now and then even great scientists allow their biases to affect their work, and to pay homage to the mechanisms of scientific discourse that allow and provoke Paterson's and others' corrective critique. Another is to argue that, regardless of their ultimate truth-value or socio-political analogues, Mayr's

and Dobzhansky's theories had adequate scientific warrant when they were proposed and accepted.

In different ways, both these strategies operate to reinstate a distinction that the story itself calls into question: the distinction between science's inside and its outside. Inside scientific practice, these strategic assertions imply, there are claims and sets of standards that order thought "scientifically." Outside scientific practice, there are claims and sets of standards that order thought "unscientifically," "politically," or "irrationally." Science functions well when the inside and the outside are not allowed to mix. But whenever what is outside gets inside and contaminates scientific practice, there is trouble, and the story I have told this afternoon is an example of just such a situation.

But is not this very distinction between pure inside and distinct outside itself a product of eugenic thinking? Does it not rest on a eugenic desire to purify our knowledge as a means to insure scientific advance? What would happen if we allowed ourselves to entertain the thought that modern genetics, indeed all of modern biology and therefore much of our contemporary intellectual and technological world, is conditioned by scientific racism? Would the raft of science be swamped by the rising tide of politics? What if, instead of shoring up the dikes meant to prevent intimacy and flow between science and politics, we took the self-overcoming step of acknowledging our assertions of scientific fastidiousness as a political strategy? How would we live with these thoughts? How would these thoughts transform us?

Thank you.

NOTES

ⁱ Kevin de Queiroz called Mayr “almost certainly the greatest of all biologists.” See his “Ernst Mayr and the Modern Concept of Species,” in *Systematics and the Origins of Species: On Ernst Mayr’s 100th Anniversary*, Jody Hey, Walter M. Fitch, and Francisco J. Ayala, eds. Washington, DC: National Academies Press, 2005, p. 261. E.O. Wilson goes a step further in his preface to the same volume, placing Mayr in the company of Einstein: “Ernst Mayr, one of the 20th century’s greatest scientists and a principal author of the modern theory of evolution, passed away on February 3, 2005, at the age of 100.” See Wilson’s preface, p. v.

ⁱⁱ Mayr, “Species Concepts and Their Application, 17.

ⁱⁱⁱ There are, of course, a number of meanings of the term in other contexts such as mathematics, metallurgy, grammar, and shipping. Mayr is only interested in the meanings that have played some role in natural science. The essay I draw on here is “Species Concepts and Their Application,” 1963. I am using the article as reprinted in *The Units of Evolution: Essays on the Nature of Species*, ed. Marc Ereshefsky (Cambridge, MA: MIT Press, 1992), 15-25.

^{iv} “The more we increase the number of divisions in the productions of nature, the closer we shall approach to the true,” Buffon wrote, “since nothing really exists in nature except individuals, and since genera, orders, and classes exist only in our imagination.” This is quoted in Michel Foucault, *The Order of Things: An Archeology of the Human Sciences* (New York: Vintage, 1970), 146-7.

^v If not absolute fixity, then at least fixity with reference to the species’ original location in the Great Chain of Being. For a discussion of this, see Foucault, *Order of Things*, esp. 150-60.

^{vi} Josiah Nott, “The Mulatto a Hybrid—probable extermination of the two races if the Whites and Blacks are allowed to intermarry,” *The American Journal of the Medical Sciences* (July, 1843): 253. This essay is also reprinted in the Bernasconi and Dotson volume.

^{vii} For some discussion of this event in this intellectual context, see John S. Haller, Jr., “The Species Problem: Nineteenth-Century Concepts of Racial Inferiority in the Origin of Man Controversy,” *American Anthropologist*, vol. 72 (1970): 1319-29. Probably the debate had never really been closed in the first place, as Robert J. O’Hara maintains. “The species problem has never once dropped from sight in the long history of systematics....” See “Systematic Generalization, Historical Fate, and the Species Problem,” *Systematic Biology*. Vol. 42, no. 3 (September, 1993): 231.

^{viii} For an interesting discussion of Darwin’s rhetorical strategy, see John Beatty, “Speaking of Species: Darwin’s Strategy,” in *The Units of Evolution: Essays on the Nature of Species*, ed. Marc Ereshefsky (Cambridge, MA: MIT Press, 1992), 227-46.

^{ix} See Mayr, “Species Concepts and Their Application,” 15.

^x Madison Grant, *The Passing of the Great Race, or The Racial Basis of European History* (New York: Charles Scribner’s Sons, 1916), 152-53.

^{xi} Grant, *Passing of the Great Race*, 44-45.

^{xii} Grant, *Passing of the Great Race*, 66.

^{xiii} Between 1889 and 1914, 80% of newcomers in the US were from Southern and Eastern Europe. Between 1900 and 1910, 6 million came from Austria-Hungary, Spain, Italy, and Russia: Italy-285,000, Austria-Hungary-338,000, and the Russian Empire-250,000. See Ian Robert Dowbiggin, *Keeping America Sane: Psychiatry and Eugenics in the United States and Canada, 1880-1940* (Ithaca, NY: Cornell University Press, 1997), 193.

^{xiv} Lothrop Stoddard, *The Rising Tide of Color Against White World-Supremacy* (New York: Charles Scribner’s Sons, 1925), 252.

^{xv} Figures vary in the literature, but Philip Reilly seems to have made the most careful study and is the most frequently cited authority on the subject. This is his figure. See *The Surgical Solution: A History of Involuntary Sterilization in the United States* (Baltimore: The Johns Hopkins University Press, 1991).

^{xvi} Laughlin’s model law is reprinted in *Eugenics Then and Now*, Carl Jay Bajema, ed. (Stroudsburg, PA: Dowden, Hutchinson & Ross, Inc., 1976): 138-52.

^{xvii} William D. Partlow, “A Debt the World Owes Medical Science,” *Journal of Medical Association of the State of Alabama*, Vol. 6, no. 1 (July, 1936), 12.

^{xviii} Osborn, “,” *Eugenical News*, Vol. (1937), 106.

^{xix} Osborn, *Preface to Eugenics* (New York: Harper and Brothers, 1940), 296-97.

^{xx} It is very important to note that the eugenic turn Osborn advocated was from selection of racial to selection of familial stock. The best families, not the best races, would be supported, while the worst would be slated for extermination. Over the course of the 1950s and 1960s, this familial selection got reinterpreted as a pro-family practice and eugenic programs (including involuntary sterilization) were rearticulated as pro-family measures. In my forthcoming book *Public Pathogens and Precious Lives*, I argue that much of the late twentieth-century pro-family movement is rooted in the eugenics movement (which was in turn rooted in scientific racism). Its purpose is not to support the interests of families; its purpose is to support the interests of families thought likely to produce children with certain valued characteristics and to condemn and disrupt families thought likely to produce delinquents, defectives, and perverts. Unfortunately there is not space to elaborate on those historical connections here. For discussions of so-called pro-family movements and their links with nationalism, etc., I refer the reader to other essays in this volume, especially Noël Sturgeon's "Penguin Family Values" and Andil Gosine's "Non-white reproduction and same-sex eroticism: Queer acts against nature."

^{xxi} See Frederick Osborn, *The Future of Human Heredity: An Introduction to Eugenics in Modern Society* (New York: Weybright & Talley, 1968), vi. L.C. Dunn and T. Dobzhansky write: "It would obviously be to the advantage of society if the distribution of human genes could be controlled or modified in such a way that the good ones would increase and the bad ones would decrease." They go on to discuss sterilization as one means of accomplishing this, although they neither condone nor condemn the practice. See Dunn and Dobzhansky, *Heredity, Race, and Society*, 62-64. In the same book, however, they decisively condemn selection on the basis of race, in stark contrast to their apparently morally neutral look at sterilization to eliminate familial defect.

^{xxii} Mayr, "Species Concepts and Their Application, 17.

^{xxiii} L.C. Dunn and Theodosius Dobzhansky give a simple explanation for this phenomenon in the Appendix to Chapter IV of their little book *Heredity, Race, and Society* (New York: Penguin Books, 1946), 87.

^{xxiv} He introduced this concept in a paper in 1935 entitled "A Critique of the Species Concept in Biology." He treated the issue at much greater length in his 1937 book *Genetics and the Origin of Species*. See Paterson, *Evolution and the Recognition Concept of Species*, 1 and 138.

^{xxv} For examples of concerns about asexual entities, see Paul R. Ehrlich and Peter H. Raven, "Differentiation of Populations," and Alan Templeton, "The Meaning of Species and Speciation: A Genetic Perspective," in Erechfsky, ed., *Units of Evolution: Essays on the Nature of Species*, 57-67 and 159-83, respectively. For a discussion of oak tree differentiation, see Leigh Van Valen, "Ecological Species, Multispecies, and Oaks," in Erechfsky, ed., *Units of Evolution: Essays on the Nature of Species*, 69-77.

^{xxvi} Hugh E.H. Paterson, *Evolution and the Recognition Concept of Species: Collected Writings*, Shane F. McEvey, ed. (Baltimore: The Johns Hopkins University Press, 1993), 3, 8, 41, 64, 80, 98.

^{xxvii} Paterson sees this criticism as crucially involving a distinction between function and effect. For a discussion of this distinction, see David M. Lambert, "Biological Function: Two Forms of Explanation," in *Speciation and the Recognition Concept: Theory and Application*, David M. Lambert and Hamish G. Spencer, eds. (Baltimore: The John Hopkins University Press, 1995), 238-59.

^{xxviii} Quoted in Paterson, *Evolution and the Recognition Concept of Species: Collected Writings*, 100.

^{xxix} See Isabelle Stengers, *The Invention of Modern Science*. Trans. Daniel W. Smith. Minneapolis: University of Minnesota Press, 2000.