

The Age of Genetic Technology Arrives

Leon R. Kass¹

Abstract

As one contemplates the current and projected state of genetic knowledge and technology, one is astonished by how far we have come in the less than fifty years since Watson and Crick first announced the structure of DNA. True, soon after that discovery, scientists began seriously to discuss the futuristic prospects of gene therapy for genetic disease and of genetic engineering more generally. But no one then imagined how rapidly genetic technology would emerge. The Human Genome Project, disclosing the DNA sequences of all thirty thousand human genes, is all but completed. And even without comprehensive genomic knowledge, biotech business is booming. According to a recent report by the research director for GlaxoSmithKline, enough sequencing data are already available to keep his researchers busy for the next twenty years, developing early detection screening techniques, rationally designed vaccines, genetically engineered changes in malignant tumors leading to enhanced immune response, and, ultimately, precise gene therapy for specific genetic diseases. The age of genetic technology has arrived.

Genetic technology comes into existence as part of the large humanitarian project to cure disease, prolong life, and alleviate suffering. As such, it occupies the moral high ground of compassionate healing. Who would not welcome personal genetic profiling that would enable doctors to customize the most effective and safest drug treatments for individuals with hypertension or rheumatoid arthritis? Who would not welcome genetic therapy to correct the defects that lead to sickle cell anemia, Huntington's disease, and breast cancer, or to protect against the immune deficiency caused by the AIDS Virus?

And yet genetic technology has also aroused considerable public concern, for it strikes most people as different from other biomedical technologies. Even people duly impressed by the astonishing genetic achievements of the last decade and eager for the medical benefits are nonetheless ambivalent about these new developments. For they sense that genetic technology, while in some respects continuous with the traditional medical project of compassionate healing, also represents something radically new and disquieting. Often hard-pressed to articulate the precise basis of their disquiet, they talk in rather general terms about the dangers of eugenics or the fear of "tampering with human genes" or, for that matter, "playing God."

Introduction

Enthusiasts for genetic technology, made confident by their expertise and by their growing prestige and power, are often impatient with the public's disquiet. Much of it they attribute to igno-

1. Leon R. Kass, M.D. is professor in social thought at the University of Chicago, Hertog fellow at the American Enterprise Institute, and chairman of the President's Council on Bioethics. Excerpted from *Life, Liberty and the Defense of Dignity*. Published by Encounter Books, San Francisco, October 2002. Reprinted with permission by *The American Spectator*, November/December 2002.

rance of science: “If the public only knew what we know, it would see things our way and give up its irrational fears.” For the rest, they blame outmoded moral and religious notions, ideas that scientists insist no longer hold water and only serve to obstruct scientific progress.

In my own view, the scientists’ attempt to cast the debate as a battle of beneficial and knowledgeable cleverness versus ignorant and superstitious anxiety should be resisted. For the public is right to be ambivalent about genetic technology, and no amount of instruction in molecular biology and genetics should allay its — our — legitimate human concerns. Rightly understood, these worries are, in fact, in touch with the deepest matters of our humanity and dignity, and we ignore them at our peril.

I will not dispute here which of the prophesied technologies will in fact prove feasible or how soon.¹ To be sure, as a practical matter we must address the particular ethical issues raised by each new technical power as it comes into existence. But the moral meaning of the entire enterprise does not depend on the precise details regarding what and when. I shall proceed by raising a series of questions, the first of which is an attempt to say how genetic technology is different.

Is Genetic Technology Special?

What is different about genetic technology? At first glance, not much. Isolating a disease-inducing aberrant gene looks fairly continuous with isolating a disease-inducing intracellular virus. Supplying diabetics with normal genes for producing insulin has the same medical goal as supplying them with insulin for injection.

Nevertheless, despite these obvious similarities, genetic technology is also decisively different. When fully developed, it will wield two powers not shared by ordinary medical practice. Medicine treats only existing individuals, and it treats them only remedially, seeking to correct deviations from a more or less stable norm of health. By contrast, genetic engineering will, first of all, deliberately make changes that are transmissible into succeeding generations and may even alter in advance specific *future* individuals through direct “germ-line” or embryo interventions. Secondly, genetic engineering may be able, through so-called genetic enhancement, to create new human capacities and, hence, new norms of health and fitness.²

-
1. I will also not dispute here the scientists’ reductive understanding of life and their treatment of rich vital activities solely in terms of the interactions of genes. I do, however, touch on the moral significance of such reductionism toward the end of this essay.
 2. Some commentators, in disagreement with these arguments, insist that genetic technology differs only in degree from previous human practices that have existed for millennia. For example, they see no difference between the “social engineering” of education, which works on the next generation through speech or symbolic deed, and biological engineering, which inscribes its effects, directly and irreversibly, into the human constitution. Or they claim to see no difference between the indirect genetic effects of human mate selection and deliberate, direct genetic engineering to produce offspring with precise biological capacities. Such critics, I fear, have already bought into a reductionist view of human life and the relation between the generations. And they ignore the fact that most people choose their mates for reasons different from stud farming.

For the present, it is true, genetic technology is hailed primarily for its ability better to diagnose and treat *disease* in *existing* individuals. Confined to such practices, it would raise few questions (beyond the usual ones of safety and efficacy). Even intrauterine gene therapy for existing fetuses with diagnosable genetic disease could be seen as an extension of the growing field of fetal medicine.

But there is no reason to believe that the use of gene-altering powers can be so confined, either in logic or in practice. For one thing, “germ-line” gene therapy and manipulation, affecting not merely the unborn but also the unconceived,¹ is surely in our future. The practice has numerous justifications, beginning with the desire to reverse the unintended dysgenic effects of modern medical success. Thanks to medicine, for example, individuals who would have died from diabetes now live long enough to transmit their disease-producing genes. Why, it has been argued, should we not reverse these unfortunate changes by deliberate intervention? More generally, why should we not effect precise genetic alteration in disease-carrying sperm or eggs or early embryos in order to prevent in advance the emergence of disease that otherwise will later require expensive and burdensome treatment? In short, even before we have had more than trivial experience with gene therapy for existing individuals — none of it successful — sober people have called for overturning the current (self-imposed) taboo on germ-line modification. The line between somatic and germ-line modification cannot hold.

Despite the naive hopes of many, neither will we be able defend the boundary between therapy and genetic enhancement. Will we reject novel additions to the human genome that enable us to produce, internally, vitamins or amino acids we now must get in our diet? Will we decline to make alterations in the immune system that will increase its efficacy or make it impervious to HIV? When profiling becomes able to disclose the genetic contributions to height or memory or intelligence, will we deny prospective parents the right to enhance the potential of their children?² Finally, should we discover — as no doubt we will — the genetic switches that control our biological clock and that very likely influence also the maximum human life expectancy, will we opt to keep our hands off the rate of aging or our natural human life span? Not a chance.

We thus face a paradox. On the one hand, genetic technology really *is* different. It can and will go to work directly and deliberately on our basic, heritable, life-shaping capacities at their biological roots. It can take us beyond existing norms of health and healing — perhaps even alter fundamental features of human nature. On the other hand, precisely because the goals it will serve, at least to begin with, will be continuous with those of modern high-interventionist medicine, we will find its promise familiar and irresistible.

-
1. Correction of a genetically abnormal egg or sperm (that is, of the “germ cells”), however worthy an activity, stretches the meaning of “therapy” beyond all normal uses. Just who is the “patient” being “treated”? The potential child-to-be that might be formed out of such egg or sperm is, at the time of the treatment, at best no more than a hope and a hypothesis. There is no medical analogue for treatment of nonexistent patients.
 2. To be sure, not all attempts at enhancement will require genetic alterations. We have already witnessed efforts to boost height with supplementary growth hormone or athletic performance with steroids or “blood doping.” Nevertheless, the largest possible changes in what is “normally” human are likely to come about only with the help of genetic alterations or the joining of machines (for example, computers) to human beings.

This paradox itself contributes to public disquiet: rightly perceiving a powerful difference in genetic technology, we also sense that we are powerless to establish, on the basis of that difference, clear limits to its use. The genetic genie, first unbottled to treat disease, will go its own way, whether we like it or not.

How Much Genetic Self-Knowledge Is Good for Us?

Quite apart from worries about genetic engineering, gaining genetic knowledge is itself a legitimate cause of anxiety, not least because of one of its most touted benefits — the genetic profiling of individuals. There has been much discussion about how knowledge of someone’s genetic defects, if leaked to outsiders, could be damaging in terms landing a job or gaining health or life insurance, and legislative measures have been enacted to guard against such hazards. Little attention has been paid, however, to the implications of genetic knowledge for the person himself. Yet the deepest problem connected with learning of your own genetic sins and unhealthy predispositions is neither the threat to confidentiality nor the risk of “genetic discrimination” in employment or insurance, important though these practical problems may be.¹ It is, rather, the various hazards and deformations in living your life that will attach to knowing in advance your likely or possible medical future. To be sure, in some cases such foreknowledge will be welcome, if it can lead to easy measures to prevent or treat the impending disorder, and if the disorder in question does not powerfully affect self-image or self-command. But will and should we welcome knowledge that we carry a predisposition to Alzheimer’s disease or schizophrenia, or genes that will definitely produce, at an unknown future time, a serious but untreatable disease?

Still harder will it be for most people to live easily and wisely with less certain information — say, where multigenic traits are involved. The recent case of a father who insisted that ovariectomy and mastectomy be performed on his ten-year-old daughter because she happened to carry the BRCA-1 gene for breast cancer dramatically shows the toxic effect of genetic knowledge.

Less dramatic but more profound is the threat to human freedom and spontaneity, a subject explored twenty-five years ago by the philosopher Hans Jonas, one of our wisest commentators on technology and the human prospect. As Jonas observed, “Knowledge of the future, especially one’s own, has always been excepted [from the injunction to ‘Know thyself’] and the attempt to gain it by whatever means (astrology is one) disparaged — as futile superstition by the enlightened, but as sin by theologians.” Everyone remembers that Prometheus was the philanthropic god who gave fire and the arts to humans. But it is often forgotten that he gave them also the greater gift of “blind hopes” — “to cease seeing doom before their eyes” — precisely because he knew that ignorance of one’s own future fate was indispensable to aspiration and achievement. I suspect that many people, taking their bearings from life lived open-endedly rather than from preventive

1. I find it odd that it is these issues that have been put forward as the special ethical problems associated with genetic technology and the Human Genome Project. Issues of privacy and risks of discrimination related to medical conditions are entirely independent of whether the medical condition is genetic in origin. Only if a special stigma were attached to having an inherited disease — for example, only if having thalassemia or sickle cell anemia were more shameful than having gonorrhea or lung cancer — would the genetic character of a disease create special or additional reasons for protecting against breaches of confidentiality or discrimination in the workplace.

medicine practiced rationally, would prefer ignorance of the future to the scientific astrology of knowing their genetic profile. In a free society, that would be their right.

Or would it? This leads us to the third question.

What About Freedom?

Even people who might otherwise welcome the growth of genetic knowledge and technology are worried about the coming power of geneticists, genetic engineers and, in particular, governmental authorities armed with genetic technology.¹ Precisely because we have been taught by these very scientists that genes hold the secret of life, and that our genotype is our essence if not quite our destiny, we are made nervous by those whose expert knowledge and technique touch our very being. Even apart from any particular abuses and misuses of power, friends of human freedom have deep cause for concern.

C. S. Lewis, no friend of ignorance, put the matter sharply in *The Abolition of Man*:

If any one age really attains, by eugenics and scientific education, the power to make its descendants what it pleases, all men who live after it are the patients of that power.... But even within this master generation (itself an infinitesimal minority of the species) the power will be exercised by a minority smaller still. Man's conquest of Nature, if the dreams of some scientific planners are realized, means the rule of a few hundreds of men over billions upon billions of men.

Most genetic technologists will hardly recognize themselves in this portrait. Though they concede that abuses or misuses of power may occur, especially in tyrannical regimes, they see themselves not as predestinators but as facilitators, merely providing increased knowledge and technique that people can freely choose to use in making decisions about their health or reproductive choices. Genetic power, they tell us, serves not to limit freedom, but to increase it.

But as we can see from the already existing practices of genetic screening and prenatal diagnosis, this claim is at best self-deceptive, at worst disingenuous. The choice to develop and practice genetic screening and the choices of which genes to target for testing have been made not by the public but by scientists — and not on liberty-enhancing but on eugenic grounds. In many cases, practitioners of prenatal diagnosis refuse to do fetal genetic screening in the absence of a prior commitment from the pregnant woman to abort any afflicted fetus. In other situations, pregnant women who still wish *not* to know prenatal facts must withstand strong medical pressures for testing.

1. Until the events of September 11 and the anthrax scare that followed, they did not worry enough. It is remarkable that most bioethical discussions of genetic technology had naively neglected its potential usefulness in creating biological weapons, such as, to begin with, antibiotic-resistant plague bacteria, or later, aerosols containing cancer-inducing or mind-scrambling viral vectors. The most outstanding molecular geneticists were especially naive in this area. When American molecular biologists convened the 1975 Asilomar Conference on recombinant DNA research, which called for a voluntary moratorium on experiments until the biohazards could be evaluated, they invited Soviet biologists to the meeting who said virtually nothing but who photographed every slide that was shown.

In addition, economic pressures to contain health care costs will almost certainly constrain free choice. Refusal to provide insurance coverage for this or that genetic disease may eventually work to compel genetic abortion or intervention. State-mandated screening already occurs for PKU (phenylketonuria) and other diseases, and full-blown genetic screening programs loom large on the horizon. Once these arrive, there will likely be an upsurge of economic pressure to limit reproductive freedom. All this will be done, of course, in the name of the well-being of children.

Already in 1971, geneticist Bentley Glass, in his presidential address to the American Association for the Advancement of Science, enunciated “the right of every child to be born with a sound physical and mental constitution, based on a sound genotype.” Looking ahead to the reproductive and genetic technologies that are today rapidly arriving, Glass proclaimed: “No parents will in that future time have a right to burden society with a malformed or a mentally incompetent child.” It remains to be seen to what extent such prophecies will be realized. But they surely provide sufficient and reasonable grounds for being concerned about restrictions on human freedom, even in the absence of overt coercion, and even in liberal polities like our own.

What About Human Dignity?

Here, rather than in the more discussed fears about freedom, lie our deepest concerns, and rightly so. For threats to human dignity can — and probably will — arise even with the free, humane, and “enlightened” use of these technologies. Genetic technology, the practices it will engender, and above all the scientific teachings about human life on which it rests are not, as many would have it, morally and humanly neutral. Regardless of how they are practiced or taught, they are pregnant with their own moral meanings and will necessarily bring with them changes in our practices, our institutions, our norms, our beliefs, and our self-conception. It is, I submit, these challenges to our dignity and humanity that are at the bottom of our anxiety over genetic science and technology. Let me touch briefly on four aspects of this most serious matter.

“Playing God”

Paradoxically, worries about dehumanization are sometimes expressed in the fear of super humanization, that is, that man will be “playing God.” This complaint is too facetly dismissed by scientists and nonbelievers. The concern has meaning, God or no God.

Never mind the exaggeration that lurks in this conceit of man’s playing God. (Even at his most powerful, after all, man is capable only of *playing* God.) Never mind the implicit innuendo that nobody has given to others this creative and judgmental authority, or the implicit retort that there is theological warrant for acting as God’s co-creator in overcoming the ills and suffering of the world. Consider only that if scientists are seen in this godlike role of creator, judge, and savior, the rest of us must stand before them as supplicating, tainted creatures. Despite the hyperbolic speech, that is worry enough.

Practitioners of prenatal diagnosis, working today with but a fraction of the information soon to be available from the Human Genome Project, already screen for a long list of genetic diseases and abnormalities, from Down syndrome to dwarfism. Possession of any one of these defects,

they believe, renders a prospective child unworthy of life. Persons who happen still to be born with these conditions, having somehow escaped the spreading net of detection and eugenic abortion, are increasingly regarded as “mistakes,” as inferior human beings who should not have been born.¹ Not long ago, at my own university, a physician making rounds with medical students stood over the bed of an intelligent, otherwise normal ten-year-old boy with spina bifida. “Were he to have been conceived today,” the physician casually informed his entourage, “he would have been aborted.” Determining who shall live and who shall die — on the basis of genetic merit — is a godlike power already wielded by genetic medicine. This power will only grow.

Manufacture and Commodification

But, one might reply, genetic technology also holds out the promise of redemption, of a *cure* for these life-crippling and life-forfeiting disorders. Very well. But in order truly to practice their salvific power, genetic technologists will have to increase greatly their manipulations and interventions, well beyond merely screening and weeding out. True, in some cases genetic testing and risk management aimed at prevention may actually cut down on the need for high-tech interventions aimed at cure. But in many other cases, ever-greater genetic scrutiny will lead necessarily to ever more extensive manipulation. And, to produce Bentley Glass’s healthy and well-endowed babies, let alone babies with the benefits of genetic enhancement, a new scientific obstetrics will be necessary, one that will come very close to turning human procreation into manufacture.

This process was already crudely begun with in vitro fertilization. It is now taking giant steps forward with the ability to screen in vitro embryos before implantation (so-called pre-implantation genetic diagnosis). And it will come to maturity with interventions such as cloning and, eventually, with precise genetic engineering. Just follow the logic and the aspirations of current practice: the road we are traveling leads all the way to the world of designer babies — reached not by dictatorial fiat, but by the march of benevolent humanitarianism, and cheered on by an ambivalent citizenry that also dreads becoming merely the last of man’s man-made things.

Make no mistake: the price to be paid for producing optimum or even only genetically sound babies will be the transfer of procreation from the home to the laboratory. Such an arrangement will be profoundly dehumanizing, no matter how genetically good or healthy the resultant children. And let us not forget the powerful economic interests that will surely operate in this area; with their advent, the commodification of nascent human life will be unstoppable.

Standards, Norms, and Goals

According to Genesis, God, in His creating, looked at His creatures and saw that they were *good* — intact, complete, well-working wholes, true to the spoken idea that guided their creation. What standards will guide the genetic engineers?

1. One of the most worrisome but least appreciated aspects of the godlike power of the new genetics is its tendency to “redefine” a human being in terms of his genes. Once a person is decisively characterized by his genotype, it is but a short step to justifying death solely for genetic sins.

For the time being, one might answer, the norm of health. But even before the genetic enhancers join the party, the standard of health is being deconstructed. Are you healthy if, although you show no symptoms, you carry genes that will definitely produce Huntington's disease? What if you carry, say, 40 percent of the genetic markers thought to be linked to the appearance of Alzheimer's disease? And what will "healthy" and "normal" mean when we discover your genetic propensities for alcoholism, drug abuse, pederasty, or violence?¹ The idea of health progressively becomes at once both imperial and vague: medicalization of what have hitherto been mental or moral matters paradoxically brings with it the disappearance of any clear standard of health itself.

Once genetic *enhancement* comes on the scene, standards of health, wholeness, or fitness will be needed more than ever, but just then is when all pretense of standards will go out the window. "Enhancement" is, of course, a euphemism for "improvement," and the idea of improvement necessarily implies a good, a better, and perhaps even a best. If, however, we can no longer look to our previously unalterable human nature for a standard or norm of what is good or better, how will anyone know what constitutes an improvement? It will not do to assert that we can extrapolate from what we like about ourselves. Because memory is good, can we say how much more memory would be better? If sexual desire is good, how much more would be better? Life is good, but how much extension of the life span would be good for us? Only simplistic thinkers believe they can easily answer such questions.²

More modest enhancers, like more modest genetic therapists and technologists, eschew grandiose goals. They are valetudinarians, not eugenicists. They pursue not some far away positive good, but the positive elimination of evils: diseases, pain, suffering, the likelihood of death. But let us not be deceived. Hidden in all this avoidance of evil is nothing less than the quasi-messianic goal of a painless, suffering-free and, finally, immortal existence. Only the presence of such a goal justifies the sweeping-aside of any opposition to the relentless march of medical science. Only such a goal gives trumping moral power to the principle "cure disease, relieve suffering."

"Cloning human beings is unethical and dehumanizing you say? Never mind: it will help us treat infertility, avoid genetic disease, and provide perfect materials for organ replacement." Such, indeed, was the tenor of the June 1997 report of the National Bioethics Advisory Commission, *Cloning Human Beings*. Notwithstanding its call for a temporary ban on the practice, the only moral objection the commission could agree upon was that cloning "is not safe to use in humans at this time," because the technique has yet to be perfected.³ Even this elite ethical body, in other words, was unable to muster any other moral argument sufficient to cause us to forgo the possible health benefits of cloning.⁴

-
1. Many scientists suspect that we have different inherited propensities for these and other behavioral troubles, though it is almost certain that there is no single "gene for x" that is responsible.
 2. This strikes me as the deepest problem with positive eugenics: less the threat of coercion, more the presumption of thinking we are wise enough to engineer "improvements" in the human species.
 3. This is, of course, not an objection to cloning itself but only to hazards tied to the technique used to produce the replicated children.
 4. I forbear mentioning what is rapidly becoming another trumping argument: increasing the profits of my biotech company and its shareholders, an argument often presented in more public-spirited dress: if we don't do it, other countries will, and we will lose our competitive edge in biotechnology.

The same argument will also justify creating and growing human embryos for experimentation, revising the definition of death to increase the supply of organs for transplantation, growing human body parts in the peritoneal cavities of animals, perfusing newly dead bodies as factories for useful biological substances, or reprogramming the human body and mind with genetic or neurobiological engineering. Who can sustain an objection if these practices will help us live longer and with less overt suffering?

It turns out that even the more modest biogenetic engineers, whether they know it or not, are in the immortality business, proceeding on the basis of a quasi-religious faith that all innovation is by definition progress, no matter what is sacrificed to attain it.

The Tragedy of Success

What the enthusiasts do not see is that their utopian project will not eliminate suffering but merely shift it around. Forgetting that contentment requires that our desires do not outpace our powers, they have not noticed that the enormous medical progress of the last half-century has not left the present generation satisfied. Indeed, we are already witnessing a certain measure of public discontent as a paradoxical result of rising expectations in the health care field: although their actual health has improved substantially in recent decades, people's *satisfaction* with their current health status has remained the same or declined. But that is hardly the highest cost of success in the medical/humanitarian project.

As Aldous Huxley made clear his prophetic *Brave New World*, the road chosen and driven by compassionate humaneness paved by biotechnology, if traveled to the end, leads not to human fulfillment but to human debasement. Perfected bodies are achieved at the price of flattened souls. What Tolstoy called "real life" — life in its immediacy, vividness, and rootedness — has been replaced by an utterly mediated, sterile, and disconnected existence. In one word: dehumanization, the inevitable result of making the essence of human nature the final object of the conquest of nature for the relief of man's estate. Like Midas, bioengineered man will be cursed to acquire precisely what he wished for, only to discover — painfully and too late — that what he wished for is not exactly what he wanted. Or, worse than Midas, he may be so dehumanized he will not even recognize that in aspiring to be perfect, he is no longer even truly human. To paraphrase Bertrand Russell, technological humanitarianism is like a warm bath that heats up so imperceptibly you don't know when to scream.

The main point here is not the rightness or wrongness of this or that imagined scenario; all this is, admittedly, highly speculative. I surely have no way of knowing whether my worst fears will be realized, but you surely have no way of knowing they will not. The point is rather the plausibility, even the wisdom, of thinking about genetic technology like the entire technological venture, under the ancient and profound idea of tragedy in which success and failure are inseparably grown together like the concave and the convex. What I am suggesting is that genetic technology's way of approaching human life, a way spurred on by the utopian promises and perfectionist aims of modern thought and its scientific crusaders, may well turn out to be inevitable, heroic, and doomed. If this suggestion holds water, then the question regarding genetic technology is not "triumph *OR* tragedy" because the answer is "both together."

In the nineteenth and early twentieth century, the challenge came in the form of Darwinism and its seeming opposition to biblical religion, a battle initiated not so much by the scientists as by the beleaguered defenders of orthodoxy. In our own time, the challenge comes from molecular biology, behavioral genetics, and evolutionary psychology, fueled by their practitioners' overconfident belief in the sufficiency of their reductionist explanations of all vital and human phenomena. Never mind "created in the image of God"; what elevated *humanistic* view of human life or human goodness is defensible against the belief, asserted by most public and prophetic voices of biology, that man is just a collection of molecules, an accident on the stage of evolution, a freakish speck of mind in a mindless universe, fundamentally no different from other living — or even nonliving — things? What chance have our treasured ideas of freedom and dignity against the reductive notion of "the selfish gene" (or, for that matter, of "genes for altruism"), the belief that DNA is the essence of life, or the teaching that all human behavior and our rich inner life are rendered intelligible only in terms of their contributions to species survival and reproductive success?

These transformations are, in fact, welcomed by many of our leading scientists and intellectuals. In 1997 the luminaries of the International Academy of Humanism — including biologists Crick, Dawkins, and Wilson, and humanists Isaiah Berlin, W.V. Quine, and Kurt Vonnegut — issued a statement in defense of cloning research in higher mammals and human beings. Their reasons were revealing:

Views of human nature rooted in humanity's tribal past ought not to be our primary criterion for making moral decisions about cloning.... The potential benefits of cloning may be so immense that it would be a tragedy if ancient theological scruples should lead to a Luddite rejection of cloning.

In order to justify ongoing research, these intellectuals were willing to shed not only traditional religious views, but any view of human distinctiveness and special dignity, their own included. They failed to see that the scientific view of man they celebrated does more than insult our vanity. It undermines our self-conception as free, thoughtful, and responsible beings, worthy of respect because we alone among the animals have minds and hearts that aim far higher than the mere perpetuation of our genes.

The problem may lie not so much with the scientific findings themselves, but with the shallow philosophy that recognizes no other truths but these and with the arrogant pronouncements of the bioprophets. For example, in a letter to the editor complaining about a review of his book *How the Mind Works*, the well-known evolutionary psychologist and popularizer Stephen Pinker rails against any appeal to the human soul:

Unfortunately for that theory, brain science has shown that the mind is what the brain does. The supposedly immaterial soul can be bisected with a knife, altered by chemicals, turned on or off by electricity, and extinguished by a sharp blow or a lack of oxygen. Centuries ago it was unwise to ground morality on the dogma that the earth sat at the center of the universe. It is just as unwise today to found it on dogmas about souls endowed by God.

One hardly knows whether to be more impressed by the height of Pinker's arrogance or by the depth of his shallowness. But he speaks with the authority of science, and few are able and willing to dispute him on his own grounds.

There is, of course, nothing novel about reductionism, materialism, and determinism of the kind displayed here; these are doctrines with which Socrates contended long ago. What is new is that, as philosophies, they seem (to many people) to be vindicated by scientific advance. Here, in consequence, is perhaps the most pernicious result of our technological progress, more dehumanizing than any actual manipulation or technique, present or future: the erosion, perhaps the final erosion, of the idea of man as noble, dignified, precious, or godlike, and its replacement with a view of man, no less than of nature, as mere raw material for manipulation and homogenization.

Hence our peculiar moral crisis. We are in turbulent seas without a landmark precisely because we adhere more and more to a view of human life that both gives us enormous power and, *at the same time*, denies every possibility of non arbitrary standards for guiding its use. Though well equipped, we know not who we are or where we are going. We triumph over nature's unpredictability only to subject ourselves, tragically, to the still greater unpredictability of our capricious wills and our fickle opinions. Engineering the engineer as well as the engine, we race our train we know not where. That we do not recognize our predicament is itself a tribute to the depth of our infatuation with scientific progress and our naive faith in the sufficiency of our humanitarian impulses.

Does this mean that I am therefore in favor of ignorance, suffering, and death? Of killing the goose of genetic technology even before she lays her golden eggs? Surely not. But unless we mobilize the courage to look foursquare at the full human meaning of our new enterprise in biogenetic technology and engineering, we are doomed to become its creatures if not its slaves. Important though it is to set a moral boundary here, devise a regulation there, hoping to decrease the damage caused by this or that little rivulet, it is even more important to be sober about the true nature and meaning of the flood itself.

That our exuberant new biologists and their technological minions might be persuaded of this is, to say the least, highly unlikely. For all their ingenuity, they do not even seek the wisdom that just might yield the kind of knowledge that keeps human life human. But it is not too late for the rest of us to become aware of the dangers — not just to privacy or insurability, but to our very humanity. So aware, we might be better able to defend the increasingly beleaguered vestiges and principles of our human dignity, even as we continue to reap the considerable benefits that genetic technology will inevitably provide.