Book Reviews

What It Means to Be 98% Chimpanzee: Apes, People, and Their Genes

By Jonathan Marks. 312 pp., illustrated.
Berkeley, University of California Press, 2002. $27.50.
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DO not be deceived by the title of this book. It takes just five pages to figure out that for Jonathan Marks, being 98 percent chimpanzee means nothing: despite all similarities, chimps are chimps, and humans are humans. No suspense here. So why should one venture through the 307 remaining pages of this book, if the main message is obvious from the start? I can see two good reasons. First of all, because it is fun. I have been a fan of Marks since his 1982 letter to *Nature* (295:276) entitled "All in the Book." His style is provocative and often amusing, and his arguments are interesting even when there is room for disagreement (as there sometimes is).

The second reason is that the subject of this book is extraordinarily important. Many scientists and physicians deal daily, in one way or another, with human variation and its consequences. However, only seldom do we have the time to reflect on the assumptions underlying many concepts, even apparently simple ones, in this area. Marks does a remarkable job of placing those concepts in the historical and cultural contexts in which they were developed, reviews a large body of results, and examines their implications. To what extent are our intellectual and physical skills determined by our genes, and are we sure we have enough good data to answer that question in the first place? Is there any biologic basis for sexual preferences or for the tendency to commit crimes? What is culture, and can we use that word to refer to the transmission of learned behavior in apes?

Chapters 3 and 4, in particular, deal with a crucial issue: the existence of human races. As the author aptly remarks, it is probably as difficult to convince people today that races exist in certain species but not in ours as it was to convince people in the 17th century that the earth rotated around the sun and not vice versa. Still, current genetic data are not ambiguous. Everybody can tell a Nigerian from a Dane, but human diversity is distributed continuously, and the identification of discrete clusters of human genotypes (which one could then legitimately call races) has so far proved to be impossible. It is important to stress this notion, because many, including many scientists, still think that although racial distinctions may not be obvious, some sort of racial classification is useful for practical purposes, such as diagnosis or, in the future, the tailoring of race-specific drugs. Marks's book and two later studies

(Wilson JF, et al. "Population Genetic Structure of Variable Drug Response." *Nature Genetics* 2001;29:265-9; Romualdi C, et al. "Patterns of Human Diversity, within and among Continents, Inferred from Biallelic DNA Polymorphisms." *Genome Research* 2002;12:602-12) show clearly that even for those practical purposes, what matters is the individual genotype and not the largely arbitrary, and hence potentially misleading, racial labels attached to people.

The aspect of this book that I fail to understand is its frontal attack on science as a whole, as well as on specific disciplines — genetics enjoying particularly harsh treatment in chapters 6 and 11. Does the author really believe that many scientists would subscribe to statements such as the following: "Science has explained many things about the universe. Your life has no meaning"? Is he really convinced that studying the diversity of the human genome is useless because human history "is difficult to extract from genetic differences" anyway, and that the standpoint of science is held by scientists to be superior to all rivals? Personally, I am among those who consider the scientist's viewpoint superior for addressing scientific questions but neither better nor worse than others for addressing questions in the realms of, say, music, ethics, or football (in both the U.S. and the European senses).

I wonder why Marks has felt the need to create (and then, predictably, to triumph over) such a grotesque fictitious character as the Evil Geneticist. We know that science has had some shameful moments. Eugenics, for instance, is part of the history of genetics (as well as the history of anthropology), and it is good to be reminded of its theoretical inconsistencies and horrendous consequences. But it is possible to say that humans do not come in neat racial clusters only because geneticists cared to measure the differences among continental groups and showed that they account for but a small fraction of our global genomic diversity. Sometimes Marks seems to miss the difference between reflecting critically on science and rejecting it en bloc because its "numbers" only confirm what he already knew anyway. He is right in remarking that numerical analyses of data require assumptions and therefore cannot be considered to be objective. He is wrong when he pushes that argument so far as to suggest that quantitative science is just an exercise in arbitrariness. It is not, of course; experiments can be repeated, and wrong conclusions may eventually be modified.

Shortly after this book hit the stores, Enard et al. ("Intra- and Interspecific Variation in Primate Gene Expression Patterns, *Science* 2002;296:340-3) demonstrated that differences in gene expression between humans and chimps are much higher in the brain than in the liver. We have largely the same genes as chimpanzees, and these genes do the same things in much of our bodies, but in the brain, the patterns of gene expression diverge dramatically. That and future similar studies can help us understand our evolutionary relationships a little bit better, although, ultimately, what it means to be human is a fantastically complex question and one that science can only contribute to addressing.

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