Ernst Mayr

The biology of race and the concept of equality

There are words in our language that seem to lead inevitably to controversy. This is surely true for the words "equality" and "race." And yet among well-informed people, there is little disagreement as to what these words should mean, in part because various advances in biological science have produced a better understanding of the human condition.

Let me begin with race. There is a widespread feeling that the word "race" indicates something undesirable and that it should be left out of all discussions. This leads to such statements as "there are no human races."

Those who subscribe to this opinion are obviously ignorant of modern biology. Races are not something specifically human; races occur in a large percentage of species of animals. You can read in every textbook on evolution that geographic races of animals, when isolated from other races of their species, may in due time become new species. The terms "subspecies" and "geographic race" are used interchangeably in this taxonomic literature.

This at once raises a question: are there races in the human species? After all, the characteristics of most animal races are strictly genetic, while human races have been marked by nongenetic, cultural attributes that have very much affected their overt characteristics. Performance in human activities is influenced not only by the genotype but also by culturally acquired attitudes. What would be ideal, therefore, would be to partition the phenotype of every human individual into genetic and cultural components.

Alas, so far we have not yet found any reliable technique to do this. What we can do is acknowledge that any recorded differences between human races are probably composed of cultural as well as genetic elements. Indeed, the cause of many important group differences may turn out to be entirely cultural, without any genetic component at all.

Still, if I introduce you to an Eskimo

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and a Kalahari Bushman I won't have much trouble convincing you that they belong to different races.

In a recent textbook of taxonomy, I defined a "geographic race" or subspecies as "an aggregate of phenotypically similar populations of a species inhabiting a geographic subdivision of the range of that species and differing taxonomically from other populations of that species." A subspecies is a geographic race that is sufficiently different taxonomically to be worthy of a separate name. What is characteristic of a geographic race is, first, that it is restricted to a geographic subdivision of the range of a species, and second, that in spite of certain diagnostic differences, it is part of a larger species.

No matter what the cause of the racial difference might be, the fact that species of organisms may have geographic races has been demonstrated so frequently that it can no longer be denied. And the geographic races of the human races – established before the voyages of European discovery and subsequent rise of a global economy – agree in most characteristics with the geographic races of animals. Recognizing races is only recognizing a biological fact.

Still, the biological fact by itself does not foreclose giving various answers to the question, What is race? In particular, adherence to different political and moral philosophies, as we shall see, permits rather different answers. But I believe it is useful at the outset to bracket the cultural factors and explore some of the implications of a strictly biological approach.

The evolutionary literature explains why there are geographic races. Every local population of a species has its own gene pool with its own mutations and errors of sampling. And every population is subject to selection by the local environment. There is now a large literature on the environmental factors that may influence the geographic variation of a species. For example, populations of warm-blooded vertebrates (mammals and birds) in the colder part of their geographical range tend to larger size (Bergmann's rule). Darwin wondered whether these climatic factors were sufficient to account for the differences between geographic races in the human species. He finally concluded that sexual selection, the preference of women for certain types of men, might be another factor leading to differences between geographic races.

This kind of biological analysis is necessary but not sufficient. By itself, biology cannot explain the vehemence of the modern controversy over race. Historically, the word "race" has had very different meanings for different people holding different political philosophies. Furthermore, in the last two hundred years there has been a change in the dominant philosophy of race.

In the eighteenth century, when America's Constitution was written, all our concepts were dominated by the thinking of the physical sciences. Classes of entities were conceived in terms of Platonic essentialism. Each class (*eidos*) corresponded to a definite type that was constant and invariant. Variation never entered into discussions because it was considered to be "accidental" and hence irrelevant. A different race was considered a different type. A white European was a different type from a black African. This went so far that certain authors considered the human races to be different species.

It was the great, and far too little appreciated, achievement of Charles Darwin to have replaced this typological approach by what we now call *population*

thinking. In this new thinking, the biological uniqueness of every individual is recognized, and the inhabitants of a certain geographic region are considered a biopopulation. In such a biopopulation, no two individuals are the same, and this is true even for the six billion humans now on Earth. And, most important, each biopopulation is highly variable, and its individuals greatly differ from each other, thanks to the unique genetic combinations that result from this variability.

Let me illustrate the implications of individual differences by analyzing the outcome of the 2001 Boston marathon. Kenyans are a population famous for producing long-distance runners. Three Kenyans had entered the race, and it was predicted that they would end the race as numbers one, two, and three. However, to everybody's great surprise, the winner was a Korean, and, even more surprisingly, number two was an Ecuadorian from a population that had never been credited with long-distance running abilities. It was a clear refutation of a typological – or essentialist – approach to thinking about race.

In a Darwinian population, there is great variation around a mean value. This variation has reality, while the mean value is simply an abstraction. One must treat each individual on the basis of his or her own unique abilities, and not on the basis of the group's mean value.

At the same time, nothing could be more meaningless than to evaluate races in terms of their putative "superiority." Superiority where, when, and under what circumstances? During the period of the development of the human races, each one became adapted to the condition of its geographic location. Put a Bushman and an Eskimo in the Kalahari Desert and the Bushman is very much superior; put a Bushman and an Eskimo on the Greenland ice and the Eskimo is by far superior. The Australian Aborigines were very successful in colonizing Australia around sixty thousand years ago and developed local races with their own culture. Yet they could not defend themselves against European invaders.

What happened to the human population in this case of European colonization is comparable to what happened to the biota of New Zealand – a case that Darwin studied. When British animals and plants were introduced into New Zealand, many native species were not able to cope with this new competition and became extinct. In both cases, the success of the European populations of plants, animals, and colonists may have been simply due to a constellation of favorable geographic factors. There is no evidence at all that it was due to some intrinsic genetic "superiority."

When dealing with human races we must think of them as the inhabitants of the geographic region in which they had originated. Presumably each human race consists of individuals who, on average and in certain ways, are demonstrably superior to the average individual of another race. Eskimos, for instance, are superior in their adaptedness to cold. In the last four or five Olympics there were always six to eight contenders of African descent among the ten finalists in the sprinting races, surely not an accidental percentage.

These considerations should teach us how we should think about human races. A human race consists of the descendants of a once-isolated geographical population primarily adapted for the environmental conditions of their original home country. But, as is illustrated by the success of Europeans and Africans and Asians in all parts of

the world, any race is capable of living anywhere. Most importantly, a race is always highly variable: any human race will include a wide variety of extraordinary individuals who excel in very different human abilities.

When comparing one race with another, we do find genes that are on the whole specific for certain populations. Many individuals of Native American descent have the Diego blood group factors, and people of Jewish descent have a propensity for Tay-Sachs disease. Some of these characteristics are virtually diagnostic, but most are merely quantitative, like the description of the human races in older anthropology textbooks describing skin color, hair, eye color, body size, etc. An ensemble of such characteristics usually permits classifying an individual in the relevant race. All these characteristics are nevertheless highly variable, and it is virtually impossible to classify every individual definitively, especially in those areas where one geographic race merges into another (as is true, for example, for the human population of modern-day America).

Curiously, when people make derogatory statements about members of other races, they often do not refer to biological traits at all, but rather to putative character traits: members of a certain racial group are said to be lazy, dishonest, unreliable, thievish, arrogant, etc. There is no scientific evidence of a genetic basis for any such negative traits. There is also no scientific evidence known to me that the genetic differences we do discover among the human races have any influence at all on personality. Most of the mentioned undesirable personality traits, if they are at all correlated with specific human populations, are obviously cultural and therefore open to change through appropriate forms of education.

It is generally unwise to assume that every apparent difference in traits between populations of human beings has a biological cause. In a recent aptitude test administered in California, students of Asian descent did conspicuously better than students of African descent. Researchers evaluating these results subsequently discovered that in the year preceding the test, the Asian-American students had spent a daily average of three hours on homework, while the African-American students had done virtually no homework at all. The test results by themselves cannot tell us what percentage of the superior performance by the Asian-American students was due to their genetic endowment and what percentage to the cultural trait of being better prepared for the test thanks to spending, on the whole, far more time on homework than the African-American students did.

One can conclude from these observations that although there are certain genetic differences between races, there is no genetic evidence whatsoever to justify the uncomplimentary evaluation that members of one race have sometimes made of members of other races. There simply is no biological basis for racism.

Indeed, what is far more important than the differences between human races is the enormous variation *within* each racial group. We must always keep in mind that no two human beings – even so-called identical twins – are in fact genetically identical. When encountering a lying member of another race, nothing would be more illogical – and unjust – than to conclude that all members of that race are liars. Likewise, if one encountered a particularly warmhearted member of a different race, it would be equally foolish to conclude that all members of that race are equally

warmhearted. To avoid such mistakes, it is useful to apply the population thinking pioneered by Darwin.

It also helps to adopt the motto "They are like us." This was my motto more than seventy years ago when I became one of the first outsiders to visit a native village in the interior of New Guinea. Invariably, they *are* like us. Whenever I lived with one of these relatively isolated populations of human beings for any length of time, it did not take me long to discover the differences in the personalities of the individuals with whom I had to deal. The rule that no individuals are the same was as true for the Stone Age natives of New Guinea as it is for a group of my Harvard colleagues. A lot of our human difficulties are due to people forgetting the simple rule that no two people are the same.

So what, if anything, does biology, and specifically the biological understanding of race, have to teach us about the concept of equality?

In the first place, the biological facts may help to remind us just how new the political concept of equality really is. When we look at social species of animals, we discover that there is always a rank order. There may be an alpha-male or an alpha-female, and all other individuals of the group fall somewhere below them in the rank order.

A similar rank-ordering has long marked many human societies as well. During the years I lived in a small village of Papuans in the mountains of New Guinea, the local chief had three wives, other high-ranking members of the village had one, and a number of "inferior" tribesmen had no wives at all. Nineteenth-century British society distinguished clearly between aristocrats, gentlemen, and common workingmen. As George Eliot describes in the novel *Middlemarch*, there was even a rank order within each of these major classes.

As a historian of science, I am inclined to believe that the scientific revolution of the eighteenth century helped to promote new ways of thinking about equality. From the perspective of Newtonian essentialism, all samples of a chemical element are identical and, as modern physics assumes, so are nuclear particles. Equality of this sort is a universal phenomenon. Perhaps it was only a small step from Newtonian essentialism to the moral proposition that all human beings are essentially equal, and therefore should have equal rights.

As is true of the word "race," "equality" has come to mean different things to different people. I take it for granted that every good American accepts the principle of civil equality. This means equal opportunity, equality before the law, and equality in social interactions. To have elaborated this principle is one of the glorious achievements of the American Revolution.

Still, the principle cannot in many contexts be applied concretely, for the kinds of biological reasons I have already discussed. No two human individuals are genetically the same. Paradoxically, it is precisely because the human population is genetically and culturally so diverse that we need a principle of civil equality. Anybody should be able to enjoy the benefits of our liberal society in spite of differences of religion, race, or socioeconomic status. Regardless of whether the difference in performance between individuals, or two groups, has biological or purely cultural causes, it is our moral obligation to see to it that each individual and group has an equal opportunity. The great British geneticist J. B. S. Haldane asked what we can do to provide equal opportunities to all members of our society, regardless of

any differences in ability. He said we simply have to provide more opportunities, we must diversify our educational curricula, and we must offer new incentives.

These reflections on the biology of race and the concept of equality suggest the following conclusions:

- Every single human being is biologically unique and differs in major characteristics even from close relatives.
- Geographical groups of humans, what biologists call races, tend to differ from each other in mean differences and sometimes even in specific single genes. But when it comes to the capacities that are required for the optimal functioning of our society, I am sure that the performance of any individual in any racial group can be matched by that of some individual in another racial group. This is what a population analysis reveals.
- In small groups of primitive human beings, just as in all groups created by social animals, there is a rank order, with certain individuals being dominant.
- In the large human societies that developed after the origin of agriculture and the rise of cities, new systems of ranking became established, of which the European feudal societies of the fourteenth to the eighteenth century were typical.
- Democracy, including the principle of civil equality, emerged during the Enlightenment and became fully established through the American Revolution and incorporated in the Constitution of the new American republic.
- When Thomas Jefferson proclaimed that "all men are created equal," he failed to distinguish between the civil equality of individual human beings and their biological uniqueness. Even though all of us are in principle equal before the law and ought to enjoy an equality of opportunity, we may be very different in our preferences and aptitudes. And if this is ignored, it may well lead to discord.
- It is our obligation to overcome the seeming conflict between a strict upholding of civil equality and the vast biological and cultural differences among individual human beings and groups of individuals. The introduction of new educational measures and even legislation to overcome existing inequalities will be successful only if based on a full understanding of the underlying biological and cultural factors.