

OUR POSTHUMAN FUTURE CONSEQUENCES OF THE BIOTECHNOLOGY REVOLUTION

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A TALE OF TWO DYSTOPIAS

The threat to man does not come in the first instance from the potentially lethal machines and apparatus of technology. The actual threat has always afflicted man in his essence. The rule of enframing (*Gestell*) threatens man with the possibility that it could be denied to him to enter into a more original revealing and hence to experience the call of a more primal truth.

Martin Heidegger, *The Question Concerning Technology*

I was born in 1952, right in the middle of the American baby boom. For any person growing up as I did in the middle decades of the twentieth century, the future and its terrifying possibilities were defined by two books, George Orwell's *1984* (first published in 1949), and Aldous Huxley's *Brave New World* (published in 1932).

The two books were far more prescient than anyone realized at the time, because they were centered on two different technologies that would in fact emerge and define the world over the next two generations. The novel *1984* was about what we now call information technology: central to the success of the vast, totalitarian empire that had been set up over Oceania was a device called the telescreen, a wall-sized flat-panel display that could simultaneously send and receive images from each individual household to a hovering Big Brother. The telescreen was what permitted the vast centralization of social life under the Ministry of Truth and the Ministry

of Love, for it allowed the government to banish privacy by monitoring every word and deed over a massive network of wires.

Brave New World, by contrast, was about the other big technological revolution about to take place, that of biotechnology. Bokanovskification, the hatching of people not in wombs but, as we now say, invitro; the drug soma, which gave people instant happiness; the Feelies, in which sensation was simulated by implanted electrodes; and the modification of behavior through constant subliminal repetition and, when that didn't work, through the administration of various artificial hormones were what gave this book its particularly creepy ambiance.

With at least a half-century separating us from the publication of these books, we can see that while the technological predictions they made were startlingly accurate, the political predictions of the first book 1984, were entirely wrong. The year 1984 came and went, with the United States still locked in a Cold War struggle with the Soviet Union. That year saw the introduction of a new model of the IBM personal computer and the beginning of what became the PC revolution. As Peter Huber has argued, the personal computer, linked to the Internet, was in fact the realization of Orwell's telescreen. But instead of becoming an instrument of centralization and tyranny, it led to just the opposite: the democratization of access to information and the decentralization of politics. Instead of Big Brother watching everyone, people could use the PC and Internet to watch Big Brother, as governments everywhere were driven to publish more information on their own activities.

Just five years after 1984, in a series of dramatic events that would earlier have seemed like political science fiction, the Soviet Union and its empire collapsed, and the totalitarian threat that Orwell had so vividly evoked vanished. People were again quick to point out that these two events—the collapse of totalitarian empires and the emergence of the personal computer, as well as other forms of inexpensive information technology, from TVs and radios to faxes and e-mail—were not unrelated. Totalitarian rule depended on a regime's ability to maintain a monopoly over information, and once modern information technology made that impossible, the regime's power was undermined.

The political prescience of the other great dystopia, *Brave New World*, remains to be seen. Many of the technologies that Huxley envisioned, like in vitro fertilization, surrogate motherhood, psychotropic drugs, and genetic engineering for the manufacture of children, are already here or just over the horizon. But this revolution has only just begun; the daily avalanche of announcements of new breakthroughs in biomedical technology and achievements such as the completion of the Human Genome Project in the year 2000 portend much more serious changes to come.

Of the nightmares evoked by these two books, *Brave New World's* always struck more challenging and me as subtler. It is easy to see what's wrong with the world of 1984: the protagonist, Winston Smith, is known to hate rats above all things, so Big Brother devises a cage in which rats can bite at Smith's face in order to get him to betray his lover. This is the world of classical tyranny, technologically empowered but not so different from what we have tragically seen and known in human history.

In *Brave New World*, by contrast, the evil is not so obvious because no one is hurt; indeed, this is a world in which everyone gets what they want. As one of the characters notes, "The Controllers realized that force was no good," and that people would have to be seduced rather than compelled to live in an orderly society. In this world, disease and social conflict have been

abolished, there is no depression, and madness, loneliness, or emotional distress, sex is good and readily available. There is even a government ministry to ensure that the length of time between the appearance of a desire and its satisfaction is kept to a minimum. No one takes religion seriously any longer, no one is introspective or has unrequited longings, the biological family has been abolished, no one reads Shakespeare. But no one (save John the Savage, the book's protagonist) misses these things, either, since they are happy and healthy.

Since the novel's publication, there have probably been several million high school essays written in answer to the question, "What's wrong with this picture?" The answer given (on papers that get A's, at any rate) usually runs something like this: the people in *Brave New World* may be healthy and happy, but they have ceased to be *human beings*. They no longer struggle, aspire, love, feel pain, make difficult moral choices, have families, or do any of the things that we traditionally associate with being human. They no longer have the characteristics that give us human dignity. Indeed, there is no such thing as the human race any longer, since they have been bred by the Controllers into separate castes of Alphas, Betas, Epsilons, and Gammas who are as distant from each other as humans are from animals. Their world has become unnatural in the most profound sense imaginable, because *human nature* has been altered. In the words of bioethicist Leon Kass, "Unlike the man reduced by disease or slavery, the people dehumanized à la *Brave New World* are not miserable, don't know that they are dehumanized, and, what is worse, would not care if they knew. They are, indeed, happy slaves with a slavish happiness."

But while this kind of answer is usually adequate to satisfy the typical high school English teacher, it does not (as Kass goes on to note) probe nearly deeply enough. For one can go on to ask, what is so important about being a human being in the traditional way that Huxley defines it? After all, what the human race is today is the product of an evolutionary process that has been going on for millions of years, one that with any luck will continue well into the future. There are no fixed human characteristics, except for a general capability to choose what we want to be, to modify ourselves in accordance with our desires. So who is to tell us that being human and having dignity means sticking with a set of emotional responses that are the accidental byproduct of our evolutionary history? There is no such thing as a biological family, no such thing as human nature or a "normal" human being, and even if there were, why should that be a guide for what is right and just? Huxley is telling us, in effect, that we should continue to feel pain, be depressed or lonely, or suffer from debilitating disease, all because that is what human beings have done for most of their existences a species. Certainly, no one ever got elected to Congress on such a platform. Instead of taking these characteristics and saying that they are the basis for "human dignity," why don't we simply accept destiny as creatures who modify themselves?

Huxley suggests that one source for a definition of what it means to be a human being is religion. In *Brave New World*, religion has been abolished and Christianity is a distant memory. The Christian tradition maintains that man is created in God's image, which is the source of human dignity. To use biotechnology to engage in what another Christian writer, C. S. Lewis, called the "abolition of man," is thus a violation of God's will. But I don't think that a careful reading of Huxley or Lewis leads to the conclusion that either writer believed religion to be the *only* grounds on which one could understand the meaning of being human. Both writers suggest that nature itself, and in particular human nature, has a special role in defining for us what is right and wrong, just and unjust, important and unimportant. Our final judgment on "what's wrong" with Huxley's brave new world stands or falls with our view of how important human nature is as source of values.

The aim of this book is to argue that Huxley was right, that the most significant threat posed by contemporary biotechnology is the possibility that it will alter human nature and thereby move us into a "post human stage of history. This is important, I will argue, because human nature exists, is a meaningful concept, and has provided a stable continuity to our experience as a species. It is, conjointly with religion, what defines our most basic values. Human nature shapes and constrains the possible kinds of political regimes, so a technology powerful enough to reshape what we are will have possibly malign consequences for liberal democracy and the nature of politics itself.

It may be that, as in the case of 1984, we will eventually find biotechnology's consequences are completely and surprisingly benign, and that we were wrong to lose sleep over it. It may be that the technology will in the end prove much less powerful than it seems today, or that people will be moderate and careful in their application of it. But one of the reasons I am not quite so sanguine is that biotechnology, in contrast to many other scientific advances, mixes obvious benefits with subtle harms in one seamless package.

Nuclear weapons and nuclear energy were perceived as dangerous from the start, and therefore were subject to strict regulation from the moment the Manhattan Project created the first atomic bomb in 1945. Observers like Bill Joy have worried about nanotechnology—that is, molecular-scale self-replicating machines capable of reproducing out of control and destroying their creators. But such threats are actually the easiest to deal with because they are so obvious. If you are likely to be killed by a machine you've created, you take measures to protect yourself. And so far we've had a reasonable record in keeping our machines under control.

There may be products of biotechnology that will be similarly obvious in the dangers they pose to mankind—for example, superbugs, new viruses, or genetically modified foods that produce toxic reactions. Like nuclear weapons or nanotechnology, these are in a way the easiest to deal with because once we have identified them as dangerous, we can treat them as a straightforward threat. The more typical threats raised by biotechnology are those captured so well by Huxley, and are summed up in the title of an article by novelist Tom Wolfe, "Sorry, but Your Soul Just Died." Medical technology offers us in many cases a devil's bargain: longer life, but with reduced mental capacity; freedom from depression, together with freedom from creativity or spirit; therapies that blur the line between what we achieve on our own and what we achieve because of the levels of various chemicals in our brains.

Consider the following three scenarios, all of which are distinct possibilities that may unfold over the next generation or two.

The first has to do with new drugs. As a result of advances in neuropharmacology, psychologists discover that human personality is much more plastic than formerly believed. It is already the case that psychotropic drugs such as Prozac and Ritalin can affect traits like self-esteem and the ability to concentrate, but they tend to produce a host of unwanted side effects and hence are shunned except in cases of clear therapeutic need. But in the future, knowledge of genomics permits pharmaceutical companies to tailor drugs very specifically to the genetic profiles of individual patients and greatly minimize unintended side effects. Stolid people can become vivacious; introspective ones extroverted; you can adopt one personality on Wednesday and another for the weekend. There is no longer any excuse for anyone to be depressed or unhappy; even "normally" happy people can market themselves happier without worries of addiction, hangovers, or long-term brain damage.

In the second scenario, advances in stem cell research allow scientists to regenerate virtually any tissue in the body, such that life expectancies are pushed well above 100 years. If you need a new heart or liver, you just grow one inside the chest cavity of a pig or cow; brain damage from Alzheimer's and stroke can be reversed. The only problem is that there are many subtle and some not-so-subtle aspects of human aging that the biotech industry hasn't quite figured out how to fix: people grow mentally rigid and increasingly fixed in their views as they age, and try as they might, they can't make themselves sexually attractive to each other and continue to long for partners of reproductive age. Worst of all, they just refuse to get out of the way, not just of their children, but their grandchildren, and great-grandchildren. On the other hand, so few people have children or any connection with traditional reproduction that it scarcely seems to matter.

In a third scenario, the wealthy routinely screen embryos before implantation so as to optimize the kind of children they have. You can increasingly tell the social background of a young person by his or her looks and intelligence; if someone doesn't live up to social expectations, he tends to blame bad genetic choices by his parents rather than himself. Human genes have been transferred to animals and even to plants, for research purposes and to produce new medical products; and animal genes have been added to certain embryos to increase their physical endurance or resistance to disease. Scientists have not dared to produce a full-scale chimera, half human and half ape, though they could; but young people begin to suspect that classmates who do much less well than they do are in fact genetically not fully human. Because, in fact, they aren't.

Sorry, but your soul just died...

Toward the very end of his life, Thomas Jefferson wrote, "The general spread of the light of science has already laid open to every view the palpable truth, that the mass of mankind has not been born with saddles on their backs, nor a favored few booted and spurred, ready to ride them legitimately, by the grace of God." The political equality enshrined in the Declaration of Independence rests on the empirical fact of natural human equality. We vary greatly as individuals and by culture, but we share a common humanity that allows every human being to potentially communicate with and enter into a moral relationship with every other human being on the planet. The ultimate question raised by biotechnology is, What will happen to political rights once we are able to, in effect, breed some people with saddles on their backs, and others with boots and spurs?

A STRAIGHTFORWARD SOLUTION

What should we do in response to biotechnology that in the future will mix great potential benefits with threats that are either physical and obvious or spiritual and subtle? The answer is obvious: *We should use the power of the state to regulate it.* And if this proves to be beyond the power of any individual nation-state to regulate, it needs to be regulated on an international basis. We need to start thinking concretely now about how to build institutions that can discriminate between good and bad uses of biotechnology, and effectively enforce these rules both nationally and internationally.

This obvious answer is not obvious to many of the participants in the current biotechnology debate. The discussion remains mired at a relatively abstract level about the ethics of procedures

like cloning or stem cell research, and divided into one camp that would like to permit everything, and another camp that would like to ban wide areas of research and practice. The broader debate is of course an important one, but events are moving so rapidly that we will soon need more practical guidance on how we can direct future developments so that the technology remains man's servant rather than his master. Since it seems very unlikely that we will either permit everything or ban research that is highly promising, we need to find a middle ground.

The creation of new regulatory institutions is not something that should be undertaken lightly, given the inefficiencies that surround all efforts at regulation. For the past three decades, there has been commendable worldwide movement to deregulate large sectors of every nation's economy, from airlines to telecommunications, and more broadly to reduce the size and scope of government. The global economy that has emerged as a result is a far more efficient generator of wealth and technological innovation. Excessive regulation in the past, however, led many to become instinctively hostile to state intervention in any form, and it is this knee-jerk aversion to regulation that will be one of the chief obstacles to getting human biotechnology under political control.

But it is important to discriminate: what works for one sector of the economy will not work for another. Information technology, for example, produces many social benefits and relatively little harm and therefore has appropriately gotten by with a fairly minimal degree of government regulation. Nuclear materials and toxic waste, on the other hand, are subject to strict national and international controls because unregulated trade in them would clearly be dangerous.

One of the biggest problems in making the case for regulating human biotechnology is the common view that even if it were desirable to stop technological advance, it is impossible to do so. If the United States or any other single country tries to ban human cloning or germ line genetic engineering or any other procedure, people who wanted to do these things would simply move to a more favorable jurisdiction where they were permitted. Globalization and intern wanted competition in biomedical research ensure that countries that hobble themselves by putting ethical constraints on their scientific communities or biotechnology industries will be punished.

The idea that it is impossible to stop or control the advance of technology is simply wrong, for reasons that will be laid out more fully in Chapter 10 of this book. We in fact control all sorts of technologies and many types of scientific research: people are no more free to experiment in the development of new biological warfare agents than they are to experiment on human subjects without the latter's informed consent. The fact that there are some individuals or organizations that violate these rules, or that there are countries where the rules are either nonexistent or poorly enforced, is no excuse for not making the rules in the first place'. People get away with robbery and murder, after all, which is not a reason to legalize theft and homicide.

We need at all costs to avoid a defeatist attitude with regard to technology that says that since we can't do anything to stop or shape developments we don't like, we shouldn't bother trying in the first place. Putting in place a regulatory system that would permit societies to control human biotechnology will not be easy: it will require legislators in countries around the world to step up to the plate and make difficult decisions on complex scientific issues. The shape and form of the institutions designed to implement new rules is a wide-open question; designing them to be minimally obstructive of positive developments while giving them effective enforcement capabilities is a significant challenge. Even more challenging will be the creation of common rules at an international level, the forging of a consensus among countries with different cultures

and views on the underlying ethical questions. But political tasks of comparable complexity have been successfully undertaken in the past.

BIOTECHNOLOGY AND THE RECOMMENCEMENT OF HISTORY

Many of the current debates over biotechnology, on issues like cloning, stem cell research, and germ-line engineering, are polarized between the scientific community and those with religious commitments. I believe that this polarization is unfortunate because it leads many to believe that the *only* reason one might object to certain advances in biotechnology is out of religious belief. Particularly in the United States, biotechnology has been drawn into the debate over abortion; many researchers feel that valuable progress is being checked out of deference to a small number of antiabortion fanatics.

I believe that it is important to be wary of certain innovations in biotechnology for reasons that have nothing to do with religion. The case that I will lay out here might be called Aristotelian, not because I am appealing to Aristotle's authority as a philosopher, but because I take his mode of rational philosophical argument about politics and nature as a model for what I hope to accomplish.

Aristotle argued, in effect, that human notions of right and wrong—what we today call human rights—were ultimately based on human nature. That is, without understanding how natural desires, purposes, traits, and behaviors fit together into a human whole, we cannot understand human ends or make judgments about right and wrong, good and bad, just and unjust. Like many more recent utilitarian philosophers, Aristotle believed that the good was defined by what people desired; but while utilitarian's seek to reduce human ends to a simple common denominator like the relief of suffering or the maximization of utility, Aristotle retained a complex and nuanced view of the diversity and greatness of natural human ends. The purpose of his philosophy was to try to differentiate the natural from the conventional, and to rationally order human goods.

Aristotle, together with his immediate predecessors Socrates and Plato, initiated a dialogue about the nature of human nature that continued in the Western philosophical tradition right up to the early modern period, when liberal democracy was born. While there were significant disputes over what human nature was, no one contested its importance as a basis for rights and justice. Among the believers in natural right were the American Founding Fathers, who based their revolution against the British crown on it. Nonetheless, the concept has been out of favor for the past century or two among academic philosophers and intellectuals.

As we will see in Part II of this book, I believe this is a mistake, and that any meaningful definition of rights must be based on substantive judgments about human nature. Modern biology is finally giving some meaningful empirical content to the concept of human nature, just as the biotech revolution threatens to take the punchbowl away.