

The Good, the Bad and the Ugly: Science, Pseudoscience, and Ideology in Genetics

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"The physicists have known sin; and this is a knowledge they cannot lose," said a guilt-ridden J. Robert Oppenheimer, following the bombing of Nagasaki. No such equivalent expression of guilt was ever issued by a geneticist, although their sin was infinitely deadlier. Indeed, the impossible cocktail of science and ideology (or worse of pseudoscience and moral imperative) proved to be extremely murderous as far as genetics was concerned. After all, the selection at Auschwitz was done by a geneticist using hereditary principles.

Science can degenerate into pseudoscience (or bad science) through several discombobulating methods. Chief among them are (1) illiteracy (e.g., ignorance of historic precedent), (2) innumeracy (i.e., inadequacy of data and analysis), (3) neologism (i.e., obscurantism by reification, nonsense, vagueness, and euphemism), (4) historicism (i.e., argumentation by predestination), (5) antievolutionism (i.e., inadequacy of categorization and ignorance of covariance), and alibiism (e.g., methodological nihilism). When these methods are also used to serve a political agenda, the resulting pseudoscience degenerates further into ideology. Bad science is usually harmless, however pseudoscience may be presented as science, and then it may have harmful practical implications.

Genetics has been frequently misused in the past to serve political ends. Its chief political manifestation has been the eugenic

movement, an ideological application of bad genetics. The eugenic platform has been drawn by Francis Galton, who defined eugenics as the science of improvement of the human "germplasm" through better breeding. In particular, Galton emphasized the study of agencies under social control that may improve or impair the racial qualities of the future generations, whether physically or mentally. At its peak, the eugenic movement dictated political behavior of legislative, executive, and judicial establishments in many countries. Among such agencies were the supreme court of the United States, the racial hygiene ministry in Nazi Germany, and the reeducation camps in Stalinist Soviet Union. The revelation of the ultimate consequences of eugenics, particularly during the Nazi era, caused eugenics to lose its respectability, and for a short while it was declared clinically dead. The official history of eugenics can, therefore, be summarized as: (1) born with Galton, (2) thrived in USA, Germany, France and USSR, and (3) died with Hitler. We note, however, that eugenics never really died and, indeed, its principles are currently being resurrected under the guise of molecular medicine, a phenomenon that has been dubbed "backdoor eugenics". Sadly, at the beginning of the twenty-first century it seems that eugenics grows faster than fruitflies.

In the following, I shall discuss an example of eugenic research that illustrates not only how easy it is for science to degenerate into ideology, but also that old nineteenth century pseudoscientific arguments are frequently recycled and presented anew as scientific fact. In this example the ideology promoted is one of genetic supremacy and predestination, i.e., "white" genes are better than "black" genes. Similar stories abound in the eugenic literature purporting to show that men are genetically superior to women, that homosexuals are inferior to heterosexuals, and that the upper classes are endowed with a superior genetic makeup than that of the poor people. At the conclusion of my essay, I

shall show how molecular biology is currently being harnessed as an eugenic tool to support essentially nineteenth century ideas.

In the seventeenth and eighteenth centuries, the inferiority of blacks was presented as a matter of empirical fact. For instance, Johann Fabricius wrote "It has been demonstrated that Negroes descended through crossbreeding between white men and monkeys." The same sentiment is echoed in the writings of Richard Lynn, professor of psychology at the University of Ulster, who presents his 1998 ideology as a matter of scientific fact. "Who can doubt that the Caucasoids and the Mongoloids are the only two races that have made significant contributions to civilization?"

In the nineteenth century the black-and-white tale invokes Darwinian principles presented as a "Just So Story." According to this tale, whites evolved under stringent selective pressures and, therefore, in each generation only the strongest, the cleverest, and the healthiest survived. A constant improvement in quality ensued. In contrast, blacks evolved under hospitable conditions, and were subject to no selection. Consequently, even defective individuals managed to reproduce. How can such a story be converted into a scientific twentieth-century narrative? First, one must obliterate all facts that contradict the story. For example, it is now known that *Homo sapiens* evolved in Africa. Ergo, all humankind evolved under "hospitable conditions." One ingenious solution is to claim that *Homo sapiens* evolved in Africa when it was cold! Ridiculous? Not according to William H. Calvin in his 1990 book "Ascent of Mind: Ice Age Climates and the Evolution of Intelligence."

Through illiteracy of historical precedent, the nineteenth century evolutionary tale can be reversed completely. For example, according to Leonard Jeffreys, professor of African-American

Studies at New York University, whites have evolved under stringent selective pressures. Therefore, in each generation only the rowdiest, most aggressive, brutal, and destructive individuals survived. Blacks, on the other hand, evolved under hospitable conditions. Therefore, they were selected for peace-loving, cooperation, and harmony with nature.

One of the best example of innumeracy used to justify a racist ideology can be found in a 1995 book by J. Philippe Rushton, entitled "Race, Evolution and Behavior." The premise and the conclusion of the book is that blacks engage in sex earlier, more frequently, and in a more promiscuous manner than whites or orientals. Consequently, they have time for little else, e.g., developing a civilization. This thesis is supported by many detailed tables, in which the sexual behavior of the three major races are contrasted. For example, it is claimed that the average age at the first intercourse among 18-year olds in Los Angeles is 16.4 and 14.4 years for orientals and blacks, respectively. Similarly, the percentage of sexually active men at age 18 is claimed to be 32 and 81% for orientals and blacks, respectively. Rushton performs all his analyses under the assumption of a normal distribution and equality of variances. Under these assumptions, it is possible to calculate retrospectively some frequency distributions concerning sexual behavior to check whether or not the data are reasonable. If his tables and assumptions are correct, we must conclude that 1 in 10 blacks start sexual activity before the age of 10, 1 in 100 start before the age of 6, and 1 in 1,000 start before they are 2 years of age. The fact that his book and the analyses it contains is taken seriously by some scientists, and that his research is supported monetarily by funding agencies, only goes to show that Einstein was right when he said that "the most common elements in the universe are hydrogen and stupidity."

Neologism through reification is by far the most commonly used method to disguise racist ideology as science. In particular, the intelligence quotient (IQ) is the most frequently used and debated entity. We note, however, that IQ is just a name that has been given to a score that an individual obtains on a questionnaire. It has nothing to do with intelligence. In fact, even the proponents of the validity of the IQ (such as Edmund Boring, professor of psychology at Harvard University) admit that "intelligence as a measurable capacity must be defined as the capacity to do well in an intelligence test." In other words, "intelligence is what the test tests." With as much justification, I could have called the score "gezplaz." "Gezplaz is what the test tests." The name, however, makes all the difference in the world. For who would be interested in having his or her "gezplaz" tested? Would universities accept students according to their "gezplaz" score?

Discombobulation in the genetic engineering era follows a very rigid methodological pattern. We start by taking a vague parameter that can be described numerically, preferably as a continuous variable. The best choices are values based on questionnaires and then reified by assenting that the name given to the questionnaire reflects an objective reality beyond the questionnaire. The psychogenetic literature abounds in such examples. An inexhaustive list of variables that are claimed to be quantifiable include: ability to suppress negative thoughts, job involvement, charitability, pessimism, independence, openness, arachnophobia, homophobia, depression, ethical behavior, dental fear, and intelligence.

At the end of stage 1, we will have a distribution list ascribing to each individual in the sample a precise measure of a behavioral trait, say, religiosity. In the second step we use a set of genetic parameters that can be described objectively, and in which large interpopulational variability exists. The best choices are micros-

atellites, i.e. functionless repetitive sequences in the genome. At the end of this stage each individual is characterized by the number of repeated sequences at several loci, usually of the order of hundreds or thousands of loci. In stage 3, the researcher conducts several thousands correlations, preferably by using the latest neologisms in the field (e.g., lod scores, transmission disequilibrium ratios, parametric fastlink techniques, theta distributions). Obviously, 5% of all correlations will come out statistically significant. By ignoring the rules of simultaneous statistical analysis, one may conclude, for instance, that the religiosity gene is located on the short arm of chromosome 6.

By using this methodology, many behavioral traits are currently classified as genetic in nature. Such traits include: criminality, sexual orientation, shyness, directional ability, genius, religiosity, political leanings, traditionalism, adventureness, saving, sinning, style of dressing, and my favorite, couch-potato-ness.

We note that if everything is in the genes, then personal responsibility, free choice, and the entire edifice of western civilization are rendered meaningless. Thus the punishment should no longer fit the crime, but should fit the criminal. Such a form of moral relativism, especially when presented as science, can have ominous consequences.

It is often said that the twentieth century belonged to the physicists, while the twenty-first century will belong to the geneticists. One can only imagine the consequences of genetic Hiroshimas.