*James Neel, Darkness in El Dorado, and Eugenics: The Missing Context*

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The controversy surrounding Patrick Tierney's Darkness in El Dorado has been thick with charges of "eugenics." In their letter summarizing the book manuscript, Terry Turner and Leslie Sponsel assert that geneticist James Neel championed "extreme eugenic theories" and even "fascistic eugenics." Indeed, they suggest that to obtain evidence for these theories, Neel deliberately spread a deadly epidemic of measles among Yanomami, refusing to treat the sick and dying or allow others to do so. Although the phrases "extreme" and "fascistic" do not appear in Tierney's manuscript, which is also vaguer on the link between the eugenics and the measles epidemic, Neel is certainly portrayed as a fanatic. According to Tierney, he lost the chance of a Nobel Prize because his eugenic views made him "a pariah outside his specialty" (p. 38). (The source cited in support of that astonishing claim is Neel’s autobiography, pp. 1-130, which does not include a discussion of Nobel Prizes much less a self-description as a pariah!). Tierney's Oct. 9 essay in the New Yorker, appearing in the aftermath of many widely-circulated critiques, softens the rhetoric. It describes Neel merely as a "self-professed" eugenicist.

But even that characterization is clearly intended to condemn. So what does it mean? The terms "eugenics" and "eugenicist" have been deployed as though their content were self-evident. That this is far from the case becomes evident when we try to apply the term to concrete cases. We would all agree that the Nazi Lebensborn program and coercive sterilization laws passed by certain governments exemplify eugenics. But what of prenatal and carrier screening? Or U.S. state statutes barring first-cousin marriages? Or perhaps most germane to this controversy, concerns that atmospheric nuclear testing will increase human mutation rates?

In respect to each of these cases, interpretations and opinions vary (For a discussion of the multiple meanings of the term "eugenics" see Paul 1998a). To further complicate things, both the meanings and emotional loading of the term have changed over time. Today, "eugenicist" functions as a term of abuse. Notwithstanding recent efforts by philosophers to initiate a serious discussion about whether all forms of eugenics are bad and, if so, exactly why (for example, Kitcher 1996, Wikler 1998, Caplan 2000, Buchanan et al. 2000), it is still generally assumed that whatever eugenics may be, it is something appalling. That is why Tierney's claim that Neel was a "self-professed eugenicist" reads as an accusation. But in the 1950s, 60s, and even 70s, the word did not automatically condemn. Indeed, nearly all geneticists were then "self-professed eugenicists" of some sort, or could certainly be seen as such by contemporary standards. For example, Theodosius Dobzhansky and Ashley Montagu, both of whom saw themselves and were seen by their peers (rightly) as critics of eugenics, believed that no one has a right to transmit a serious genetic disease. As Dobzhansky wrote in Mankind Evolving, "Persons known to carry serious hereditary defects ought to be persuaded to refrain from reproducing their kind. Or, if they are not mentally competent to reach a decision, their segregation or sterilization is justified" (1962, 333; see also Montagu 1959, 305-6). Franz Boas, writing in a much earlier period, agreed (1916, 478). Thus to historians, the claim that Neel was a eugenicist is simply banal. A historian of science would want to know what kind of eugenics he favored, and how it compared with that of his contemporaries.

So what kind of eugenics did Neel espouse? To answer that question, a little background may be helpful. Toward the end of his graduate work in the mid-to-late 1930s, Neel became interested in human heredity. At the time, most of those who wrote on human genetics and eugenics worked on the genetics of microorganisms, fruit flies, or mice. Neel's own graduate work had been in classical Mendelian, Drosophila genetics. But Neel came to believe that progress in human genetics required training in medicine, and applied to the National Research Council (NRC) in 1941 for funding for his medical education. In his letter to the NRC, he stressed that scientists who talk about human genetics should know something about humans as well as genetics, and also that combined training in medicine and genetics would be the best way to counter the "unsound" eugenic doctrines and policies of the Nazis (Neel to Snyder, attached to Neel to Stern, 10/10/41, in the Curt Stern Papers at the American Philosophical Society Library; for his views on Nazi and mainline American eugenics see Neel 1994, 18; for more on Neel's background, see Kevles 1995, 223-31).

The Turner/Sponsel letter and the Tierney essay and manuscript note that much of Neel's work was funded by the Atomic Energy Commission (AEC), the agency that succeeded the Manhattan Project. This is made to sound sinister, especially in connection with Neel's eugenic interests, but the evidence that we present here shows that while the connection was there, it was hardly sinister.

Among the greatest threats posed by the atomic age and cold war was the possibility of significantly increased mutation rates due to radiation exposure from nuclear weapons tests and even nuclear war. As Daniel Lang reported in the New Yorker in the mid-1950s, most Americans could more easily accept the idea of nuclear annihilation than the thought of transmitting radiation-induced mutations to their children (Lang [1955] 1959, 382). It is worth emphasizing that it was common at the time to refer to radiation-induced mutation as a "eugenic" threat (e.g., Stern 1956).

As the government agency primarily responsible for radiation-related health and safety issues, the AEC established a number of biomedical research programs, including an extensive genetics program. The AEC’s genetics program was not small, nor secretive; by the late 50s and early 60s, it funded approximately one-half of all federally funded genetic research in the U.S. (Bentley Glass in USJCAE 1957, 1043). Moreover, approximately twenty percent of the active members of the Genetics Society of America were engaged in AEC-sponsored research (USAEC 1960). These included many of the most respected geneticists of the 50s, 60s, and 70s, including Tracy Sonneborn and H.J. Muller at Indiana University (Muller had won the Nobel Prize in 1946 for his discovery of radiation-induced mutation), Theodosius Dobzhansky and Leslie Dunn at Columbia, Alfred Sturtevant and George Beadle at Cal Tech, Milislav Demerec, Director of the Cold Spring Harbor Laboratory, Curt Stern at Berkeley, Richard Lewontin at Chicago and Harvard, and many others (concerning Lewontin's involvement, see his 1997). These geneticists carried out a wide variety of research projects ranging from studies of mutation processes and rates to investigations of the ways in which population size, breeding structure (e.g., degree of inbreeding), migration, and various forms of natural selection influence the evolutionary fate of mutations in populations. (This history helps explain why the AEC's successor, the Department of Energy, has such a large role in the Human Genome Project.)

Neel was initially funded by the AEC to investigate the possibility of increased mutation rates among offspring of the atomic bomb survivors in Hiroshima and Nagasaki (Beatty 1991; Lindee 1994). The South American populations were of interest to Neel for many reasons, some of which were shared by the AEC. One joint interest was in estimating the impact on "civilized" societies of industrial sources of mutation like radiation and various chemicals. Neel presumed that the South American populations had not been exposed to as many sources of mutation; as a result, their mutation rates could be used as a baseline (e.g., Neel 1969, 389-90, 396-97).

Another important joint interest was in determining the influence of natural selection on the evolutionary fate of mutations in humans. At the time, a common view among geneticists was that most species are extremely well-adapted to their environments, due to the fact that the optimal genes for most traits have already arisen and have been accumulated by natural selection. Selection now acts mainly to eliminate new, relatively suboptimal mutations. Those who held this view--most notably Muller--also believed that humans were an exception to the rule. The reason is that we humans have supposedly accumulated a very large "genetic load" of disadvantageous mutations as a result of conditions of civilization, such as modern medicine, that result in the relaxation of natural selection. Muller and others were concerned that further increases in the genetic load of humans--e.g., due to radiation exposure--might threaten the ability of our species to perpetuate itself (Paul 1987; Beatty 1987). This view involves assumptions about the role of natural selection in "less civilized" societies, which was one other reason why Neel was interested in studying what he called "primitive" tribes in South America, and why the AEC was willing to fund him (see, e.g., Neel 1967, 1-2, 14-15).

In the 1960s, a concern about human mutation rates would itself have qualified Neel as a "eugenicst." But what of his views on control of human reproduction? Neel consistently warned that we did not know enough to intervene in human breeding. Thus the influential textbook he authored with William Schull ends with the statement that: "The day may yet come when man has sufficiently accumulated knowledge concerning his heredity and its interaction with his environment that a comprehensive program of self-directed evolution may be undertaken. But for the present the effort which would be expended on a eugenics program might better go into efforts to explore the many gaps in our present fragmentary information" (Neel and Schull 1954, 348). He warned that any effort to control breeding could easily fall prey to racial and class bias. He was skeptical, on multiple grounds, of the proposed benefits of eugenic sterilization, arguing that we know almost nothing about the inheritance of mental attributes, which he thought far more important than physical ones; that individuals with severe defects already have low reproductive rates; and that in any case, selection against recessive diseases, which are also often multigenic, would be extremely slow. He was concerned that even ostensibly "voluntary" programs could in practice become coercive. And he worried about slippery slopes, noting that: "Few would doubt the wisdom of curbing the reproduction of the mentally unbalanced. But the principle involved, once unleashed, has ramifications which touch upon the lives of us all" (Neel and Schull, 1954, 346). Most unusually for a geneticist, he maintained that efforts to improve intelligence through dietary manipulation would do far more for society's well being than would the same expenditure devoted to curing rare genetic diseases (Neel 1974, 39). Hence his later skepticism about the purported benefits of gene therapy was entirely in character (e.g., Neel 1994, 380-82, 393).

Neel certainly believed that individual mental and temperamental differences--including something like "intelligence"--were influenced by differences in genes, and he was sympathetic to the eugenic aim of increasing the proportion of superior genotypes and reducing the number of those considered deficient. But claims that Neel’s eugenic ideal was the Yanomami breeding structure are wrong. Neel believed that ‘primitive’ populations such as Yanomami consisted of small tribes in which highly intelligent ‘headmen’ have much greater reproductive success than other males. He inferred that there was much greater selection for high intelligence in such societies than in "civilized" ones, which were therefore accumulating more genes associated with lesser intelligence. Nevertheless, he did not recommend modeling our society on the Yanomami's! He only jokingly raised, and then discounted, that option (Neel 1980, 290). His own recommendations for "countermeasures" to the relaxation of natural selection in humans were, first, greater provision of genetic counseling services, and second, greater attention to the dangers posed by environmental sources of mutation (Neel 1980, 289-91).

Contrary to the current ethos of genetic counseling (but not necessarily to its practice; see Michie et al. 1997), Neel believed that there were right and wrong reproductive choices. In his view, parents should abort "defective fetuses" (Neel 1970, 821; 1994, 361). But that hardly distinguishes Neel from other medical geneticists of his generation - or for that matter, many people today (see Wertz 1998; Paul 1998b). Indeed, by the standards of the 1960s, Neel was unusually supportive of the principle of respect for procreative liberty, arguing not only against coercion, but against any form of directedness in genetic counseling. To publicly associate Neel's views with those of Josef Mengele, Auschwitz's "angel of death," is not just wrong; it is obscene.

We end with a few words on a related issue. It is by now well known that the AEC supported many experiments on the health effects of radiation that involved the intentional exposure of subjects who were ill-informed or not informed at all about what was happening to them (U.S. Advisory Committee on Human Radiation Experiments 1996; Welsome 1999; Moreno 2000). To the best of our knowledge, no such cases involved the study of inheritable effects of radiation.

Turner and Sponsel, following Tierney's manuscript, insinuate that Neel's work in South America was closely connected to AEC-sponsored, secret radiation-exposure experiments. The insinuation plays an important role in the overall case against Neel; the allegation that he was part-and-parcel of a culture that allowed such deceptive manipulation of research subjects makes more plausible his alleged decision to infect Yanomami with measles as part of an effort to test his extraordinary eugenic theory. Since the claim about Neel's motives is not in fact made more credible by Neel's actual eugenic views, some other evidence that he was up to no good in vaccinating Yanomami against measles is certainly required. But his accusers present no evidence that Neel was connected in any way to secret radiation-exposure experiments.

We hope that we have shown that Neel did not in fact hold the bizarre eugenic views invoked to explain his actions. However, the issue remains whether Neel's investigations were conducted according to appropriate research procedures and standards of informed consent, as understood and practiced by the medical, anthropological, and genetics communities of his time. (On issues regarding the conduct of the research in question, see Tooby (2002) at website http://www.psych.ucsb.edu/research/cep, which also includes links to a related essay by Tooby in Slate, and Susan Lindee’s findings). We will not take up this issue here apart from noting that the allegations concerning consent also need to be considered carefully and in context.

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The publisher declined Diane Paul's request to see the proofs of Darkness in El Dorado on the grounds that an agreement with the New Yorker magazine restrained them from releasing copies before publication. (They were unmoved by her argument that they had effectively made it impossible to address the accusations now widely circulated as a result of actions by their own pre-publication reviewer). However, we were fortunate to learn that Prof. David Maybury-Lewis possessed a copy, which he agreed without any hesitation to share with us. We are extremely grateful for his generosity toward scholars who are not only in a different discipline, but whom he had never met.

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