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Introduction

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Ours is the age of technology. What this means exactly has for some time now been the subject of intense debate that spans the entire spectrum of opinion from Luddism to the most unabashed technophilia. Technology, in one form or another, has always been a significant element of the human condition, but never has it been so ubiquitous and determinative of who and what we think we are. Cyborgs, artificial intelligence, cloning, and genetic engineering—all are indicative of a swiftly moving reality we struggle to make sense of in the absence of traditional signposts and historical precedents. What distinguishes modern technology from all other types, both premodern and non-Western, is its exclusive focus on the perfection of technical procedures and processes that had historically been subordinate to supratechnical norms and standards, usually of a moral, political, and religious nature. The underlying assumption in this revolutionary shift in orientation is the radical separation of technical and humanistic concerns. This divorce expresses itself in the widely held belief that technology is a neutral tool whose internal operations fall under a kind of immunity from the judgmental gaze of ethicists and metaphysicians, reducing their role, with few exceptions, to commentary on what is essentially a fait accompli. Environmental and medical ethics in particular rarely, if ever, get to question ongoing scientific research and its technological applications, but instead have been limited to reacting to discoveries and products and their possible ramifications on the natural and human worlds.

The power and unpredictability of modern technology outstrip traditional ways of thinking and judging at every turn. The reasons for this novel situation are too many and complex to be examined here, but a few remarks are in order to shed light on the problems presented by

bioengineering and genetic research. The most obvious difficulty we face is the degree of specialization now characteristic of the pursuit of scientific and technological knowledge that when coupled with the rapidity with which this knowledge is developed and disseminated, makes it extremely difficult to construct the kind of overview necessary for effective assessment and evaluation. In addition, the calculative kind of thinking employed in the constant improvement and refinement of methodology and technique simply does not lend itself to—though it does not necessarily preclude—a reflective or self-critical turn of mind. When the focus is on results and cost-benefit analyses, it would be naive, perhaps even otherworldly, to expect technicians and scientists to think like traditional humanists. All of which tells us that there exists a culture that has grown up around a class of intellectual elites whose progressive mores, values, and goals go unquestioned, if they are considered at all. The best description of this culture remains Francis Bacon's visionary *New Atlantis*, which already in the seventeenth century outlines the kind of research community best suited to the development of a systematic scientific knowledge that lends itself to technological exploitation and application. Guided by the goal of the "relief of man's estate" and the emerging modern principle of the division of labor where every researcher has a function to perform much like factory workers on an assembly line, Bacon foresaw an enterprise whose collective wisdom would be ensured by the goodness of its intentions and the triumph of its techniques. What is more, the communal aspect of "Solomon's House," Bacon's somewhat presumptuous though revealing name for this enterprise, would, he believed, transform the nature of scientific endeavor from the empirical groping of isolated individuals into a vast, intricate project requiring large amounts of financial and technical support that could be made available only by a civilization that sees and defines itself in terms of that project. And he was right.

The obstacles confronting a critical assessment of this project, which has been in full swing for centuries now, are thus formidable. But they are not insurmountable. Indeed, in the case of genetics and its various technological applications, something new has occurred. While it is true that the cloning of nonhuman animals and the engineering of agricultural products have gone forward without much serious public reflection

or debate (at least in the United States) about their desirability or chances of success, the very real possibility of applying these techniques to humans in the not-too-distant future seems finally to have caused many in the political community and some in the scientific professions to step back and ask whether we really want to go down this road. Already in most of Europe, the cloning of humans is banned for reproductive—though not, as in the case of England, for therapeutic—purposes, and support for similar legislation is growing in North America as well. This suggests that cracks may be appearing in the collective will to subject ourselves and future generations to changes whose inalterability is matched only by their profundity. To be sure, the compromises and shifts in popular and scientific opinion that undoubtedly lie on the horizon are unknown and impossible to predict. One can legitimately wonder whether this is merely a pause in a process that no human or group of humans can hinder or stop in the long run. But what is becoming clearer to many through the public voice of environmentalism and the high profile of many bioethical issues such as stem cell research is the unprecedented character of our technologies in their temporal and geographic impact on the planet. The effects of genetic enhancement, like the consequences of atomic fission, will last far into the future and will not be limited to localities or even large regions. Dealing with this sobering fact has recently taken on a new sense of urgency, since the distinction between somatic and germ line therapies has become increasingly difficult to maintain in light of a variety of new techniques as simple as preimplantation genetic diagnosis that blur the demarcation of what is presently permissible in genetic research and application.

The chapters in this book should be seen against this background. Specifically, they arose out of a conference in spring 2001 at the University of Scranton dedicated to posing two questions: (1) does genetic engineering of humans require a new understanding of what it means to be human, and (2) does what we already know suggest that there should be (and can be) effective limits to what can be done? With these considerations in mind, we brought together thinkers from a variety of disciplines for three days of intense discussion and exchange of ideas. (Jean Bethke Elshtain was unable to attend, but graciously agreed to write a chapter especially for this volume.) Papers were not read but briefly summarized, having been distributed several weeks beforehand. This of

course allowed for advance preparation, and so for a longer and more sustained conversation. In planning the conference, we were acutely aware that most of our participants had not met one another—a result no doubt of the narrow disciplinary character of conference-going today. Nor, we knew, were they of one mind about the issues we laid out before them. In fact, the group as a whole represents a diversity of views: some in the group are very much concerned with the impact of biotechnology on humans and on the role the concept of the human condition should play in determining genetic research and application, while others contend that such concerns may be obsolete and, at the very least, are not a necessary condition for moral reflection on the refashioning of our genetic constitution. What these scholars do have in common are national and international reputations for their astuteness in these matters and the sobriety of their reflections. Most important for us was the public nature of their work, ranging from publishing books for the general populace and writing for popular journals and magazines to testifying before Congress and even advising the president. Their ability to speak in nuanced and sophisticated ways to an educated audience outside their own disciplines and beyond the walls of academe, we believe, is reflected in the chapters published here.

Still, the quality of the conversation, not to mention the genuine bonhomie that quickly emerged in the group, exceeded our most optimistic expectations. Rather than getting bogged down in questions of medical or scientific practice, everyone focused on questions of fundamental, ontological importance. And instead of rushing to the practical side of the debate, where all too many believe the real "action" is, the group was eager to explore the humanistic implications of a technology that promises not just to add a trait here or subtract a defect there but to alter radically our very being. The results of this interaction, which have been incorporated into these published papers, were exciting to the participants and will be to readers as well.

Summary of Chapters

It is the philosophical nature of these issues and chapters that make this volume unique. The substance of each chapter remains philosophical, or at times theological, rather than technical. The issues discussed may

touch on cloning, reproductive choices, or economic justice, but as examples and not as the purpose of the argument. Throughout, the focus remains on the question of what it is to be human and how just thinking about bioengineering alters our self-understanding. Clearly, if the success of the conference is any indication, there exists today an intellectual hunger to address in a public way the array of ontological and human issues clustered around bioengineering. The potential impact of these powerful technologies on humans whom we will never and can never know is so profound and far-reaching that the old disciplinary constraints can now only be seen as archaic and counterproductive. It is our hope that this collection will help to establish a model for addressing bioethical issues that finally razes these traditional barriers, and in doing so, moves the academy into the space of public discourse where the decisions about these vital matters will ultimately be made.

Tim Casey introduces this collection by laying out what he sees as the historical and philosophical context within which we can make sense of genetic engineering as the ultimate chapter in the ongoing Western project of subduing nature for human ends. "Nature, Technology, and the Emergence of Cybernetic Humanity" argues that despite the novelty of genetic enhancement, this new technology remains part of a tradition whose arc is discernible in certain key events over the last millennium. In particular, he focuses our attention on the metaphysical dualism arising out of modern science and its roots in a medieval technological revolution informed by both increasing mechanization and an underlying Christian anthropocentrism that initiated a new feel for matter. Here the seeds were sown for both the Galilean mathematicization of nature and the technological rationale for Galileo's new physics. Casey reminds us that the Cartesian reaction to this science resulted in a dualism intended to preserve human freedom in the face of a mechanistic determinism inherent in a clockwork universe. But more than this, he argues that out of the Cartesian compromise with Galilean science arose a productionist metaphysics whose scientific and technological hallmark was and remains the suppression of spontaneity, choice, and ultimately, any hint of indeterminacy in the natural world. The radical sense of displacement ushered in by this suppression can be gauged by more recent attempts to move beyond what are perceived as antiquated conceptions of human nature.

With this in mind, Casey discusses at some length the responses of Karl Marx and Martin Heidegger to our emerging technological age and the concomitant problem of world alienation it poses. For Marx, humans are no longer the rational animal of the Aristotelian tradition nor the thinking spectator of Western philosophical idealism. Instead, humanity is recast as the *animal laborans*, the toolmaker who has incorporated nature into human history in the historically necessary pursuit of the abolition of scarcity. As the producer of its own existence, the modern proletariat exemplifies the productionist metaphysics initiated by René Descartes and developed further by such thinkers as David Hume and Immanuel Kant. In this metaphysics, humanity has become the measure of being and the creator, quite literally, of a new reality amenable to the satisfaction of basic material needs. Hence, for Marx, production is not a mere means to human life but is in fact the expression of humanity's "species-essence," insofar as such production finally overcomes humanity's historical alienation from nature and the worst aspects of Cartesian dualism. Heidegger's take on this metaphysical situation is remarkably similar, but in the end he is not as sanguine about what this portends for the human condition. The Heideggerian account of modern technology is to view it ontologically as a mode of revealing that challenges humans to assault nature with the intent of reducing it to a standing reserve of energy and information subject to our control and manipulation. The deeper question posed by this analysis is whether such an assault threatens not only nature but humanity in its very essence.

Of particular concern to Casey is whether the human body itself is to be taken up into the standing reserve and treated as just so much raw material. His central argument is that such reductionism is leading us to the final technological frontier where we ourselves will become material to be shaped and reinvented through feedback mechanisms that jibe with the Darwinian emphasis on adaptive behavior as part of evolutionary progress. Utilizing the critique of cybernetics by Hans Jonas, Casey contends that the danger of a cybernetic humanity, armed with the powerful new tool of genetic enhancement, is in truth a more radical displacement than Cartesian dualism and that such a threat can be countered, not by attempts to restore what is left of more traditional concepts of human nature but rather through a reconsideration of our humanness that takes seriously our technological power and prowess without,

however, granting it ontological supremacy. Such a reconfiguration of the human condition, he concludes, must begin with the recognition of our essential historicity, and thus of those limitations placed on our power by the inherent indeterminacy and hence elusiveness of beings encountered in time—including that most baffling entity of all, the human body itself.

Mark Sagoff's "Nature and Human Nature" suggests that neither nature nor history is any longer sufficient as a moral force to restrain us from pursuing the technological transformation of our genetic constitution. Such restraint, Sagoff argues, has depended on maintaining a fundamental difference between the natural and the artifactual—a difference placed in question by modern technology. The impact of this fact on the question of human nature becomes most apparent in the area of biotechnology, where the line between the human as a product of nature and the human as a fabrication of technology is already becoming blurred. Sagoff makes a strong case for the view that whatever moral limits we might wish to impose on genetic engineering have been, at least traditionally, rooted in the natural as a nonhuman sphere to which we must ultimately submit. Theologians such as Paul Ramsey, for example, have appealed to this sphere not only to put the breaks on "man's limitless self-modification" but to salvage the very concept of human nature itself. Sagoff, then, wisely points us toward the nexus of nature and human nature, and the revolution brought about by the prospects of genetic therapy and enhancement in how we are to understand this relationship. Already, he maintains, biology has opened the door to these prospects by demonstrating that humanity no longer resides near the trunk of the tree of life but rather occupies an "undistinguished spot at the periphery of evolution," thus making us genomically indistinguishable from, say, yeast. Sagoff is therefore concerned with those kinds of arguments (which he takes quite seriously) against genetic engineering that rely on a demonstrable connection between the human genome and a natural and ecological order moral in its import.

To his credit, the chapter explores fairly and openly the various facets of such arguments. Sagoff begins by noting that genetic inheritance in particular lies at the heart of the moral dimension of nature since what is passed down in our genes binds us to our natural heritage as a limit to what we might become. To fool with this inheritance is to play with

an ethical norm that has guided humanity, for better or worse, down through the ages. When opponents of genetic engineering point to the danger of obscuring, if not obliterating, human nature, they are appealing, Sagoff says, to the distinction between a child that is born and one that is "made." In the former case, the child remains part of a natural lineage that connects it to family and the heritage of the species. A fabricated human, on the other hand, is severed from its history and natural lineage, and so is reduced to a mere means lacking in the dignity of a full-fledged person. Theologians like Karl Rahner argue in this fashion, presupposing that the givenness of nature and the human genome forbids the kind of self-determination that results in the manufacture of humans. Here we see quite clearly the moral status of the natural lying precisely in its independence from ultimate human control and intervention. From this it follows that human nature is also a given that while it might admit of minor alterations, should never, for any reason, be tampered with in its essentials. But there are other Christian theologians, Sagoff informs us, who maintain that as cocreators with God, we are entitled to transform our genome as long as our purposes for doing so are in accord with God's. And Jewish theologians are even more open to such activity because, unlike their Christian counterparts, they are not indebted to Aristotelian form and function as essential and unchangeable. If there is an argument against genetic engineering to made here, it will point to the potential arrogance of modern technology and not to the harm it might inflict on nature and the human gene pool.

Sagoff concludes by considering two senses of nature delineated by John Stuart Mill in the nineteenth century. One specifically applies in modern science and encompasses everything that exists. In this view of nature, everything humans do is natural, including technology. The second sense is narrower and includes only what is not made by human hands. Such a notion is of course nonsensical to a scientist, but it provides a basis for normative questions concerning the fabrication and use of technology. This is the nature that until recently has provided humans with a discernible set of limits, and hence an ethical basis for reining in certain kinds of manufacture and bioengineering. But once technology has invaded the processes of life itself, such a notion becomes questionable at best and outdated at worst, as does the very notion of human nature. Clearly, then, since the moral worth of the larger natural world

is a concept that is increasingly unsupportable, appeals to a fixed human nature, in Sagoff's view, have become irrelevant. Instead, the problem facing us is not whether engineering of the human genome will alienate us from our nature—for, as he tells us, nature in fact became hostile and lost its moral resonance when we were evicted from the Garden of Eden—but whether we can bear the coming moral burden of responsibility for the creation of a "second nature," including our own.

Paul Rabinow is likewise opposed to turning our backs on genetic intervention out of a misplaced allegiance to human nature. His argument in "Life Sciences: Discontents and Consolations" is that romanticism about a fixed human essence is not only impossible in the face of modern scientific development and its disenchantment of the world but constitutes an all-too-familiar cultural immaturity and even narcissism that can lead to the kind of dire political consequences that littered much of the twentieth century. Applying the Freudian analysis of civilization and its modern discontents, Rabinow challenges us to strip away any lingering illusions about occupying a privileged place in the cosmos and finally to accept the scientific demystification of the natural world. The lessons of the Copernican, Darwinian, and Freudian revolutions have combined to deflate humanity's pride and tendency toward a megalomania. A twentieth-century heir to the Enlightenment, Sigmund Freud regarded his own work as embodying a scientific wisdom that counsels pursuit of the truth wherever it leads, however subversive such knowledge may be to our reigning self-image or however uneasy it may make us feel. Max Weber expresses similar sentiments in his essay "Science as a Vocation," one of the great statements, according to Rabinow, of the scientific ethos as a model of maturity and sober realism. But unlike Freud, Weber rejects the Enlightenment equation of science with wisdom, restricting knowledge to the rarified sphere of specialization and calculative reason. Today, the knowledge business is an exclusively technical affair with no pretensions to wisdom or meaning. Indeed, the idea that science could or should submit to the guidance of the cultural sciences is as futile as it would no doubt be harmful to the *Geisteswissenschaften* themselves. As Rabinow puts it, the value of science is simply "to invent concepts and conduct rational experiments," not to judge its usefulness for mastering the world or for producing the greatest happiness for the greatest number (a goal Rabinow scornfully dismisses as suitable for

Friedrich Nietzsche's "last men"). On ultimate philosophical matters science is therefore mute, though as a training in disciplined thought it does contribute to the ideal of clarification, which for Rabinow, underpins the primary virtue of an ethos of maturity: responsibility.

Rabinow does not flinch from recognizing the complicity of modern science and scientists in the "gravest betrayals," as Jürgen Habermas puts it, of reason and responsibility over the last hundred years. But, he warns, this should not tempt us to an irrationalism or rejection of the scientific ethos. Science, as Freud and Weber made clear even in the midst of last century's horrors, remains a vocation and an inspiration for a humanity devoted to peace and the overcoming of the Thanatos instinct. In our own time, molecular biology and biochemistry have emerged as new and fresh challenges to the remnants of a universal narcissism in contemporary human beings. And though these sciences are ineluctably intertwined with the state and increasingly dependent on the largesse of multinationals, this calls not for rolling back research but for serious reflection on the moral and political consequences of this situation. More important, Rabinow contends, is what we have learned from biology over the past decade or so—namely, that at the genetic level, all forms of life are materially the same, and that the technology central to this discovery demands "further intervention into that materiality." In the shift in the 1990s from a focus on genes to the production, mapping, and sequencing of DNA, a "new industrial mode of operation" has been instituted in molecular biology, which in turn has led to a rethinking of the gene as the locus of a DNA sequence as opposed to its reification in classical genetics. The next exciting step will entail seeing when genes are switched on and off, and for what duration, since we now know, as the geneticist Sydney Brenner observes, that evolution proceeds "by modulating the expression of genes" and not by "enlarging the protein inventory."

Thus, while genetic mapping and sequencing have neither yielded the meaning of life (such metanarratives are in Rabinow's view alien to science and hence unsuitable for our time) nor ushered in eugenics, biology today does raise the question of human nature by demonstrating our similarities with all living things (recall Sagoff's point about how little we differ genetically from yeast). The inevitable intervention into our genetic constitution therefore requires rigorous reflection on the

meaning of a gene and the human genome, rather than on whether we should go forward with mapping and subsequent engineering. A realistic ethics of science will avoid both sociobiology as just another metanarrative and moral hand-wringing as juvenile self-denial. Instead, it will address the moral, political, and material conditions of this new advance in knowledge and its claims to power. And it will recognize that Western humanity has been engaged in its own self-production through labor, language, and, for some time now, genetic manipulation. While there is, of course, a justifiable discontent with the kind of power that science has given humans over other humans, there is a consolation, Rabinow argues, in the recognition of both the limits of science and its role in fostering our growing maturity. Indeed, herein lies a more consoling thought than the illusory belief in a static human nature. True enlightenment, harsh as it may be, is an authentically adult consolation. In daring to know, Rabinow writes, science gives us real hope, not in an ultimate technical mastery of nature but in finally arriving at the awareness that we are not the center of existence or a higher kind of being free to wield our immense power, without scruple, over the rest of life.

In "Genetic Engineering and Eugenics: The Uses of History," Diane Paul explores the ways both advocates and critics of human genetic engineering turn the history of eugenics to disparate ends. Optimists and pessimists alike have adopted a narrative that emphasizes brutal measures of state control, such as the compulsory sterilization of those considered defective and the Nazi murder of mental patients. The similarity of their narratives is not a simple reflection of fixity to historical facts. On the contrary, much eugenics was voluntary, not coercive. "Positive" eugenics, which relies on the cooperation of its subjects, is necessarily so, and as an effort at improvement, much closer in spirit to human genetic engineering, with its promise (or threat) of human enhancements, including a wholesale transformation of human nature. Thus Paul asks, If one looks to history for lessons, why focus on sterilization and murder to the exclusion of other, utopian projects whose goals are much closer to contemporary aspirations to improve humanity?

As a start toward constructing a history more germane to issues arising from human genetic engineering, Paul analyzes the utopian strain in eugenics, including works by Francis Galton (in some of his moods), Alfred Russel Wallace, and such scientific socialists of the 1920s and

1930s as J. B. S. Haldane, J. D. Bernal, and H. J. Muller. She notes that Bernal's *The World, the Flesh, and the Devil: An Inquiry into the Three Enemies of the Human Soul*, which envisioned a sci-fi future of the human race divided into the masses and their scientific masters, anticipates a recent raft of similar prophecies—for example, one by German philosopher Peter Sloterdijk, who even employs Bernal's metaphor of a "human zoo," and another by U.S. biologist Lee Silver, who predicts an ultimate splitting of humanity into the "normals" and the "gen-rich." Paul looks in particular detail at Haldane's 1923 *Daedalus*, which prefigures almost every aspect of the contemporary debate over human genetic engineering, including the famous "wisdom of repugnance" argument associated with bioethicist Leon Kass. She also notes that as Marxists, Haldane, Bernal, Muller, and Trotsky emphasized the human capacity for self-transformation, rejecting the idea that there was an immutable human nature exempt in its sacredness from genetic intervention. Paul extends the analysis of arguments about improving human nature through the 1960s and 1970s, when the morality of genetic engineering was first hotly contested.

Given the rich history of projects to redesign humanity, why do both the celebrants of human genetic engineering and those more impressed by its dangers constantly invoke a history of eugenics told as a story of brutal state action to cull the unfit, and thus maintain the status quo? Paul argues that enthusiasts savor the evident libertarian moral: If a central wrong of eugenics was the use of coercion, then leaving people free to make their own reproductive decisions seems an obvious way to avoid the mistakes of the past. But the nightmare of those who worry about where human genetic engineering may lead is hardly an authoritarian state intent on forcing parents to design their offspring. Quite to the contrary, it is a world in which those parents demand the right to use the available reproductive technologies. Thus it is a privatized, consumer-oriented eugenics they fear, a eugenics directed by the market and not by the state. Given the perceived source of danger, the solution cannot be a laissez-faire approach toward the new technologies. Yet this is the direction in which the standard narratives point.

Critics favor oversight of human genetic engineering because they believe that even libertarian eugenics has consequences that should concern us all. Invoking Nazis lends an emotional charge to their claims,

but it also misleads in ways that are counterproductive to the larger agenda. Critics favor some kind of regulatory oversight out of misgivings detailed by Paul in her essay; they include the impact of genetic manipulations on parent-child relationships, assumptions about human worth, and attitudes toward individuals with disabilities. Notwithstanding these and other worries, Paul notes that the exigencies of abortion politics have made it difficult for those on the political Left to call for curbs on consumer sovereignty in the realm of reproduction. In her view, some oversight (along the lines proposed by LeRoy Walters elsewhere in this volume) is badly needed. Yet to establish a degree of social control over genetic engineering, it will first be necessary to acknowledge that the principle of respect for autonomy is not absolute.

For a theologically based thinker like Jean Bethke Elshtain, abandonment of the idea of an unalterable human nature presents serious ethical difficulties. In "The Body and the Quest for Control," Elshtain argues for a moral standard rooted in our bodily nature and the order of creation itself. While she is not opposed to gene therapy or medical attempts to alleviate suffering where reasonably possible, genetic engineering and cloning are from the standpoint of one committed to a Christian anthropology merely the latest manifestations of a "messianic project" to perfect the human body and overcome human finitude. This project, moreover, is based on a false sense of freedom and a misconception of the self as radically autonomous. Indeed, all signs, as Elshtain reads them, point to a culture that has reduced the body to a commodity malleable in the hands of modern technique and constructable by a technocratic elite. Citing Martin Luther, she traces this reductionism to a rebellious willfulness that separates us from God, the "source of undistorted love," and from a natural order given in advance as a moral and theological compass whose dismissal is now apparent in a number of technological projects such as genetic screening, prenatal testing, abortion on demand, and cloning. Such projects, she writes, have at their core an ideal of bodily perfection demeaning to the disabled and the "developmentally different" among us. Thus, the flight from finitude results in a slippery slope that ultimately narrows our concept of humanness in light of culturally fleeting notions of normality.

Tying these various projects together, in Elshtain's view, is a fundamental rejection of the sphere of the "unchosen" and a concomitant

enlargement of the sphere of "control-over" (her example here is the elimination of Down syndrome as an acceptable human type). But even more important is what underlies this urge to dominate the corporeal world—namely, the unstated though powerful theological presumption that nothing in God's original creation is good, but rather that everything must be redeemed and transformed according to images that reinforce the dominant cultural ideals, most especially the notion that it is culture itself (and not nature) that now generates our moral ideals and projects. It is for this reason that Elshtain believes it impossible to overstate the significance of the technocratic mentality of our time and, in particular, the growing sense that we are duty bound to exercise control over our descendants, including deciding which culturally determined types of humans should be allowed to exist at all. The goal in all this is the elimination of imperfection, inconvenience, and risk; and the danger of this denial of our essential finitude is a moral one, since it goes to the heart of human nature as well as to the very meaning and being of such a thing as nature at all.

What is lacking in this denial is an appropriate ontological understanding of the human body and its centrality to our humanness and genuine exercise of freedom. Specifically, an ontology grounded in our Jewish and Christian traditions teaches us that embodiment is a given, not a construction or cultural product, of human being itself, and that any conception of human freedom grows out of the basic indeterminacy of this embodiment as an image but not a replication of God's perfection. What is more, this limited freedom exists only in relationship, not in a radical autonomy disconnected from the creation and its existential demands. Sin is thus understood by Elshtain as the abuse of this freedom, and its expression today is to be found in the enhancement of human power over the creaturely world—an enhancement that predicates itself on the rejection of a natural order of things and the situatedness of the human being in the world through its body. But the proper use of this freedom, Elshtain maintains, arises from a moral understanding of nature where the very givenness of creation serves as a standard against which we might measure the claims and pretensions of whatever Platonic cave we happen to inhabit. The freedom of finitude, in other words, can bring us back from our absorption in the world, providing a perspective on our culture and history from which we might imagine alternative

possibilities; whereas its denial can only result in our incapacity to effect change within the boundaries of our situation.

Clearly, Elshtain sees a threat to our humanness in the notion that "creation itself must be put right." Remove the idea that nature is a given and you destroy the time-honored belief that moral norms and standards exist outside of cultural prejudice and power plays. Eliminate the fact of a natural order, with all its imperfection and disappointment, and you erode what tolerance we have left for difference and unpredictability. Elshtain singles out the technology of cloning as indicative of our desire for control and sameness, and hence of our fear of the Other. As a significant part of the eugenics project to exert full authority over human reproductive material, cloning represents an anthropocentrism antithetical to natural diversity and, even more disturbing, to the Judeo-Christian ontology of creation that underpins our conviction that nature is good regardless of whether it serves our needs or not. As Genesis shows, such an ontology provides us with a story of our origins, a story that roots human freedom in the body and human will in the creation. An unbounded will is thus a will that respects neither life nor the givenness of our humanity. The will toward the unnatural, Elshtain argues, is in the end what connects genetic engineering and cloning to euthanasia, abortion, physician-assisted suicide, capital punishment, and even slavery, torture, and deportations. Needed, then, in our "world of rootless wills" is a Christian theological anthropology that can at once revivify the categories of nature and human finitude, and debunk the constructs of a culture that denies that naturalness in the name of ontological sameness and the prideful idea of human perfectibility.

Richard Zaner's "Visions and Re-visions: Life and the Accident of Birth" also explores the potential impact of genetic engineering and cloning on our understanding of the human body, particularly the body's role in the constitution of self-identity. Echoing Elshtain, Zaner reminds us that even today, most of the world remains a given and not a construction of modern technology or social theorists. Moreover, he cautions that many technological deeds, especially in the area of biomedical research, have gone awry, confounding the best of intentions. Zaner thus points to the thorny problems of chance and control as well as to the questionableness of culturally constructed notions of normalcy and illness as keys to an understanding of the underlying difficulties genetic

engineering poses. Since such an understanding requires an act of imagination concerning our future, Zaner turns to a recent novel, Simon Mawer's *Mendel's Dwarf*, and the story of Ben, a geneticist and descendant of Gregor Mendel who happens to be a dwarf and the father (through in vitro fertilization) of eight embryos, four of which he determines to be protodwarfs. Ben is faced with the decision of whether to remove the "dwarf gene" from the four "mutants" (in effect denying his own selfhood) or to buck the reigning social yardstick of normalcy and affirm his own embodiment as central to who he is. At issue here is the philosophical concern with self-identity and whatever role the body plays in resolving this question.

As Zaner rightly observes, because traditional medicine has almost always recognized restoration as an inherent limit, it therefore cannot judge Ben to be defective and in need of improvement. And yet, at the same time, Ben himself knows that he is different and suffers his otherness acutely, for he now exists in a world where the boundaries of restorative medicine have been stretched by the mapping of the human genome to include genetic enhancement as measured against socially defined norms and ideals. Thus have molecular biology and the technique of cloning already brought into question the meaning of health and disease, not to mention medicine itself, precisely through a blurring of the formerly unassailable distinction between culture and nature. Indeed, in the world of post-Mendelian genetics, nothing is unthinkable, and everything now seems possible, if not desirable. The venerable adage "Do no harm" increasingly fails to measure up to the brave new reality we find ourselves in, as evidenced, for example, by the disturbing need for patient consent in most scientific experimentation on human subjects. The result, Zaner fears, is a situation where we now deem the handicapped to be certifiable freaks and hence, not being fully human, in need of a medical fix. And lurking in the background, if this were not troubling enough, is the very real possibility of a technocratic elite who, under the cloak of treating disease, will in fact be tempted to institute a political agenda through a eugenics aimed at redirecting nothing less than human evolution itself. As a philosopher, Zaner wants to direct our attention to the heart of this scandal, namely, the paucity of wisdom so characteristic of the technocratic mind, an appalling ignorance, moreover, which is the direct result of the natural-

ization of consciousness inherent in any reduction of our humanness to DNA. Here, he concludes, theory and practice will inevitably reinforce one another in a downward spiral into the nightmare of nihilism.

Underlying these moral and political consequences is the even more difficult problem of human identity, of "whether there is a self at all" or simply "genetic information encoded in and on strands of DNA/RNA nestled within any individual's body cells." In wrestling with this question, Zaner appeals to the attempt by the twentieth-century phenomenologist Alfred Schutz to ground our humanity in our sociality, and to further ground that sociality in the "primal . . . we-relationship" of mother and fetus and the experience shared by all human beings of being born. Zaner interprets Schutz to mean here that humanness is a gift, perhaps the "originary gift," since we are brought into this world through the love of a woman and not through any choice of our own. The very mystery of being born—and hence, the lack of any apparent reason for our existence—returns Zaner's meditation on embodiment to Ben's dilemma and the threat genetic control poses to that mystery, that is, to the gratuitous character of our being as the very source of our humanity. Zaner is thus led to the conclusion that one's uniqueness as a person, grounded in the accident of birth and in particular birth by a woman, has been placed in question by both the control promised by the imminent technology of human cloning and the bewildering choices it now presents to us. To be sure, Zaner admits, this technique is in essence no different than in vitro fertilization. Thus, the real question becomes whether the cloned embryo is implanted in an actual human womb or an artificial uterus. The issue of our humanness, in other words, is one of development: "to be human is to become human." And that means to be socialized by the primal other—one's mother. Clearly, for Zaner, socialization (and by implication humanization) is primordially a bodily experience. To contravene this biological attachment of the fetus to its mother is to thwart the givenness of who and what we are. Significantly, it is only on these grounds that Zaner parts company with thinkers like Elshtain and their blanket rejection of human cloning. The danger of this looming technology is thus not so much to the uniqueness of the clone but more profoundly to its biological link to a primal other constitutive of its identity as a person.

Nonetheless, Zaner urges caution and vigilance regarding cloning, and argues that the asymmetrical power now placed in the hands of the medical establishment ought to transform the definition of medical wisdom into one of judicious restraint. Such humility, he believes, can be fostered primarily by serious reflection on the fact of being born and borne by woman, and the relevance of that to our humanness. Seen in this light, one's world—that is to say, the culture into which one is born—is also gifted in the form of an existence unconditionally bequeathed to one by one's mother. To preserve, then, both the idea and the reality of the gift and givenness is in the end to save the mystery of being born at this time, in this place, to this particular mother, family, society, and so on. By inscribing our self-identity in embodiment, Zaner seeks to delimit the human condition precisely in our being subject to chance and an inability to find a "firmer footing" in existence. In doing so, he throws up a metaphysical and perhaps even religious challenge to the current technological impetus toward control and the elimination of randomness and indeterminacy. More positively, he argues for a recognition of finitude as the first step in the affirmation of embodiment as the essential link to others—a link that with all its imperfection and uncertainty, is ignored at the expense of our selfhood and whatever meaning the human condition might have in a world where traditional metaphysical answers no longer pack the force they once had before the advent of the technological imperative.

Harold Baillie's chapter "Aristotle and Genetic Engineering: The Uncertainty of Excellence" raises the question of uncertainty in discussions of both genetic engineering and human nature. He begins by noting that ethics is in a sense tragic, as it reflects on past events with only a slight ability to anticipate or predict. Particularly with genetic engineering, the pace of change and the newness of the results threaten to leave ethics, at least in the sense developed by Lisa Sowle Cahill and LeRoy Walters later in this volume, reflecting on a series of fait accompli. Given this implicit criticism of social theory and utilitarianism as approaches to the evaluation of genetic engineering, Baillie turns to the traditional distinction between genetic therapy and genetic enhancement, which he suggests is inadequate to establish any clear understanding of, much less limits to, the possibilities of genetic engineering. The slippery slope he sees linking therapy and enhancement can only be avoided by a refo-

cusing of the discussion of genetics as engineering—that is, of the possibilities of technology and control—to an examination of the metaphysical roots of personhood.

He argues that two traditional understandings of the person cast no light directly on the ethics of genetic science. Descartes' dualism, as in the second and sixth of his *Meditations on First Philosophy*, fails to be useful in addressing genetics because it suggests that the soul, or res cogitans, exists utterly independently of the body. Thus, modifications of the body (for example, the improvements in the health of the body called for in the *Discourse on Method*) can improve the situation of the soul, even its wisdom, without altering its nature. Second, Jean-Jacques Rousseau's sense of freedom as the ability to imitate and change leaves open the questions of limits to that change. Fundamental to Rousseau's position is the suggestion that we have already significantly altered our nature simply by joining society, so there is no inherent objection to further changes. Freedom does not in principle suffer from genetic engineering, nor does it offer any guidance to a discussion of the appropriateness of genetic change in general or specific forms of it.

Baillie then attempts a more positive discussion of the issue by turning to Aristotle's hylomorphism. Like Tom Shannon's effort in this volume at ressourcement, Baillie suggests that a rereading of hylomorphism may help in the discussion of embodiment and the impact that genetic engineering can have on the person. He identifies *person* with the actuality of a body with organs, a "possession" of the body by its own being. This actuality is both the cause of the unity of the parts of the body and the result of this unity. As such, the position avoids the freedom-materialism distinction, or the soul/body distinction, by seeing the relationship as a vertical one of potentiality and actuality. What the person is, is identified by what the person consists of, and what the person does with that what. This is the ground for Baillie's distinction between freedom and serendipity. Freedom tends to be understood as unidirectional. Rousseau, for example, orients freedom to the possibilities opened by imitation, and neglects the material source of those possibilities. In contrast, serendipity is the response of the person to his or her embodiment, a response made possible by the body itself. Thus, the person goes beyond the body by making more of the body than it is. The life activity of a body always comes as a surprise, in essence, a discovery.

Baillie uses this sense of life as a discovery to argue against any position that presents life as a plan, something that is "known and recognized," or at least whose basic capabilities are known and recognized. For example, John Rawls's suggestion that because of the natural lottery people can be unfairly disadvantaged, presumes a given collection of natural abilities, the absence or degradation of which is a problem of nature that society has an obligation to correct. This position encourages genetic therapy, as well perhaps as genetic engineering, as a likely extension of this social obligation. Rawlsian limits on this would be due to other problems of social justice—that is, the equal protection of rights or a fair distribution of resources—not because of any interference with human nature.

Baillie argues against this abandonment of the discussion of human nature in favor of issues of social justice. His hylomorphic view of human nature does generate adequate content to critique genetic engineering before later limiting conditions of social justice appear. As a critique, he claims "the focus of genetic engineering is the body actualized. . . . [I]t seeks to eliminate the need for a soul by substituting a developed genetic code for the serendipity of the soul." Genetic engineering, whether in the form of therapy or enhancement, seeks to substitute control of the body for surprise by the soul. This substitution of controlled genetic code for the soul makes impossible the discovery of the self by taking away the only means by which the self is discovered: a life in which serendipity (no matter what the occasion) can occur. It is not that we know the person and know the effects that genetic engineering will have; it is rather that genetic engineering will make it impossible to be a person. The substitution of control for spontaneity is ultimately the basis of his critique of genetic engineering.

Robert Proctor is a historian of science and technology. His approach to the question of the future of human nature reflects a historian's preference: he looks back. Specifically, he looks back at the paleontological record of human diversity to illustrate the difficulties in arriving at a clear sense of what is "fully human." His reflection on this record leads to several observations. Humanness is a recent phenomenon (dating back between 150,000 and 50,000 years), and in general the attribution of humanness is a bit faddish—or at least influenced by the concerns of the times. For the purposes of his discussion, Proctor equates humanness

with language and culture, attributes that do not require a fixed human essence but do seem to argue for an identifiable human condition—that is, for a set of limits within which human life has historically functioned. But his concern is not to define humanness so much as to observe the disputes that have altered the dating of the attribution of humanness. This dating has recently gone through three crises, in archaeology, paleontology, and molecular anthropology, and the core of Proctor's chapter is a review of each.

In archaeology, the crisis has been over the interpretation of the oldest tools, those found in the Oldowan Gorge in Kenya and, of particular interest to Proctor, in St. Acheul, northwest of Paris. These tools tend to be uniform in style and manufacture for vast stretches of time, and their use seems to cross different hominid species during that time. This suggests that these tools are not necessarily the indicators of human culture they have been taken for since their endurance does not seem to depend on the transmission of knowledge of their use by symbolic language. The second crisis is in paleontology, where it has been discovered "that more than one species of hominid must have coexisted at many points in the course of hominid evolution." The recognition of this diversity has implications for our understanding of the politics of doing science since this question of diversity was submerged in our concern to deny the category of race, as in, for example, the 1952 United Nations Educational, Scientific, and Culture Organization (UNESCO) "Statement on Race." Finally, there is the crisis in molecular anthropology, arising from the discovery that all living humans share a common ancestor from Africa approximately 135,000 years ago. This not only points to human recency, but it also emphasizes the unity of the surviving species.

Proctor suggests that "if evolution has taught us anything, it is that there is no essence of humanity, no fixed form." But he is also concerned to point out that political goodwill can stifle science, which points to the larger issue of whether the ethics and politics of genetic engineering can be considered in isolation from the question of what constitutes our humanness. The UNESCO "Statement on Race" denounced racial theory and racial prejudice, but it accomplished this political good on the basis of a conception of the unity of hominid development—the only significant diversity was the hominid split from apes, perhaps eleven or twelve million years ago—that slowed the recognition both of hominid

diversity and human recency. Proctor's conclusion is to endorse "hominid bushiness," a recognition of the variation in the evolution of hominids, and that "the prehistory of tools, bodies, and beliefs will forever remain a fertile field for projection and wishful thinking." In a concluding note, Proctor suggests that humanness is a linguistic concept, opening the possibility that other language-using creature or machines might be considered human. But at this stage in the development of our understanding of the relationship between human nature and genetic knowledge, the tale of hominid bushiness is primarily a cautionary one about exclusion.

While Proctor's chapter is a call to caution about bold claims regarding the nature of our physical inheritance, Tom Shannon's is a more aggressive argument against using materialist reductionism to limit the range of discussion about human nature. He finds this error in two of the major voices in the current literature on genetics and human nature: Richard Dawkins and E. O. Wilson. A theologian, Shannon's contention is that reality itself is ambiguous enough to be open to the possibilities of transcendence that go beyond the arguments of scientific materialism, but do not stand independent of contemporary genetic information. There are three foundation stones for his argument. He is concerned with scientific reductionism and its contrast with the larger question of the relationship between the parts and the whole. He uses the method of ressourcement, part of the Roman Catholic tradition of reappropriating concepts and ideas from the tradition for contemporary discussions. Finally, he is concerned with the limitations of our current genetic knowledge and the temptation to overestimate the clarity our limited knowledge has provided us, a point of significant concern with regard to sociobiology. In particular, Shannon focuses on John Duns Scotus's distinction between *affectio commodi* and *affectio justitiae* to illustrate the openness of human nature to transcendence, particularly its ability to transcend itself as part of nature. Shannon contrasts this approach to the difficulties Dawkins and Wilson experience when attempting to explain altruistic behavior and, more generally, our ability to resist the apparent genetic-based tendencies of our nature.

For Duns Scotus, *affectio commodi* is a drive rooted in the nature of the individual entity "to seek his perfection and happiness in all he does." Shannon identifies this with Dawkins's and Wilson's "genetic selfish-

ness," and points out that for Duns Scotus this self-interest of a divine creation was good, while Dawkins and Wilson are ambivalent about this wellspring of evolutionary development. Duns Scotus's conception of *affectio justitiae* refers to an "inclination to seek the good in itself"; it is, in other words, "the means by which we can transcend nature and go beyond our individually defined good and ourselves to see the value of another being." While Duns Scotus sees this as a fundamental human inclination, Wilson and Dawkins struggle with the phenomenon and find no clear explanation. Duns Scotus is able to speak of the human will as free and as oriented to a transcendent good that allows it to act unnaturally—that is, to transcend its own nature. The materialism of the sociobiological position must find a purely naturalistic position and, Shannon argues, stumbles in the effort. This added dimension of Duns Scotus's account is a central example of the advantages of ressourcement for Shannon. It also illustrates the larger philosophical problem at stake here: Is there a need to understand the larger phenomena, that is, understand what they are, before we begin to locate the phenomena's material conditions? For example, we need to understand in some sense what memory is before we go looking for its "place" in the brain, or we need to understand what altruism is before we look to see its genetic basis.

The discussion is, in essence, about the contrast between materialism and freedom, and the adequacy of each in explaining the phenomenon of human life. But our knowledge of genetics reinvigorates another traditional discussion, that of nature and grace. Genetics reminds us that nature is not abandoned, and thus cannot be ignored, in the full expression of a human life. Shannon quotes Lindon Eaves and Lora Gross to sum up the theological implications of his argument: "Genetics provides *a basis for grace within the structure of life itself*." Matter must be taken seriously even while it cannot be taken as providing the entire explanation.

Clearly, for Shannon, the discussion of freedom illuminates the orientation of human nature toward the transcendent, leaving unanswered the question of the relationship between transcendence and genetic engineering. Genetic engineering can be seen as an expression of transcendence and freedom, one that should be tempered by the inconsistent rhetoric of materialist explanations of human life and existence. Bernard

Rollin addresses this question of transcendence and materialism by introducing the notion of telos as a starting point for parsing out acceptable and unacceptable genetic manipulation. In his chapter "*Telos*, Value, and Genetic Engineering," Rollin starts with Aristotelian insights regarding telos, and argues for a distinction between "is" and "ought" that would reveal ethically acceptable and unacceptable forms of genetic engineering. His chapter falls into two sections. The first deals with establishing a contemporary understanding of telos, rooted in Aristotle's metaphysical concern with individuals, while the second uses this understanding to tease apart two sets of concerns with human nature: the biological and the social.

A short introductory section endorses the Aristotelian love of the world we live in and suggests that Aristotle's understanding of biology as the master science avoids many of the difficulties to which the Cartesian mechanistic view of the world, with physics as the master science, falls prey. He echoes Shannon and several others in his more traditional sense that we have an access to nature that can guide us (somewhat) in these discussions. But as his analysis of animal telos makes clear, nature can be surprisingly flexible.

In the first section of his chapter, Rollin notes that telos refers to a thing's nature, particularly its needs and interests that constitute its nature. Articulating these needs and interests allows us to see how each living thing responds to the challenges of living. Aristotle developed telos into the ground for an ethic for human beings, but did not extend this to the animal world. Yet Aristotle did see continuity between the animal and the human worlds, particularly with regard to the similarities in the use of slaves and domesticated animals. Rollin ties this similarity to the issue of husbandry, the practical obligations humans have to their animals because "domestic animals existed in a state of symbiotic unity with their human owners." For animals to survive, thrive, and fulfill their domestic function, owners had serious responsibilities to care for their animals, as in the biblical notion of the shepherd. The nature of animals required a connection between their well-being and their successful domesticated use. When the notion of husbandry was replaced by industry, the connection between animals' well-being and their successful use was severed. Industry is able to use a variety of technologies to ensure that animals are successfully manipulated to meet human needs, but

these technologies and their results are independent of, and generally insensitive to, the telos of animals.

The use of the concept of telos with regard to human beings creates difficulties for the obvious reason that the "plasticity" in human nature, its rationality and sociality, dramatically overshadow the relatively focused biological component. Rollin examines this plasticity and concludes that "rationality and sociality are highly variegated in their instantiation, and to attempt to create a descriptive account that does justice to all of their differing manifestations would seem to be impossible. For this reason, the notions of 'is' and 'ought' seem to be much more closely connected in a teleological worldview than in a mechanistic one." Rollin's argument rests on this sharp distinction between biological or animal telos and human telos. Animal telos functions as a basis for husbandry and for a critique of current industrial practices. This extends to humans, with regard to our principally biological functions. Thus, the general practice of medicine and future possibilities of genetic therapy are acceptable to Rollin, as they focus on the biology of the human telos. But human telos, properly speaking, involves "rationality, sociality, moral concern, and so forth," issues about which no precise description of "what we ought to strive for" can be provided. Here, we cannot change what is without altering what ought to be. "Efficiency, productivity, wealth—none of these trump reason and autonomy, and thus the *Brave New World* scenario is deemed unacceptable." That is, we should never accept any form of genetic engineering that would alter these central human concerns.

One implication of this distinction is that it would be allowable to genetically alter an animal to change its (biological) telos and, in so doing, make it more productive or more suited to an efficient environment. We could engineer a legless, blind chicken that would not suffer if raised in a battery cage. But we ought not fundamentally alter the human telos of a human being in any analogous way. Rollin argues that the key unalterable elements in human beings are "traits in people that would radically separate them from the companionship of other humans," such as immortality, living underwater, or abnormal size. Only therapeutic interventions, including both somatic and (preferably) genomic efforts, would be acceptable. Rollin is aware that there would be difficulties at the boundaries between a human's biological telos (and

what might count as a disease or correctable condition) and a human telos (and thus what counts as suitable for companionship). He thinks that these ambiguities should be settled politically.

Lisa Cahill's "Nature, Sin, and Society" is an exploration of the concerns regarding genetic research and engineering from the perspective of theological ethics. Echoing Elshtain, she asserts that traditional, theological understandings of human nature carry the resources to respond to current concerns with genetic work, and in particular these resources call for serious limitations. Her argument, however, is not an intrinsicist or essentialist one; rather, it springs from the focus of Catholic social teaching on the social and political nature of human beings. Thus, her primary concern is with social justice and the social context within which the results of genetic work will be expressed and manipulated. Like Rollin, she is optimistic that not only are limits on genetic work necessary and desirable but indeed they are possible.

Cahill's starting point is Catholic social teaching, particularly that tradition that began with Pope Leo XIII's encyclical *Rerum Novarum* (*On the Condition of Labor*), and that has been developed and expanded in a variety of encyclicals by Pope John Paul II. The well-known elements of that position include an appeal to objective and universal standards of behavior, human solidarity, a trust in the "human propensity for cooperative social living," and "imaginative empathy with our fellow human beings" enlivened by biblical symbols and commands. Generally speaking, there is a common good that draws human beings together, both in individual societies and ultimately in a global community.

Important to Cahill's ultimate position is the moderation of Catholic social "optimism" by a discussion of Reinhold Niebuhr's "Christian realism." Neibuhr suggests that in the tension between human freedom and human finitude resides human sin, a problem less manageable on the social level than it is for the individual. The pride and sensuality that arises from sin is structuralized in society, and acts much more powerfully as a force for division and conflict. For Neibuhr, coercion is a necessary element of social ethics, enforcing reasonableness on society and its members. Cahill finds this darker picture a needed corrective to the "encyclical tradition's nonconflictual social optimism."

Cahill then concludes her argument with a critique of global capitalism, particularly the waning power of the liberal welfare state in the face

of international capital and the impact of international patents that exacerbate differences between the rich and the poor. Her chapter ends on an optimistic note, as she cites the examples of a variety of international organizations working to establish hedges against international capital in favor of a renewed sense of the common good. She suggests that these efforts, such as those by Oxfam or the pharmaceutical company Cipla, Ltd., or even China's State Council, are limitations on foreign-funded genetic research, and are hopeful indications that genetic research and engineering can be limited and guided by an internationally shared sense of the common human good. Thus, Cahill, like Rollin and Langdon Winner, looks to a political and institutional solution to the questions of genetic engineering. Insights offered by the tradition may be helpful in such discussions, but those insights are not metaphysically compelling and cannot be relied on to answer practical questions in a pluralistic world. Only a shift in discussion to the social conditions of humans can provide the resources to work out acceptable principles of guidance for the opportunities offered by genetic engineering.

LeRoy Walters's "Human Genetic Intervention: Past, Present, and Future" is a review and analysis of the fortunes of federal oversight of human-gene-transfer research by the Recombinant DNA Advisory Committee (RAC) within the National Institutes for Health (NIH). Walters summarizes the past, present, and future prospects of the RAC, tracking its bureaucratic fortunes and the parallel problems of oversight regarding cutting-edge—and dangerous-human-gene-transfer research. He then gives an account of the degeneration of the RAC, originally formed as a proactive group of research academics to foster the public transparency of research and standards of evaluation, to provide anticipatory oversight for researchers, and to develop clear and current research guidelines. He argues that when policy makers at the NIH and the Food and Drug Administration (FDA) weakened the RAC in 1996–97, genetic researchers and their financial backers began to operate with increasing secrecy. The loss of transparency led to a refusal to disclose adverse results, a loss of objectivity in planning research projects, self-interested manipulation of results, a failure to submit full and timely reports of progress and difficulties, and ultimately to the death of a patient.

Walters is well aware that the RAC was not without its detractors and inherent difficulties. Indeed, the difficulties inspired the attention from

policy makers that led to the changes in the size and functioning of the RAC and in its relations with the NIH and the FDA. Yet when he turns his attention to the future of human-gene-transfer research, Walters endorses several steps that perhaps do not require a RAC but nevertheless call for procedures and duties that were very much like the RAC's original tasks. His recommendations are in response to both the changes in research funding and the now tragically obvious insufficiencies regarding oversight of clinical research. These are reforms that must occur at both the local and the national levels, and call for greater cooperation and integration of these two levels. Walters remains convinced that the regulatory opportunities of government can adequately identify limits for genetic research and protect both research subjects and scientific integrity. Much like Cahill, he relies on the fundamental authority and goodness of the social nature of human beings to protect us from not only the excesses of research process but also the vainglory of research ambition.

Like Cahill and Winner, Walters is concerned primarily with the social structures that will limit and guide genetic research. He seems confident that proper procedures will allow for both adequate public discussion of the direction such research should take and high ethical standards to protect research subjects and the integrity of the research itself. Ideally, science should be allowed to pursue its own research agenda, and to ensure this, science must be protected from such nonscientific factors as the market concerns of funding sources and the unabashed enthusiasm of researchers.

Langdon Winner writes from a humanistic tradition suspicious of the technological domination of nature and its more recent attempts to turn modern techniques against humanity itself. His chapter "Resistance Is Futile: The Posthuman Condition and Its Advocates" marvels not so much at the fact that the dire predictions of the Jacques Elluls and Lewis Mumfords concerning technology might still come to pass but that their fulfillment is embraced by some with such enthusiasm and fascination. While Winner admits that most of us have yet to join the chorus singing the praises of a posthuman future, he is nonetheless troubled by the potential influence the "scientific enthusiasts of posthumanism" might wield in the not-too-distant future. With this in mind, he reviews for us the latest literature in this genre, subjecting it to a searching critique. Of

particular interest are the predictions of such futurists as Gregory Stock, Lee Silver, and Hans Moravec of a posthuman, Nietzschean world where humans have either been divided into "superior and inferior genetic classes" or, what is perhaps more probable, surpassed and made obsolete by "robotic decision makers." But more important here than the actual predictions is the prevailing view of human nature among these prognosticators. As Winner makes clear, their extrapolations stem from a commonly held belief that our "stone-age biology," to cite Moravec, has already been superseded in the information age. The idea, then, that humans might be technologically reconstructed or pushed aside has already moved from the realm of science fiction into a world where the appeal of a posthuman future runs the gamut from profit to fame to simple adventurousness. At the forefront of such thinking are groups like The World Transhumanist Association, The Extropy Institute, and, of course, the Raelians, all of which advocate the transformation of humans from organic to mechanical beings for the purposes of abolishing death and illness and of ushering in an age where everyone has been cosmetically refashioned and groomed for success.

The rejection of the givenness of our biological makeup, Winner correctly notes, finds its apotheosis today in the idea of the cyborg: that amalgam of human biology and technological hardware now so familiar to us from a slew of movies and pulp fiction. Winner points out that the desirability of this posthuman creature is in fact gaining traction in academic circles and especially in the social sciences. For it is there that the hoary concept of a "stable, coherent" human nature (and all its ethical and political implications) has finally given way to all forms of theoretical and social constructionism. In short, among our university elites, nothing now stands in the way of seriously considering the merging of our bodies with technical devices. Winner traces the breakdown in this metaphysical belief in a fixed human essence to the Marxist definition of humans as the toolmaking animal and, later, to the engineering-inspired notion that our technologies are really nothing more than "powerful extensions" of our organs. Over the last century, both ideas have come together to argue for technology as the central fact of human existence, elevating the goals of dominating nature and removing biological limitations to a status unknown in the premodern world. The emergence, then, of the ideal of a cyborg, a hybrid of the human

and the technological, is not surprising. And yet, with this hybrid we have moved beyond both Marxist and engineering kinds of humanism. For in creating cyborgs, we will not just make technology, we will become it. Technology will no longer function as an extension of our physical capabilities but will actually constitute them. Here, Winner observes, the tendency in the social sciences to no longer recognize the traditional distance between culture/artifice and nature/biology serves as a powerful underpinning to the desirability of replacing humans with manufactured hybrids.

While applauding the undoubtedly positive ethical and political aspects of social constructionism in helping us detect the strategies of domination and marginalization in many appeals to the "natural," Winner admonishes against a too hasty embrace of these entities. Citing the work of Donna Haraway, he observes that proponents of hybridization are more prone "to generate a collection of moral sentiments" than arguments that lead to "explicit ethical commitments." Moreover, their attempts to denigrate the supposed integrity of natural things, while clothed in progressive sensibilities and liberal convictions, fail in the end to address the challenge of biotechnology and its possible violation of a natural order that exists beyond human influence or control. And finally, Winner worries over the conflation of a leftist social constructionism with "the work of radical reconstruction and recapitalization at stake in today's technical and corporate realms." In effect, Winner reaffirms Zaner's and Elshtain's essential presupposition: that most of the world remains a place, not of human making, but of things—including humans—that are simply given. But in doing so, he extends their arguments by raising the question of whether genetic engineering is the appropriate tool to address the injustice that always accompanies the world in its imperfect givenness. Might, he asks, an engineering approach to all our problems actually subvert the claims of justice by refusing to simply let beings be?

Winner is thus anxious to expand the question of human nature and genetic engineering to include its moral and political aspects. Progressives have traditionally focused on institutional change and a critique of political life. But this template is now being challenged by the seemingly more rational prospect of biological transformation, especially at the genetic level. Aside from the disturbing question of the justice of employ-

ing such means, Winner leaves us with the practical fear concerning the untold consequences that will follow from our abandonment of a political theory and praxis focused on social structures and their capacity for oppression, including those that result from modern technoscience itself.

And so we are left to contemplate a paradox. There is little doubt that humans as humans—whatever in the traditional sense that means—have a long and storied history of wondering and tinkering with our understanding of our abilities and place in the world. This history has brought us astonishing accomplishments, and now has brought us even to the brink of altering our own nature. Yet, at what many see to be the moment of our highest accomplishments, we find animating the turn toward hybrids and cyborgs an impatience with the merely human—that is, with a being whose biological limitations seem to be at the root of so much violence, suffering, and unhappiness. In the final analysis, the challenge raised by the question of this book is quite possibly a weariness with the human condition itself.