

ARE WE THE SUM OF OUR GENES?

by Howard L. Kaye

Appause and a collective sigh of relief greeted the announcement in 1990 that a portion of the U.S. Human Genome Project's budget would be set aside each year for studies of the social and ethical implications of genetic research. Mindful of past experience with the atom and other revolutionary research put to uses that were not fully anticipated, scientists and administrators now seemed prepared to grapple with the possible uses and abuses of their work while it was underway.

Yet amid this celebration, the project's more profound implications are being overlooked. Many of the prominent scientists involved believe that the logical consequence of unlocking the gene's secrets will transcend science, requiring nothing less than a fundamental change in our understanding of human nature. With the mapping and sequencing of the human genome, they believe, will ultimately come knowledge of the genes associated with the whole range of human behavioral, mental, and moral traits. As these putative "genes for" such things as schizophrenia, alcoholism, homosexuality, manic-depression, intelligence, and criminality are "discovered" and publicized, the cumulative effect will be a transformation of how we understand ourselves: from moral beings, whose character and conduct is largely shaped by culture, social environment, and individual

choice, to essentially biological beings, whose "fate," according to project head James Watson, "is in our genes."

This claim of Watson and other scientists is the latest episode in the controversial "return to biology" that began with the ethology of the 1960s and the sociobiology of the '70s and '80s. But whereas behavioral biologists during the past three decades, like the late-19th-century Social Darwinists before them, simply speculated about the possible hereditary bases and adaptive value of human traits and conduct, the geneticists of today believe they are poised to discover such genes and the biochemical pathways by which they shape our lives. To them, the Human Genome Project marks the culmination of more than a century of debate over the "implications" of modern biology that began with Darwin's *Origin of Species* (1859) and Francis Galton's *Hereditary Genius* (1869)—a debate lucidly chronicled in Carl Degler's recent *In Search of Human Nature*.

Yet from the days of T. H. Huxley and Bishop Wilberforce to those of E. O. Wilson, Stephen J. Gould, and James D. Watson, there is a discouraging repetitiveness to the debate, despite the illusion of scientific and moral progress. In the opinion of some (including Darwin himself), biology sanctions traditional moralities and social ideals and provides the necessary tools for their realization. According to others, biology, for better or worse, utterly shatters

such notions. For example, James Rachels asserts in a recent work subtitled *The Moral Implications of Darwinism* (1990) that "Darwinism undermines traditional morality," "religious belief," and "the idea of human dignity," while other writers tell us that its "logical consequences" include eugenics, racism, and totalitarianism.

As for public policy, some declare as self-evident truth that modern biology sanctifies a conservative agenda and social inequalities, while others, such as molecular geneticist Christopher Wills of the University of California, San Diego, claim biology with equal conviction for social activism and liberal reform. Some see in the dogmas of molecular biology and Darwinism the ultimate ground of objective truth, toward which the humanities and social sciences must bow, while others insist on their essential irrelevance to such concerns.

Whatever particular forms it has taken, the debate has always centered on the "implications" and "logical consequences" of the biological sciences for our understanding of human nature and culture. Today, however, faced by the prospect of an increased capacity and desire to intervene in the human genome, I believe that we must change the terms of the debate and give up this misguided quest. To think in terms of "implications" and "logical consequences" is to suggest that certain facts or propositions about human social behavior are so inseparably entwined with certain facts or propositions about biology that if the biological statement is true, the social statement follows necessarily.

"Implication" suggests a connection

that is objective and logical. Yet is this really the case, or do we not thereby grant too much to science—ultimately the ability to tell us objectively who we are by nature—and too little to ourselves? Does any natural scientific proposition logically entail some significant human conclusion, or is this connection derived from other sources? Does relativity in physics, for example, "imply" moral relativity, as was argued earlier in this century? Does Darwinian theory "imply" the falseness of the biblical account of creation, as many have claimed for over a century? Does the proposition that an organism is "only DNA's way of making more DNA" imply that we and our culture are also "survival machines" built by natural selection to preserve and replicate our "immortal genes"? And finally, does the discovery of genetic correlates to the full range of human capacities and conduct truly imply the knowledge that "fate is in our genes"?

The "logical consequences" discerned by the combatants in this debate are more properly understood as *interpretations*, more philosophical, sociological, and psychological in nature than objectively scientific. The theory of relativity in physics may have been seen by some individuals as lending "scientific" support to moral relativity, but the idea of moral relativity long predated 20th-century physics. For all the furor and spiritual anguish that we wrongly believe was experienced by the pious because of Darwin's theory of evolution through natural selection, many readers of Genesis, including many biologists (such as Francis Collins, codiscoverer of the gene for cystic fibrosis), perceive no incompatibility in the respective accounts and thus

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feel no need to redefine human nature or purpose. This is so because the perception of such "implications" depends not simply on knowledge of natural phenomena and scientific theory but on a host of background assumptions, philosophical orientations, and cultural commitments.

Pious Jews or Christians may read the account of creation in Genesis symbolically or as a charming but primitive myth, which, despite its outdated cosmology, contains important truths about life's ultimate

able research. Nevertheless, to argue that the findings reveal "the essence of humanity," as Christopher Wills does, or the "objective criteria" by which human conduct must ultimately be judged, as political theorist Roger Masters does, and the proper means for making ourselves, in Watson's words, "a little better," is an interpretation of nature and of man that is more metaphysical than scientific.

Unfortunately, it is not always clear to either scientists or to their lay audience



Plus ça change . . . From Charles Darwin to James Watson, the argument that biology is destiny has hardly changed at all.

origins and about our own problematic nature. For them, a God who creates by natural selection may be just as believable as one who creates through word and division. Yet to those already alienated from, and hostile toward, such religious visions—as well as their foes, those religious fundamentalists threatened by a "godless" modernity—the implications of Darwinism for biblical religion are obvious.

The recognition that natural selection acting on the genome can affect behavioral characteristics has stimulated much valu-

when such claims are being made. A scientist or naive popularizer like the Pulitzer Prize-winning science reporter Natalie Angier, who tells us that "adultery" and "infidelity" are far more prevalent in the animal kingdom than had been previously thought and serve to increase the "adulterer's" reproductive fitness, appears to be describing only the facts of life. Yet what else is being conveyed by the use of human moral terms like "debauchery," "adultery," and "philandering" to describe nonhuman animals? Does this not imply that these

nonhuman and all-too-human sexual activities are essentially the same in their meanings, motivations, purposes, and consequences? Would it not also appear to be a logical consequence that human adultery is "natural" and our moral condemnation of it unrealistic and even unnatural?

From Pliny the Elder to Saint Francis of Sales, the elephant was held forth as a model of ideal conjugal conduct. Saint Francis wrote:

It never changes females and is tenderly loving with the one it has chosen, mating only every three years, and then only for five days, and so secretly that it is never seen in the act; but it can be seen again on the sixth day, when the first thing it does is go straight to the river and bathe its whole body, being unwilling to return to the herd before it is purified.

Does the apparent faultiness of this ethology (so far only the California mouse has proven to be truly monogamous) mean that the ideal of mutual faithfulness and self-mastery is discredited or less desirable and noble? Would better ethology provide us with a better ideal? I think not. The ideal of fidelity was never put forth *because of* the behavior of elephants but because of the behavior of people. To understand human adultery and proper conjugal conduct, we have far more to learn from literature, religion, philosophy, and our own self-reflection than biology can ever provide.

Or when laypersons read in Wills's *Exons, Introns, and Talking Genes: The Science Behind the Human Genome Project* (1991) that the discovery of "genes for" intellectual abilities and personality traits is as "inevitable as the eventual discovery of genes for manic-depression or schizophrenia," how many will recognize the *a priori* beliefs that lie concealed behind the white coat of science? How many readers will fail to interpret such future "discoveries" as suggesting possible genetic *influences* on

the development of certain traits and capacities in *some* of the individuals manifesting them and instead see the "implication" of genetic determinism?

In confronting such allegedly scientific accounts, we need to ask not what human propositions may be objectively drawn from a given body of biological fact but three other questions: What leads us to perceive, construct, and proclaim such interpretations as objective truths? How adequate are they as interpretations of nature and ourselves, based on *all* of the knowledge available to us? What might be their social and moral impact?

Enthusiasm over the explosion of knowledge about the genome is not the only, nor perhaps the most compelling, motive at work in the perception of implications. Beneath the surface of today's scientific optimism is a profound sense of cultural crisis and moral uncertainty. Thanks in part to challenges posed by science, communally binding and individually compelling religious faiths and moral ideals have long been eroding. For centuries our philosophers and social scientists have sought to unmask our cultures, our politics, and our very selves, presenting them as illusory structures shaped by forces beyond conscious control. In such a cultural climate, the specter of nihilism, cultural relativity, and individual disorientation seems a constant threat. Confused about who we are and how we should live, suspicious of all answers, we can agree on nothing beyond the primacy of individual desires or group demands in both private and public affairs.

For those who do not celebrate such a condition, the seeming certainties achieved by the natural sciences have been powerfully attractive. Ever since Thomas Hobbes, who in horror at the anarchy of the English Civil War turned to geometry for guidance,

the search for a secular morality has dominated social thought, driving us from science to science—mathematics, physics, biology, psychology, sociology—in hope of discovering a stable moral ground or law-generating method. Cut loose from religious traditions and systems of meaning, adrift in a sea of relativity, and buffeted by chance, expediency, and impulse, we continue to find both the “certainties” of scientific “fact” and its power to satisfy human desires alluring.

As our latest attempt at dropping some moral anchor, biology may prove as ambiguous and unsuccessful as previous scientific moralities—and perhaps even more harmful. Our current infatuation with biology, unlike that of a century ago, is occurring at a time when the humanities and social sciences have declared moral bankruptcy, thus depriving us of a vital part of the collective memory we need to regulate and resist our increased capacity for genetic manipulation. This sort of amnesia is painfully apparent, for example, in Wills’s discussion of genetic influences on criminal behavior. Pointing to the common social backgrounds of police and criminals, Wills asks rhetorically, “Why should one group be law-abiding and the other not, if criminal behavior is engendered entirely by the environment?” For Wills, environmental and genetic determinism are apparently the only choices. What the former cannot explain must be attributed to the latter. Wedding a crude sociological determinism to an equally crude biology, Wills, like all for whom “nature and nurture” or “heredity and environment” are the only legitimate categories for understanding human life, utterly ignores the irreducible element of individual will, choice, and responsibility.

How are we to resist such irresponsible assertions—and the actions potentially

sanctioned by them—if our scientists and opinion makers have forgotten what it means to be a moral and cultural being endowed, in Max Weber’s words, “with the capacity and the will to take a deliberate attitude towards the world and to lend it significance”?

Fortunately, most nonacademics have not forgotten. Years ago, while literary and scientific intellectuals were extolling sociobiology’s ethic of survival and “the morality of the gene,” I overheard a doorman (married and the father of three) complain to a co-worker, “I’m not really living, just surviving.” This is a sentiment I suspect we have all heard or experienced, but what was this man really saying? In distinguishing between *human* life and *biological* life was he not expressing the presence of a “self” or “soul” within him that aspired to a higher life, a more meaningful and fulfilling life than the life of biological survival and reproduction he was leading? Unlike our biologists, structural social scientists, and poststructural humanists, he recognized that we are meaning-craving and meaning-creating animals who aspire, however perversely, to the good. To understand such a nature, which desires “the good’s being one’s own always” and which experiences the pain of shame, resentment, and guilt at our inadequacy, Plato’s *Symposium* remains a better guide than E. O. Wilson’s *Sociobiology*. It is not that Plato’s biology is better than Wilson’s but that the question of human nature is not simply a biological one, no matter how many genetic correlates of character are discovered. Our capacity for culture—understood not in the trivial biological sense as all nongenetic means that enable organisms to adapt to their environments, but in its properly human sense as that system of ideals, practices, and prohibitions that comes into being both to protect us from

nature and from ourselves and “for the sake of living well”—may certainly be the product of natural selection. Our capacities for reason, symbolic expression, and imagination; our aspirations for esteem and respect; and our qualities of curiosity and self-consciousness all may have evolutionary origins and may have contributed to our species’ biological success. But they have long since taken on applications and ends that transcend the narrowly biological and may at times contradict it. Indeed this need to dream of, reflect on, and feel shame before goods and ideals detached from and even contrary to both our “innate behavioral repertoire” and our ultimate biological ends is both our greatness and our curse. Nevertheless, it is precisely this capacity that is under attack, now on three fronts, as the natural sciences, social sciences, and humanities close in on their quarry: the self or soul.

It is this attempt to redefine fundamentally how we conceive of ourselves as human beings, and thus how we conceive of a good and proper life, that makes contemporary biological naturalism so culturally radical in its potential consequences. Yet however inadequate and even harmful this perspective may be, however unfounded its claim to the status of “scientific implications” for its moral prescriptions, it has indeed begun to alter our self-conception. This is not because scientific knowledge has social *implications* but because it has had and will continue to have social *impact*.

During the 1960s, the writings of ethologists like Konrad Lorenz and Robert Ardrey and evolutionary theorists like Theodosius Dobzhansky, G. G. Simpson, and C. H. Waddington stimulated a return to biologically grounded reflections on human nature and culture. In the 1970s and '80s, the even more reductionist writings of E. O. Wilson and other sociobiologists and of molecular

biologists such as Jacques Monod and Francis Crick reached a surprisingly large audience. If the colleague of mine who told me he decided to have a second child, seven years after his first, because he was worried about investing his genes in a single offspring is any indication, these messages have indeed been heard.

In the years to come, I expect this redefinition of ourselves as essentially biological beings to continue and to have even greater influence on individual actions and public policy. But whereas this once was the work of scientists addressing the public directly in works that were explicitly philosophical and manifestly seeking to convert, its continued development will, I fear, be far more indirect and insidious. The Human Genome Project will play a crucial role, but not simply through its discoveries in the laboratory. Instead, I expect that the cumulative effect of the ways such knowledge is likely to be interpreted for and by the broader public will push us, like sleepwalkers, toward the biologizing of our lives in both thought and practice.

When a scientist such as Harvard’s E. O. Wilson candidly acknowledges that the particular vision of human nature and culture he is advocating is drawn from the “mythology” of scientific materialism, the thoughtful reader is in a position to recognize Wilson’s work for what it is—metaphysical speculation and natural theology—and evaluate it accordingly. Yet when the public reads in the newspaper of “genes for” various human attributes and behaviors and of the means for altering the human “blueprint” in seemingly desirable ways, few are able to recognize the moral and philosophical commitments that lie behind such statements. Yet such commitments are powerfully present, however unconscious or concealed behind “descriptive” language. When George

Cahill of the Howard Hughes Medical Institute asserts that the Human Genome Project is "going to tell us everything. Evolution, disease, everything will be based on what's in that magnificent tape called DNA," the "everything" he means is everything worth knowing about life. When Maynard Olson of Washington University states that "genetics is the core science of biology and increasingly it's going to be the way that people think about life," he is not offering just a prediction but a moral prescription: Genetics is how we *ought* to think about life. When Robert Sinsheimer, the prominent scientist who helped launch the drive for a genome project in 1985, tells us that it will provide "the complete set of instructions for making a human being," he certainly ignores everything else that goes into the making of a human being. More ominous, however, is his emphasis on "making," for this is the same Robert Sinsheimer who in 1973 advocated the conscious direction of human evolution toward a "higher state" through eugenics as the only unifying goal left that could save us from our cultural despair.

Heading the Human Genome Project is, of course, James Watson, codiscoverer of the structure of the DNA molecule. For Watson, the genome project is quite simply the culmination of his reductionist quest for understanding all of life including "ourselves at the molecular level." With this understanding we can and should increasingly control our fate. After all, why not? "A lot of people say they're worried about changing our genetic instructions," Watson acknowledges, "but those [instructions] are just a product of evolution designed to adapt us for certain conditions that may not exist today . . . [So] why not make ourselves a little better suited for survival? . . . That's what I think we'll do. We'll make ourselves a little better."

The point here is not to raise the specter

of mad scientists, hell-bent on eugenics, in charge of a multibillion-dollar government research project with important medical and political potential. Nor is it to suggest that a majority of researchers participating in the project share this metaphysical and social agenda. It is instead to argue that such pronouncements may have an important impact on public perception, public understanding, and ultimately public response to emerging biological knowledge and technologies. So pervasive is this highly reductive and deterministic view of life that it passes for self-evident and unproblematic scientific fact among those science writers and journalists who seek to keep the public informed about developments in biology. Newspapers and other media constantly refer to the genome as "the blueprint for a human being," "the formula for life" that "dictates . . . how an individual confronts the world" and that contains "the very essence" of our lives. They trumpet the discovery of "genes for" cancer, schizophrenia, manic-depression, and other maladies. In the *Philadelphia Inquirer* last fall, it was put quite simply: "Everything about us . . . is determined by genes."

Even those critical of some developments in modern biology find it difficult to escape from its reductive language. Robert Wright of the *New Republic*, in a highly caustic piece on Watson and the genome project, nevertheless adheres to what Watson's colleague Francis Crick dubbed the "Central Dogma" of molecular biology: that DNA makes RNA, RNA makes protein, and "proteins (to oversimplify just a bit) are us." The "implications" of such a dogma appear clear. DNA, as shaped by natural selection and chance, essentially determines who we are and how we live, yet like any "blueprint" can be altered to fit new needs.

That human beings, and perhaps other

organisms as well, are more than their DNA "blueprints" or the sum of their proteins; that DNA, however "magnificent" a tape it may be, does not constitute the "essence" of human life, nor tell us "what we are," in Watson's words, let alone who we are; that it is both incorrect and irresponsible to speak of having discovered "genes for alcoholism" or genes that "cause" schizophrenia, are ideas that have become so strange that they are virtually unthinkable. Yet because they have become unspoken and unthinkable, many will want to take actions and advocate policies on the basis of what passes for scientific fact.

When the news media announced the discovery of a "gene for alcoholism" in 1990, I recall mentioning to a colleague in chemistry that such language was dangerously misleading. After all, the research of Drs. Ernest Noble and Kenneth Blum had only suggested a possible genetic component contributing indirectly to the alcoholism of *some* individuals. To speak of a "gene for alcoholism" both exaggerates the degree of genetic influence and seems to attribute all forms and cases of alcoholism to the same biological cause. The study, moreover, has yet to be replicated by others and involved research on only 70 brains. Much to my surprise, the chemist strongly disagreed: "Now wait a minute! This may be a very important piece of knowledge," he said, "for it might mean that the best way of treating the problem of alcoholism is through its biological causes."

He was hardly alone in making the jump to possible biological interventions. Noble and Blum plan to develop a blood test within five years that would detect the presence of the relevant dopamine recep-

tor gene so that screening and treatment by drugs can begin. Forgetting for a moment that the gene identified seems to be correlated with something vaguely defined as "pleasure-seeking activity" in general and not simply some cases of alcoholism, and ignoring temporarily the potentially devastating, stigmatizing effects of such screening, there is still a shocking lack of awareness that the question of the "best way" to treat a problem such as alcoholism is not purely a question of efficiency, speed, or cost. It is a moral and political question as well, or at least it is if we recognize that we are dealing both with a problem that has important social, cultural, and psychological causes and with a being who possesses a potentially free and responsible soul that ought to be respected. It may even be possible that the "best way" morally to treat such a person may not be the most cost-effective way.

In the years to come cases like this will only proliferate. Regular "scientific breakthroughs" will torment and excite us, yielding genetic "determinants" for dozens of traits and attributes, both desirable and undesirable. Powerful economic and political interests, coupled with the understandable desire of individual human beings to maximize the well-being of themselves and their children, will continue to tempt us to pursue courses of biological intervention that will dehumanize us all, unwittingly, in the name of scientific progress, individual freedom, and compassion. Yet the road to such dehumanization in action begins with our prior dehumanization in thought—our forgetting the kind of beings we are and our construction of a new self-definition seemingly sanctioned by the biological sciences which, in their ignorance and ambition, encourage us to forget.