



## What Does Science Say About Race?

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Observant of public behavior and attentive to public discourse over recent years, I have particularly noted two areas of conflict: (1) the value of science and (2) the concept of race. This leads me to believe that PASTCF members would be interested in and helped by having an historical perspective and discussion of current ways science regards race.

As an historian of science, I have studied how ideologies and cultural attitudes have influenced scientific thought through the years. I have learned that aspects of these views often remain with us, and we need to understand how old ideas can still influence current thinking.

Writing about ancient Greek and Roman thinkers, Denise Eileen McCoskey stated, “[They] did not consider human biology or skin color the source of racial identity, although the belief that human variation was determined by the environment or climate persisted throughout antiquity. Ancient ethnographic writing provides insight into ancient racial thought and stereotypes in both the Greek and Roman periods. Race in the Greek world centered in large part around the emergence of the category of *Greek* alongside that of *barbarian*.” [1. Endnotes on page 5.] In those cultures, the idea of race was based on how civilized they were, i.e., how much *they* behaved and acted and valued things like *we* do. Many ancient thinkers believed that physical differences were simply due to geography and climate.

By the Middle Ages, this classical idea was joined to an interpretation of the role of Noah’s three sons, Shem, Ham, and Japheth in the biblical narrative of Genesis 9-10. Shem fathered the Semitic, or Asiatic, people, Japheth fathered the Indo-European people, and Ham, the one who was cursed, became the father of the Canaanites whose offspring were prophesied to be the slaves of Japheth. Africans were viewed as Ham’s current progenies. Through this interpretation, slavery of Africans was justified biblically. Physical differences were still generally viewed as the result of environmental conditions, although there was a parallel view as early as a Babylonian *Talmud* that the descendants of Ham were black as a result of Ham’s curse and thus were perverted and wicked.

By the 17th and early 18th centuries, natural philosophers who were interested in what we call anthropology were divided between

two camps as to whether skin color was inheritable or a result of environmental influences. This question was not answered during that time, although several classification systems sought to do so. Carl Linnaeus (1707–1778), the father of our modern classification system, combined both theories in his classification of *Homo sapiens* and the four subspecies: *H. americanus* (Indigenous people of the Americas), *H. europaeus* (Europeans, i.e., white Caucasians), *H. asiaticus* (Asians), and *H. afer* (Sub-Saharan Africans). These divisions were based primarily on two factors: skin color (phenotypic characteristic) and major geographic location.

Science, or more correctly, natural philosophy, from the Middle Ages through the early part of the 18th century, was strongly influenced by the concept called “the Great Chain of Being.” Everything had a hierarchical status. When this view was used along with the Linnaean classification system, it immediately became evident that the four subspecies of *Homo sapiens* needed to be ranked. Moreover, as 18th century Enlightenment ideas began to flourish, intelligence and reason became major traits by which subspecies could be classified.

Exploration by European nations had brought their cultures into contact with many African nations and tribes, Asiatic peoples, and Indigenous peoples of the Americas. Naturally, Europeans considered themselves to be the highest. It also seemed obvious to them that the Asians were more intelligent and rational than the other non-European people, but there wasn’t a clear distinction between the other two subspecies as to which was of lower rank. But the two lower species were **definitely** lower than the Europeans. Ibram X. Kendi puts it this way:

Linnaeus positioned *Homo sapiens europaeus* at the top of the racial hierarchy, making up the most superior character traits: “Vigorous, muscular. Flowing blond hair. Blue eyes. Very smart, inventive. Covered by tight clothing. Ruled by law.” He made up the middling racial character of *Homo sapiens asiaticus*: “Melancholy, stern. Black hair; dark eyes. Strict, haughty, greedy. Covered by loose garments. Ruled by opinion.” He granted the racial character of *Homo sapiens americanus* a mixed set of attributes: “Ill-tempered, impassive. Thick straight black hair; wide nostrils; harsh face; beardless. Stubborn, contented, free. Paints himself with red lines. Ruled by

custom." At the bottom of the racial hierarchy, Linnaeus positioned *Homo sapiens afer*: "Sluggish, lazy. Black kinky hair. Silky skin. Flat nose. Thick lips. Females with genital flap and elongated breasts. Crafty, slow, careless. Covered by grease. Ruled by caprice." [2]

The hierarchy was established.

The 19th century scientific ideas about race, built on ideas such as expressed by Linnaeus, are the ones that have contributed most to both modern theories that say the concept of race is a "sociological construction" or myth, and to theories we now call "scientific racism." Moreover, the ideas came from two different fields—anthropology/ethnology and what we now call biology. Anthropologists debated two theories: *monogenesis* (common descent for all human races) and *polygenesis* (multiple origins for human races). Monogenesis was the major (and some would say only) theory until the 18th century, when contact with non-European races became more frequent. Voltaire ridiculed what he viewed as "biblically based monogenesis", and wrote:

It is a serious question among [believers in polygenesis] whether the Africans are descended from monkeys or whether the monkeys come from them. Our wise men have said that man was created in the image of God. Now here is a lovely image of the Divine Maker: a flat and black nose with little or hardly any intelligence. A time will doubtless come when these animals will know how to cultivate the land well, beautify their houses and gardens, and know the paths of the stars: one needs time for everything. [3]

From this remark one can presume that many, if not all, advocates of polygenesis were atheists or agnostics, and while that may be true, I think it is better to call them rationalists.

Anthropologists and some zoologists who subscribed to this view spent a lot of time measuring crania and comparing shapes of skulls, not only between "races," but also between humans and other primates. It is not surprising that the conclusion among these scientists was that Indo-Europeans are superior to all other forms of *H. sapiens*. Noted scientists who held this view included Louis Agassiz, an American professor of zoology at Harvard who was viewed as the preeminent zoologist of the 19th century; Samuel George Morton, a Philadelphia physician, noted for having the largest collection of crania in the world; and Paul Broca, the French physician, anatomist (he identified what is now called Broca's area in the frontal lobe of the brain), and founder of the Anthropological Society of Paris. In other words, polygenesis was not some outlandish theory supported by semi-competent scientists.

In the U.S., polygenesis was highly regarded by Southerners and especially popular among slaveholders. However, Northerners and anti-slavery proponents favored monogenesis, as was also true in England. Noted British advocates were scientists Charles Lyell, Charles Darwin, and Thomas Huxley, and while they undoubtedly viewed the races hierarchically, they did view them all as *H. sapiens* who should not be used like animals. Adrian Desmond and James Moore demonstrate how Darwin's anti-slavery views provided a "moral passion" for his theory of descent with modification in their book *Darwin's Sacred Cause*. [4]

One of the ways that Darwinism was interpreted and applied in the late 19th and first half of the 20th century was the so-called

science of eugenics. The Oxford English Dictionary defines eugenics as "the study of methods of improving the quality of human populations by the application of genetic principles." The concept was first developed by Darwin's cousin Francis Galton. It corresponded nicely with then contemporary thought regarding the means of reproduction, Darwinism, and the value of science. It existed in two forms: (1) positive eugenics that incorporated environmental factors as well as genetic ones and sponsored "better baby contests" and "Eugenic Sermon contests", and (2) negative eugenics, a form of genetic determinism that kept the *unfit* from reproducing. Thus, sterilization of prisoners, the mentally ill or *inferior* immigrants, persons of *inferior* races, the poor, and those with various deformities was not only encouraged, but often was mandatory. During the 20th century, it is believed that at least 64,000 people were sterilized *officially* in the U.S.

When we think about eugenics, most of us jump to Nazi Germany and the treatment of Jews. But we need to remember two things: (1) the 1933 "Law for the Prevention of Progeny with Hereditary Disease" was based, sometimes verbatim, on the 1907 Indiana and the 1909 California sterilization laws; and (2) the Nazi law did not originally apply to only Jews. Cultural values, when applied to genetics, were an international issue.

A second matter was determining what scientific methods could be appropriately used to acquire new knowledge. One method, in both the U.S. and Nazi Germany, was using *inferior stock* (in this case, African-Americans, Jews, Poles, and Roma) in the experimental process. In the U.S. the most well-known case is the Tuskegee Syphilis Experiments that were conducted for 40 years between 1932 and 1972. Approximately 600 African-American men were told that they were going to be treated for "bad blood." In reality, they became scientific guinea pigs to study the natural history of syphilis. The U.S. Public Health Service ran these experiments, never using penicillin to treat the men even though in 1947 it had been found to be an effective in the treatment of syphilis. By the time the nature of the experiments was made public in 1972, 128 men had died, 40 wives had been infected, and 19 children were born with syphilis. These experiments are still viewed by many African-Americans as a reason to distrust medical personnel and are why many refuse to participate in medical trials or even seek medical treatment. The Tuskegee experiment is one of several underlying factors that made it difficult to get African-Americans to volunteer for COVID-19 vaccine trials and heightened their reticence to receive the vaccinations being used.

While most Americans have heard about the Tuskegee experiments, the example of using an African-American as a basis for scientific investigation that is less known is described in Rebecca Skloot's bestseller *The Immortal Life of Henrietta Lacks*. [5] The woman who is the subject of this book became the donor—without her permission—of cells labeled by scientists as HeLa cells—cells that were immortal and served as a basis for much medical experimentation. They were used in the development of the polio vaccine, in cloning, and many other investigations. But both the way she was cared for as she was being diagnosed and treated, and the way her family was dealt with after her death, perpetuated beliefs among African-Americans that medicine and doctors cannot be trusted.

The results of medical treatments do not always provide a basis for building trust. One of the areas that "prove" to African-Americans and Indigenous peoples that medicine (and possibly the sci-

entific studies underlying medicine) cannot be trusted is maternal health. The CDC reports that between 2007-2016 the Pregnancy-Related Mortality Ratio (PRMR) is skewed negatively toward African-Americans and Indigenous women. Specifically, pregnancy-related deaths per 100,000 live births were as follows: Hispanics – 11.5; Whites – 12.7; Asian-Pacific Islanders – 13.5; Indigenous Women – 29.7; African-Americans – 40.8. [6]

Nevertheless, many scientific advances occurred during the 20th century. Improved understanding of genetics began in 1903 when Mendel's work was rediscovered by Hugo de Vries, Carl Correns, and Erich von Tschermak. Then Thomas Hunt Morgan began his experiments with fruit flies (*Drosophila melongaster*), and Mendelian genetics became firmly established by 1925. During the 1930s and 1940s, two mathematicians, G.H. Hardy and Wilhelm Weinberg, began applying genetics to evolution using the Hardy-Weinberg Principle.

But there was still much to learn. My undergraduate college genetics textbook said that *H. sapiens* have 48 chromosomes. But at that time the only chromosomes that were really identified were the X and the Y chromosomes. The number of the rest was a guess. Some said 48, some 47, and some 46. At one point, the question arose whether or not different races had different numbers of chromosomes. There was certainty that African-Americans had 48, a number shared by our closest relatives—chimpanzees, bonobos, gorillas, and orangutans—and by the mid-1920s there was general consensus that all humans had 48 chromosomes.

It was not until 1956 that two sets of geneticists—Joe Hin Tjio and Albert Levan and Charles Ford and John Hammetton—determined that the true number for all humans regardless of their origin was 46. It took a while for that number to get into the textbooks and well after my undergraduate years. What we see here is science working at its best—building on prior work and correcting it when necessary. During this phase science was more interested, although not exclusively, in the cytology and composition of chromosomes than in their functions and frequencies in different races and locations.

Maybe you noticed that the number of chromosomes in *H. sapiens* was decided **after** the double helix structure of chromosomes was discovered in 1953 by James Watson and Francis Crick. Together, these discoveries permitted the creation of a new field of genetics—genetic engineering—ultimately leading to the Human Genome Project (HGP), an international scientific effort begun in 1990 and completed in 2003. Prior to the completion of HGP, however, specific genes for specific traits were identified and located, most having to do with diseases. Medical genetic engineering, also called gene therapy, is an "experimental technique that aims to treat genetic diseases by altering a disease-causing gene or introducing a healthy copy of a mutated gene to the body." [7] The FDA approved the first gene therapy for an inherited form of blindness in December 2017. More recently, efforts in gene therapy have sought to correct sickle cell anemia, an inheritable disease affecting primarily those of Sub-Saharan African ancestry. This is an example of science seeking to help solve a medical problem unique to a particular race.

However, there is another form of genetic engineering. It is called either "the new eugenics" or "liberal eugenics." This form

[a]dvocates enhancing human characteristics and capacities through the use of reproductive technology and human genetic engineering. ... New eugenics references

eugenics, an ideology that promotes the genetic improvement of a given population by excluding groups of people which are deemed lesser. [8]

Using assisted reproductive technology (ART) to treat infertility and genetic therapy to provide the kind of child the parents want are currently advocated by liberal eugenicists. However, in practice, adherents often consider someone unfit to reproduce based on such criteria as socioeconomic status, marital status, disability, and sexual orientation, as well as race or ethnicity. Policies determined by doctors, government, and/or insurance companies are more inclined to provide availability of such treatments to white couples than to BIPOC couples. (BIPOC is a recent ubiquitous acronym that stands for "black, Indigenous and people of color.")

Moreover, scientifically-based treatments are withheld from BIPOC more often than one would hope. In an article entitled "Racial and Ethnic Disparities in Diagnosis and Treatment: A Review of the Evidence and a Consideration of Causes," H. Jack Geiger notes,

At no time in the history of the United States has the health status of minority populations—African Americans, Native Americans and, more recently, Hispanics and several Asian subgroups—equaled or even approximated that of white Americans. The health of all American racial and ethnic groups has improved dramatically, particularly over the last six decades, but the paired burdens of excess morbidity and decreased life expectancy for people of color have been noted over several centuries and have proved, even recently, to be stubbornly resistant to substantial change. [9]

He cites numerous ways in which medical science fails to provide the same quality and quantity of care to BIPOC, ranging from diagnostic procedures (the taking of medical histories, diagnostic procedures) to forms of treatment (prescriptions, surgeries, rehabilitative activities). He notes the following:

One of the largest studies reviewed more than 1.7 million hospital discharge abstracts to examine use of major diagnostic and therapeutic procedures in 77 disease categories in some 500 acute care hospitals. After controlling for patient age, severity of illness, health insurance, and hospital type, blacks were significantly less likely than whites to receive a major therapeutic procedure in almost half of the 77 disease categories. Again, in a five percent sample of more than 1.2 million claims in a HCFA [10] Medicare database, blacks were found less likely than whites to receive 23 of 32 services, and the disparities were found even when patients were insured by both Medicare and Medicaid, minimizing the confounding of race with financial barriers to care. [11]

A summary of the situation by the American Bar Association utilizing findings of the National Academy of Medicine reported the following:

[P]roviders are less likely to deliver effective treatments to people of color when compared to their white counterparts—even after controlling for characteristics like

class, health behaviors, comorbidities, and access to health insurance and health care services. For example, one study of 400 hospitals in the United States showed that black patients with heart disease received older, cheaper, and more conservative treatments than their white counterparts. Black patients were less likely to receive coronary bypass operations and angiography. After surgery, they are discharged earlier from the hospital than white patients—at a stage when discharge is inappropriate. The same goes for other illnesses. Black women are less likely than white women to receive radiation therapy in conjunction with a mastectomy. In fact, they are less likely to receive mastectomies. Perhaps more disturbing is that black patients are more likely to receive less desirable treatments. The rates at which black patients have their limbs amputated is higher than those for white patients. Additionally, black patients suffering from bipolar disorder are more likely to be treated with antipsychotics despite evidence that these medications have long-term negative effects and are not effective. [12]

Why should African-Americans trust science and medicine?

I could give more examples, but the point is made. Science and the application of science, i.e., technology, have not been neutral when it comes to the matter of race. Societal prejudices have influenced what science has said about race and about how the medical practice of science today views race as a criterion in the application to individuals. However, science also confirms that race is a social, not a biological, concept. There is no scientific reason for distinguishing between races, any more than one should classify humans by hair color, handedness, or any other diversity of traits found in our species.

Currently, the application of science, especially medical practice, is influenced too much by the cultural view of race, preventing science from being applied equally between Whites and BIPOC. Knowing these facts is a necessary prerequisite if the situation is to be corrected.

And for Christians, this is where our theology must be the motivator. Scripture tells us that "the Lord does not see as mortals see; they look on the outward appearance, but the Lord looks on the heart" (1 Samuel 16.7b).

## ENDNOTES

- [1] Denise Eileen McCoskey, November 14, 2020, <https://oxfordre.com/classics/view/10.1093/acrefore/9780199381135.001.0001/acrefore-9780199381135-e-5497#:~:text=The%20ancient%20Greeks%20and%20Romans,or%20climate%20persisted%20throughout%20antiquity>.
- [2] Ibram X. Kendi, III *How To Be an Antiracist* (New York: One World, 2019), 40.
- [3] Voltaire, III *Les Lettres d'Amabed* [Septième Lettre d'Amabed], 1769, cited in <https://en.wikipedia.org/wiki/Polygenism>.
- [4] Adrian Desmond and James Moore, III *Darwin's Sacred Cause* (New York: Houghton Mifflin Harcourt, 2009), xx.
- [5] Rebecca Skloot, III *The Immortal Life of Henrietta Lacks* (New York: Broadway Paperbacks, 2010).
- [6] <https://www.kff.org/report-section/racial-disparities-in-maternal-and-infant-health-an-overview-issue-brief>, 13 Jan. 2021.
- [7] <https://sickcellanemianews.com/gene-therapy/>, 23 Nov. 2020.
- [8] [https://en.wikipedia.org/wiki/New\\_eugenics](https://en.wikipedia.org/wiki/New_eugenics), 23 Nov. 2020.
- [9] <https://www.ncbi.nlm.nih.gov/books/NBK220337/>, 23 Nov. 2020.

# In Memoriam

*For all the Saints who from their labors rest*

**DAVID P. NOTLEY, SR.**

May 23, 1932 – August 8, 2020

David Notley was born in Gary, Indiana, the youngest son of Carl Notley and Esther (Collier) Notley. After growing up in Gary, David attended the Illinois Institute of Technology (IIT) in Chicago, graduating in 1955 with a Bachelor of Science degree in Fire Protection Engineering. While in Chicago, and in the middle of a blizzard, David married Marcia Elizabeth McCormick.

After graduating from IIT, David and Marcia moved to Denver, Colorado, where he worked in commercial insurance rating for the Insurance Bureau. A few years later with a growing family, they moved to North Augusta, South Carolina, where David began a long and storied career with the Federal Government working on fire safety at nuclear reactor sites. He began with the Atomic Energy Commission, continued for a brief period in New York, working at sites related to training sailors who served on nuclear powered Navy vessels. That led to the longest period of government work at the Nuclear Regulatory Agency in the Washington, D.C., area, helping draft the many fire safety codes needed for safely operating nuclear power plants. In retirement David continued consulting work about nuclear plant fire safety in the US and abroad.

While making major contributions in the field of engineering and his chosen profession, a life of faith was never far from him. From early age to the moment of final breath, David deeply trusted in a loving and compassionate God: the Creator of all that is or was or is to be, a gracious and caring Redeemer expressing and giving God's love for all, and an ever-present and infinitely supportive Holy Spirit who sustains all life. Active in communities of faith wherever he lived, David served as deacon, elder, Sunday School teacher, worship leader, or coffee hour host. Every task proclaimed his faith in God and the love and care for all in Jesus Christ.

Faith and science were always intertwined for David and never conflicted. This came to be best expressed when he joined PASTCF, finding a community that supported his twin vocations in new and informative ways. He sometimes voiced the regret that he did not have more time to more widely share the news about PASTCF. In 2017, PASTCF gladly honored David with the Daniel Martin "Science as Christian Vocation" award.

*David Notley's obituary was in the materials distributed at PASTCF's Biennial Meeting (via Zoom) on September 15, 2020. It is included here in SciTech† for the Association's official record.*

[10] HCFA stands for the Health Care Finance Administration, a part of the U.S. Department of Health and Human Services (HHS) that is responsible for administering Medicare and Medicaid.

[11] <https://www.ncbi.nlm.nih.gov/books/NBK220337/>, 23 Nov. 2020.

[12] [https://www.americanbar.org/groups/crsj/publications/human\\_rights\\_magazine\\_home/the-state-of-healthcare-in-the-united-states/racial-disparities-in-health-care/#:~:text=NAM%20found%20that%20E2%80%9Cracial%20and,physicians%20give%20their%20black%20patients](https://www.americanbar.org/groups/crsj/publications/human_rights_magazine_home/the-state-of-healthcare-in-the-united-states/racial-disparities-in-health-care/#:~:text=NAM%20found%20that%20E2%80%9Cracial%20and,physicians%20give%20their%20black%20patients), 13 Jan. 2021.