

## Watson's World

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The time has come, in the world of James D. Watson, to leave behind societal fears of genetic technologies. It is time to start using germ-line genetic engineering to make people who are more intelligent, more attractive, and resistant to HIV. It is time to use genetically modified organisms to improve the environment and end world hunger. And it is time for everyone to

contribute their DNA to databases, both private and public. Fortunately, there is no need to worry too much about abuse, injustice, commodification, technical error, or social stratification grounded in biological difference. Such worries are groundless because science shows that people are biologically inclined to care about one another and to care about building a good society. The Bible also

mentions how important human love is.

Despite their propensity for caring, of course, people are often fanatical, unscientific, ignorant, dishonest, prone to "Luddite paranoia," irrational, and unwilling to accept the true facts that science reveals—as Watson notes in his latest public promotion of genomics, *DNA: The Secret of Life*. People just need to stop worrying so much about power and money. It is true that politics and economics do drive science, but Watson insists that they should be irrelevant to its assessment. And people also need to stop worrying so much about "the human spirit." The idea that there "is no gene for the human spirit" reflects irrational prejudice. People wish that there were no such gene and this constitutes "a dangerous blind spot in our society." In any case, back in 1953, molecular ghostbusters Watson and Crick cleared out any spirits that might be hanging around inside the cell: "Is there something divine at the heart of a cell that

brings it to life? The double helix answered that question with a definitive No."

I have just summarized the normative framework that drives Watson's book. The alert reader might well ask how such a convoluted nexus of belief and prophecy could gain cultural legitimacy, or even a sympathetic publisher. What forces made this incoherent tangle of mysticism, historical ignorance, religiosity, corporatism, exaggerated technocratic rationality, intemperance, and social naïveté plausible to so many people? Or even to James D. Watson?

It would be comforting to attribute all to Watson himself, but both the texts reviewed here suggest Watson is merely a potent sign of what has happened to the biological sciences in the last 50 years. Biology is now an important corporate sector, and Watson is a captain of industry. Indeed, in his latest account of himself, written with Harvard biologist Andrew Berry, as well as in Victor McElheny's biography *Watson and DNA*, Watson emerges as that richly American character, the great salesman. And salesmen, as every attentive consumer knows, sometimes hedge on the details.

These two books join a wave of texts and events celebrating the 50th anniversary of the elucidation of the helical structure of DNA. Watson's book is linked to a five-part television series (which airs this month on PBS) and provides an overview of the history, science, and politics of DNA. McElheny, a science journalist who has covered molecular biology for decades and worked for Watson at Cold Spring Harbor, finds Watson boyishly charming and refers to him as "Jim" throughout the book. His biography is written in strong journalistic style, thick with quotations from people who were there. McElheny presents his subject's life as a high-energy, high-action sequence of personal confrontations—with nature, the Cold Spring Harbor Laboratory advisors and investors, other scientists, Bernadine Healy at the National Institutes of Health, ignorant critics of science, and so on. The biography briefly touches on Watson's personal life, but it offers little exploration of the interior person. Watson is all gossip, public pronouncements, machina-

tions, clever intrigue, and shock value. The result is a fast-paced, though flat, account intended to appeal to the general public.

Watson's own book has the same intended audience, but broader goals. Whereas McElheny's book primarily promotes Watson, Watson's book promotes his views of what the findings of molecular biology tell us about ourselves and our world. It mentions data suggesting racial differences in intelligence, sexual differences in mathematical ability, the inheritance of genes for violence (are these on the Y chromosome?), and the biological tendency of younger women to marry older men (as in Watson's own life story).

Throughout his account, Watson is unconstrained by either evidence or logic. For example, stressing that DNA predicts just about everything, he repeats the common claim that DNA reveals what is most important about individual human beings. However, he also be-

lieves that no one should be too concerned about making their own DNA freely available to the criminal justice system, the military, employers, the education system, health care insurers, and so on. Anyone who is concerned about privacy, he suggests, is not thinking clearly. In another example, he invokes the existence of a bioethics industry to suggest that there is no reason to get too worked up about ethical concerns: The ethicists are on the job; the public can relax. But the reason ethicists have taken an interest in genomics is that it is an endeavor that could lead to practices devastating to human rights, a potential exacerbated by the pronouncements such as Watson's. The bioethics industry built around genomics is a sign not that the public should be complacent, but that it should actively resist the kinds of answers provided in Watson's book.

If Watson, for example, wants to theorize about world hunger, perhaps he should consult the work of his fellow Nobelist Amartya Sen. Sen has demonstrated, (through finely textured, detailed, specific, and data-rich accounts of major famines since 1943) that famines are not simply the result of inadequate food supplies. They are the result of economic systems (*J*). People can starve when the grain elevators are full; they can have enough to eat when crop yields are disastrous. India, for example, has in recent years faced dual crises of both overproduction of food and profound malnutrition. By December 2000, millions of tons of wheat and rice stocks were rotting in India's granaries, while 1.5 million children

Image not available for online use.

**Sequencing promoter.** Watson was an early supporter and the first director of the Human Genome Project.

### DNA The Secret of Life by James D. Watson, with Andrew Berry

Knopf, New York, 2003.  
462 pp. \$39.95, C\$59.95.  
ISBN 0-375-41546-7.

### Watson and DNA Making a Scientific Revolution by Victor K. McElheny

Perseus, Cambridge, MA,  
2003. 379 pp. \$27.50,  
C\$42.95. ISBN 0-7382-  
0341-6.

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were dying annually of diseases linked to malnutrition. Promoters of genetically modified organisms often claim that anyone opposed to transgenic crops is turning a blind eye to the needs of those who are starving. But the anthropologist Glenn Davis Stone has suggested that the real moral outrage is the strategic use of hungry people to justify corporate programs to develop these crops. "Malthusian biotechnologists need to explain why crop genetic modification will feed hungry Indians when 41.2 million tons of excess grain will not" (2). Famine is an economic and political phenomenon. It cannot, therefore, be eliminated by genetically modified organisms or by any food product, though Watson seems to think it can.

When Watson turns to the Icelandic genome, he again gives the story a meaning that the details cannot sustain. The Icelandic genome was sold to investors on the premise that Icelanders were a uniquely homogeneous population. deCODE Genetics arranged a deal with Iceland's parliament to construct and market to pharmaceutical companies a database that combined Icelandic genotypes, medical records, and genealogies. These companies could then study genetic predispositions to common conditions such as cancer and heart disease. But if Icelanders were no more homogeneous than any other population, they would be far less valuable commercially and scientifically. Einar Arnason, at the University of Iceland, has demonstrated that Icelanders are among the most genetically heterogeneous populations in Europe. Those who calculated Icelandic homogeneity in the early promotional years were using public databases of mitochondrial DNA, databases now known to be filled with errors. Arnason tracked down the errors, proved that they were there by contacting the original authors, and used blood group and allozyme variation (in conjunction with more accurate DNA data) to show that the Icelanders have experienced, unsurprisingly, plenty of genetic admixture (3). Earlier conclusions were based, essentially, on typographical mistakes (4, 5); as molecular geneticist Peter Forster has wryly observed, the "postgenomic age promises to become a proofreading age" (6). Like the investors and the buyers, the Icelanders themselves were conned into a corporate scheme that was the equivalent of selling swampland, entering into arrangements that profoundly compromised their privacy. Watson uses the deCODE story to hint at the promise that complex, multifactorial disease genes will soon be tracked down, profiting both patients and the biotech industry. But the deCODE story is also about speculative hype; rapid profits based on inaccurate information; and disadvantaged, ill-informed patient consumers.

Similarly, Watson repeats the commonplace claim that identifying genes which

are linked to a disease leads to cures for people who have the disease. For the last 15 years or so, the overwhelming majority of scientific and press reports about such newly found genes have included a suggestion that the discovery carries us toward a cure for the relevant disease. This is ubiquitous enough to be understood as a literary convention in genomics. But discovered genes do not lead directly to cures (7), and the gap between promise and performance is drawing increasing attention from the media. Francis Collins, the director of the U.S. National Human Genome Research Institute, has become publicly, openly concerned about the need for an actual clinical payoff from gene mapping. And even parents driven to hunt for genes have found that locating the gene does not cure their children: Brad Margus, a former shrimp merchant who has started a biotechnology company related to genomics, has two sons with ataxia telangiectasia. He helped raise \$7 million to support the efforts to find the gene responsible for this fatal genetic disease. Although the gene was successfully identified in 1995, in 2000 he lamented, "Every time I see [my sons], I know we haven't done anything, because we haven't stopped the progression. My kids are slipping away" (8).

Now that the sequencing of the human genome is essentially "finished," Watson proposes that there is a new Holy Grail—the transcriptome—that would elucidate how all genes are expressed. Developing the transcriptome will, of course, cost a lot of money. But like the mapping of the human genome, it will supposedly lead to medical breakthroughs and cures.

Meanwhile, genetic disease continues to be controlled almost entirely through the selective abortion of affected fetuses, which in Watson's world is conflated quietly with compassionate medical and educational intervention. So, for example, Watson suggests that the controversial testing of school children for fragile X syndrome is intended solely to help "tailor" educational plans to their needs. But he also immediately points out that each of these children costs at least \$2 million more in health care expenses than would a child without fragile X. "The ever-increasing challenge of providing affordable health care should itself suggest a potent argument for giving every mother the right to be tested." The mother he refers to is the pregnant, prospective mother, and the right to be tested is the right to abort a fetus with fragile X. Although selective abortion is an intervention much valued by some families at risk, it does not constitute a cure for people who are living with genetic diseases, many of which are disabling, painful, and life-threatening. And Watson's invocation of

health care costs to justify testing and selective abortion is vintage eugenics. Watson urges biologists to “stand tall” and “not be intimidated by the inevitable criticism” that will come with promoting germ-line gene therapy to “redress genetic injustice.” Injustice comes in many forms, of course. For most people on the globe today, germ-line gene therapy to improve their children is not remotely possible—their pressing health care needs are for vaccines, nutrition, and environmental justice. An argument could be made that health care expenditures should reflect human needs, rather than potential corporate profits.

Celebrations this month mark both the discovery of the helical structure of DNA and the completion of the sequencing of the human genome. Both events should be celebrated. DNA is an important and interesting molecule, and the map of the human genome

does provide a baseline for the elucidation of crucial questions about evolution, development, disease, and health. The gene map does not, however, solve all social and economic problems or transform clinical care, and the exaggerated promotions and insupportable claims are becoming tiresome.

Watson is fond of saying that mapping the human genome reveals “what makes us human,” and on this point I have to agree. The genome project does reveal our extraordinary ability to imagine and create institutions and ideologies that reflect our social organization, our practices of commerce and trade, and our needs. Perhaps someday, when the body’s complex operations are better understood, the knowledge the project has produced will appear as quaint as phlogiston or mesmerism. But its organizational and ideological qualities are timeless testimony to the nature of the hu-

man species. They reveal our tendency to elevate what we craft into the realm of neutral, absolute truth, and make manifest our vulnerability to propaganda. Watson has been the genome project’s marketing director and prime salesman. His latest promotional brochure is not worth anyone’s time.

#### References and Notes

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2. G. D. Stone, *Curr. Anthropol.* **43**, 611 (2002).
3. E. Arnason, *Ann. Hum. Genet.* **67**, 5 (2003).
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5. I am grateful to M. Fortun for his insights on these matters.
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7. N. A. Holtzman, T. M. Marteau, *N. Engl. J. Med.* **343**, 141 (2000).
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## TELEVISION

# Dilemmas of a Divisive Concept

Mildred Cho and  
Maren Grainger-Monsen

The volatile topic of race in the United States is one that few dare take on, but the issue is particularly salient today as scientists in diverse fields conduct studies that specifically ask whether there are biological differences by race. These fields include pharmacogenetics, genetic anthropology, physical anthropology, forensics, and epidemiology. Current debates about race are particularly heated in the arena of health, for at least two reasons: the desire to examine the contribution of race to health disparities and the potential for discrimination against racial groups based on differences in the prevalence of conditions that are thought to have strong genetic determinants. For example, undesirable traits such as criminal behavior, if linked however tenuously to particular genetic variants, could also be linked to groups that appear to carry those variants. This could lead to discrimination against individuals who are perceived to be members of those groups (even if they are not). Such discrimination could occur even if the trait is of questionable validity or if the phenotype-genotype association is weak.

The series, *Race: The Power of an Illusion*, describes and boldly challenges concepts of race in the United States, in-

cluding ideas about the biological and genetic bases of racial classifications. The three one-hour segments highlight the links between race and social and legal institutions, as well as illustrate the role of science in the development and application of racial concepts.

The programs will be especially valuable to scientists because they show the similarity between the past use of ethnographic and anthropomorphic studies as “proof” of race and the current use of genetics to do the same. The comparison is particularly striking because the detailed 19th-century studies of cranial morphology that showed differences by race, once accepted by the scientific community, are now completely discredited. The episodes ask why researchers seek biological differences among races. They then illustrate how science is selectively invoked to validate and further particular political agendas, as well as how the personal opinions and agendas of individual scientists can greatly influence broad social policy. The series can be seen as challenging scientists to examine whether pervasive societal concepts have caused unconscious bias in their own research.

The film medium is used to best effect when visually illustrating race as a continuum. For example, the filmmakers demonstrate the concept of a gradient in physical traits by visualizing a walk from Africa to Norway during which the colors and shapes of the faces gradually change. Over the journey, the clothes change more dramatically than any physical characteristics. A particularly effective section of the first episode follows a group of high school stu-

dents as they study the similarities and differences among their own DNA sequences, which allows us to observe the breakdown of their own assumptions about race, physical characteristics, and the genetic relatedness of human beings.

However, the filmmakers sometimes slip into the very assumptions they are asking us to discard. Although several sections stress the notion of a continuum of traits (which argues against the concept of distinct races), we also hear that we are all “mongrels”—which implies that there is such a thing as a “pure-bred” human. The series does do a good job of showing what race is not, but it also does a disservice in assuming that we all agree on what race is. Furthermore, in not defining how they are using the term “race,” it perpetuates confusion. It inappropriately mixes terms and treats categories such as “Cherokee” and “Indian” or “Philippine” and “Asian” as equivalent and as descriptors of racial categories. In addition, some of the points made in the series would have been more powerful if the ways “race” is used in different countries had been examined.

Nevertheless, the episodes are provocative and raise a multitude of important questions about the use of racial classification in American society. For a scientific audience, *Race: The Power of an Illusion* will be a much-needed catalyst for an examination of the assumptions behind a concept that has become a standard, but often unquestioned and sloppily employed variable in research. The series invites researchers and the public alike to ponder the use and abuse of scientific results.

**Race**  
**The Power**  
**of an Illusion**  
Larry Adelman,  
Executive Producer  
California Newsreel,  
San Francisco. On  
PBS, Thursdays, 24  
April to 8 May 2003.  
Companion Web site,  
[www.pbs.org/race](http://www.pbs.org/race)

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