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Excerpt*

THE
BODY
POLITIC

THE BATTLE
OVER SCIENCE
IN AMERICA

JONATHAN D. MORENO

“An impassioned defense of scientific study . . . an essential dose of logic.”
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“A solid addition to any politics collections.”
—*Midwest Book Review* (reviewer’s choice)

“An engaging history of the intersection between science and democracy in everyday life.” —Book of the Month Club 2 editorial review

“Moreno shrewdly tracks the history of science in American politics from Thomas Jefferson to today’s science culture wars. He explains how science and discovery have been central to our vision for the country, but often fueled a significant counter reaction. A must read for anyone who wants to understand science policy today.” —JOHN PODESTA, Chair and Counselor, the Center for American Progress

“*The Body Politic* reminds us that science occurs within a complex context that exerts powerful forces upon scientists, public officials, advocacy groups, and patients. Moreno has written the kind of book that needed to be written, combining detailed research, enlightened analysis, and an important message, all wrapped in accessible text.”

—ERIC M. MESLIN, Ph.D., Director, Indiana University Center for Bioethics

“Moreno clarifies major points of science-society tension over the last half century and brings a sharp eye to the societal context confronting future advances and their applications.” —ALAN I. LESHNER, Ph.D., Executive Publisher, *Science*

“A beautiful book.”

—JAY SCHULKIN, Research Professor,
Department of Neuroscience, Georgetown University

“*The Body Politic* is required reading for anyone who wants to understand the history of American political thought about science, the dynamics of current controversies such as the stem cell debate, and the battle between those who see science as the route to a better future and those who see within science the potential for a loss of our sense of human distinctiveness and dignity.”

—PAUL ROOT WOLPE, Ph.D., Director, Center for Ethics, Emory University

“This groundbreaking must-read book situates the biological revolution in its historical, philosophical and cultural context and, with almost breathtaking elegance, shows how society may come to define itself by the body politic.”

—NITA A. FARAHANY, Associate Professor of Law &
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THE BODY POLITIC

The Battle Over Science in America

JONATHAN D. MORENO



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The rapid Progress *true* Science now makes, occasions my regretting sometimes that I was born so soon. It is impossible to imagine the Height to which may be carried, in a thousand years, the Power of Man over Matter. We may perhaps learn to deprive large Masses of their Gravity, and give them absolute Levity, for the sake of easy transport. Agriculture may diminish its Labour and double its Produce; all Diseases may by sure means be prevented or cured, not excepting even that of Old Age, and our lives lengthened at pleasure even beyond the antediluvian Standard. O that moral Science were in as fair a way of Improvement, that Men would cease to be Wolves to one another, and that human Beings would at length learn what they now improperly call Humanity!

—BENJAMIN FRANKLIN, 1780

Science! true daughter of Old Time thou art!
Who alterest all things with thy peering eyes.
Why preyest thou thus upon the poet's heart,
Vulture, whose wings are dull realities?
How should he love thee? or how deem thee wise,
Who wouldst not leave him in his wandering
To seek for treasure in the jewelled skies,
Albeit he soared with an undaunted wing?
Hast thou not dragged Diana from her car,
And driven the Hamadryad from the wood
To seek a shelter in some happier star?
Hast thou not torn the Naiad from her flood,
The Elfin from the green grass, and from me
The summer dream beneath the tamarind tree?

SONNET—TO SCIENCE
—EDGAR ALLAN POE, 1829

INTRODUCTION: WHO OWNS SCIENCE?

EVERY TWO YEARS THE NATIONAL SCIENCE BOARD COMPARES America's science and technology performance to the rest of the world. The 2010 report contained several nuggets of information from polling about Americans' attitudes toward scientific breakthroughs: 68 percent of Americans said that the benefits of scientific research strongly outweigh the harmful results, and only 10 percent said that harms outweigh the benefits. Other surveys confirm these results. As the Pew Research Center reported based on its own 2009 polling, Americans like science”:

Americans like science. Overwhelming majorities say that science has had a positive effect on society and that science has made life easier for most people. Most also say that government investments in science, as well as engineering and technology, pay off in the long run. And scientists are very highly rated compared with members of other professions: Only members of the military and teachers are more likely to be viewed as contributing a lot to society's well-being.

But there is also an undercurrent of unease. In spite of its generally upbeat findings, the National Science Board also found that nearly half of Americans believe that “science makes our way of life change too fast.” And it seems that the authors of the National Science Board's report excluded some survey results from the final draft, results showing that Americans are much less likely than the rest of the world to

accept evolutionary theory and the big bang explanation of the origins of the universe. The Board said the less encouraging data were excluded from the final draft because they were flawed, but a White House spokesman criticized the omission: “The Administration counts on the National Science Board to provide the fairest and most complete reporting of the facts they track.” And a science literacy researcher said that the board’s decision reflected “the religious right’s point of view.”

In America, even surveys about scientific controversy can become matters of controversy.

Future Shock Redux

But no particular group, right or left or somewhere else, is immune from the sense that change is accelerating at an ever faster pace with each passing year. The experience of too-rapid change, whether trivial or profound, is a characteristic of modernity. Information technologies are perhaps the sentinel sources and examples of what Alvin Toffler called “future shock” in 1970, right around the time that a young Bill Gates programmed a GE computer his school purchased using proceeds from a rummage sale. Information scientists cite Moore’s law, the idea that computing capacity doubles every two years. We’ve all experienced the anxiety, frustration, and even resentment that accompanies the introduction of a new version of a software product on which we depend, or the realization that people younger than ourselves have adopted a new technology that makes the pace and style of their lives seem very different from our own.

Reservations about rapid technological change are widely shared regardless of political party or philosophy. In America the tension between approval of science and worry about the rapid changes it can bring bubbles up in special ways when moral or cultural choices seem to be involved. We’ve seen this tension play out time and again in our seemingly endless controversies about the teaching of evolution, reproductive rights, the moral status of the human embryo, the origins of the universe, and nearly all the issues of science that relate to human values.

Sensitivities about science are understandable. People rightly feel that high stakes are involved when science pushes familiar boundaries, and most of all when it seems that our customary and largely workable

moral framework is being challenged. Americans seem especially touchy about such challenges. Ours is in many ways a deeply conservative country where the vast majority (generally around ninety percent) consistently report that they believe in God. The prominence of faith among Americans becomes even more striking when compared with modern western Europe, the historic source of America's core Enlightenment values of rationality and science. There, the proportion of believers is around fifty percent. Americans admire science but also treasure traditional values, which are in some ways threatened more by science than any other institution; our attitudes tend to assemble at the extremes. In this sense, America is both the principal product and the main stage for the ongoing drama of the Enlightenment. Here are these universal values of truth, freedom, and equality founded on reason rather than the authority of a church or sovereign rulers. But is reason enough, or does it threaten those very values?

The ever-quickenning pace of discovery in biology is an especially volatile source of "wedge" issues in our politics because it puts into question our familiar values about life itself. These questions are particularly clear when human dignity seems to be threatened, as critics charge is the case with embryo-related research. In 2005 the Genetics and Public Policy Center found that three-quarters of Americans opposed human embryo cloning for research. A 2008 survey sponsored by the conservative Ethics and Public Policy Center found that when the question of embryonic stem cell research is put in terms of curing disease most favored the research, but when described as destroying embryos a small majority opposed it. Five polls by the Pew Forum on Religion and Public Life from 2004 to 2007 found that a majority agreed that it was "more important to continue stem cell research that might produce new medical cures than to avoid destroying the human embryos used in the research."

These results suggest how conflicted Americans are about basic questions of science and ethics. This is nothing new; deep-seated worries about science that are as old as the Enlightenment itself have been poured into bottles made new by the experiences of the twentieth century. The sociologist John Evans has found that conservative Protestant religious groups in the United States do not reject science per se. Rather, they "are opposed to scientists' influence in public affairs not because they do not agree with their methods, but for moral reasons. . . . [T]he

relationship between religious persons and science is far more subtle than the dominant assumption of religious opposition to science due to a total rejection of scientific methodology.” The problem is not mistrust of science so much as it is mistrust of scientists.

Biopolitics, Old and New

Biopolitics refers to the ways that society attempts to gain control over the power of the life sciences. Although ideas about the role of biology in politics may be found at the earliest stages of Western philosophy, biopolitics promises to become far more prominent as the power of the modern life sciences becomes ever more obvious. The old politics of biology operated in the dark about the underlying mechanisms in question. The new politics of biology arise in the midst of rapidly growing understanding of basic life processes, with seemingly limitless opportunities to direct individual and social change. Simply put, in the modern politics of biology the stakes are about as big as they can get.

The modern abortion controversy has elements of both biology in politics and the politics of biology, especially as it has been a recurrent theme in the United States since the 1970s. As an example of biology in politics, the positions taken by pro-life and pro-choice forces have served as organizing principles. In an example of the politics of biology, each side attempts to manage the power behind the decision to continue a pregnancy or not. But the binary simplicity of the abortion decision itself (i.e., to abort or not) and the relative straightforwardness of the positions one may take on this issue in its strictly political sense (pro-life or pro-choice) are being vastly outstripped by the scenarios forced upon us by the new biology. As biological knowledge grows and as its applications become available, far more complicated and subtle new issues will emerge that can be brought under the heading of biopolitics, the new politics of biology.

The term *biopolitics* was popularized by the French philosopher and historian Michel Foucault. He saw biopolitics as an instance of biopower, the management of bodies and the collections of bodies that we call populations. Key to understanding this idea of biopower is suspending the standard modern tendency to think of the state as the main or even the principle locus of power. Rather, as the philosopher Jason

Robert has observed, Foucault's focus is on those powers among people who have certain key positions in the knowledge economy.

[B]ureaucrats, administrators, public health nurses, teachers, physicians, genetic counselors, psychotherapists, statisticians, economists. The political government of individuals is effected through special competence and disciplinary credentials. . . . Foucault documents a new power over life, distinct from the right of the sovereign.

Classically, power over bodies and populations was expressed through the idea of governmentality. Not limited to state power, and subsuming even sovereign authority, societal institutions created since the Enlightenment guide conduct in both personal and public matters. As the requirements for a rationale for such arrangements intensified through the emergence of the liberal state, so has the role of expertise, such as the specialized knowledge of the statesman and the scientist. Competition and conflict among parties contending for control over both the actual results and the symbolism of biology have also intensified since the Enlightenment. As Foucault describes it, biopolitics "is the endeavor, begun in the eighteenth century, to rationalize problems presented to governmental practice by the phenomena of a group of living human beings constituted as a population: health, sanitation, birthrate, longevity, race."

Prior to the Enlightenment, Foucault argued, the sovereign exercised supreme power over life with the threat of death. With the rise of rationality as a criterion of acceptable sovereignty, the modern state asserts control not merely over life and death but also over ways of living. The justification for the exercise of this biopower is the need to regulate labor, punishment, public health, reproduction, and various other core cultural habits for the sake of social well-being. Biotechnology may now be added to the list. In the words of another writer on Foucault and biopower, "[g]enetic engineering and genetic-based pharmaceuticals, among other biotechnological pursuits, share an approach aimed at identifying and engineering what are seen as the most basic components of life."

Foucault's idea of biopolitics must be brought up to date. In the more than quarter century since his death, we have entered what has been called the "biological century." If that description is accurate,

what does it mean for our politics? The anthropologist Paul Rabinow puts it well: “My educated guess is that the new genetics will prove to be a greater force for reshaping society and life than was the revolution in physics, because it will be embedded throughout the social fabric at the microlevel by a variety of biopolitical practices and discourses.”

In the early twenty-first century, we are crossing the threshold to a new biopolitics. Rather than concerning itself with control over bodies and populations *per se*, the new biopolitics has to do with control over the tissues, systems, and information that are the basis and manifestation of life in its various forms. This new biopolitics is vastly more subtle and, in important ways, potentially more powerful than familiar political struggles over biology, like those having to do with the ability to terminate a pregnancy, or certain clumsy forms of eugenics, and there are already many more protagonists in biopolitics than in the past. Whether the new biology today actually achieves the Promethean power that is often touted, the symbolism alone invites struggles for control. The government, private sector, and scientific community all risk a grave loss of confidence in their ability to manage the emerging forces that the new biology seems poised to let loose. Even if only some of the predictions bear fruit, the new biology will challenge everything in its path, including our understanding of ourselves as living creatures, the ways we live, our relationship to the world, our social arrangements and values, and our political systems.

Science/Technology/Invention/Innovation

The new biopolitics has taken shape just as two venerable distinctions are, in some respects, collapsing. Technology has been around since at least the beginning of agriculture and on some accounts even extends back to the tools and weapons used by hunter-gatherers. Plato wondered how it was possible for mortals to have knowledge of craft or *techne*. But science is a latecomer. One difference between science-based and nonscience-based technology is that scientific theories often have surprising implications that even their pioneers don't anticipate. A classic example is the fact that Albert Einstein had to be persuaded by Leó Szilárd that the atomic bomb was a practical possibility, partly in light of Einstein's own special theory of relativity, so that Einstein would

lend his prestige to a letter alerting Franklin Delano Roosevelt of the potential for a weapon holding massive destructive capacity.

The development of science-based technology is remarkably recent, accelerating only toward the end of the nineteenth century with specific, crafted applications of ideas drawn from the emerging explanatory and demonstrable theories, especially in biology. And of course it is still possible to engage in technical manipulations of the world without paying attention to any underlying theory, so science and technology will never be identical. But there is every reason to believe that the convergence between science and technology will go on indefinitely. For a time the idea of starting with a scientific theory as a way to solve a practical problem was so novel that the term “applied science” was used. But so much technology is now science-based, as in the development of new microprocessors, that what used to be called applied science is often virtually synonymous with technology.

To appreciate the traditional relationship between technology and invention, let us take the example of Thomas Edison. He was both a non-science-based technologist and an inventor. The incandescent lightbulb was built on a diverse array of gradually improved materials and owed its origins only very indirectly to electrical theory (of which another great American inventor, Benjamin Franklin, was an early investigator). Alexander Graham Bell is another to whom the term technologist/inventor applies. Both Edison and Bell were brilliant craftsmen who addressed a technical problem. But neither was an innovator. Innovation, in the words of the historian Harold Evans, is more than inventing a new technology. It involves “a universal application of the solution by whatever means. . . . Invention without innovation is a pastime.” Universal application is a matter of dissemination, of moving an ingenious solution out into the world. In that sense, the telephone as an innovation is owed to someone who is hardly a household name: Theodore Vail, the president of AT&T. His vision and organizational genius turned Alexander Graham Bell’s technology into a national telephone system through the merger of Western Electric and the Bell Company.

The distinction between invention and innovation is more formidable, because it is usually still true that what works in a lab could be prohibitively expensive to disseminate or might not be publicly acceptable. But in some cases, the Internet has virtually (the pun is coincidental but fortunate) eliminated the costs of innovation. The Pentagon’s

invention of the Internet in the 1960s created the opportunity for innovators like Tim Berners-Lee to develop the World Wide Web. Reminiscent of AT&T's Theodore Vail, who married two entities to produce his communications system, Berners-Lee joined hypertext to the Internet to produce the Web. Today, thanks to that fantastic resource, it is possible to invent an iPhone application and disseminate it almost immediately with hardly any capital requirements on the part of the inventor/innovator. Unlike the case with energy, where the costs of moving from invention to innovation are notoriously high, where the key product is information the moment of invention is also the moment of innovation. With little notice, a similar convergence of invention and innovation is happening in laboratory biology, as genetic sequences can now be e-mailed to labs around the world and chromosomes reconstructed from the biochemical data. In this sense as well, ease and immediacy of scientific communication are giving the scientific community leverage as a new invisible college and are also constituting a global force, a world polity of instantly shareable knowledge and innovation.

Biopolitical Organizing

It is no accident that biopolitics is coming into its own just as knowledge of basic biological mechanisms is beginning to present opportunities for remarkable medical interventions. Previously, the concrete power of biology and contributions of basic biological knowledge to human health had been a matter of debate. The extension of the human life span in the developed world since 1900 has until recently been almost entirely attributable to improvements in public health, particularly the eradication of infectious disease through improvements in water supplies and personal hygiene. As a wag once observed, whomever invented underwear was perhaps the greatest contributor to public health of all time. However, it seems that in recent years a growing portion of the developed world's increased average life span is due to medical interventions, especially in the elderly. As more is learned about gene expression and cellular processes, these interventions can take place earlier in life, resulting in less suffering through disease prevention and perhaps still longer lifetimes. If longer lives are also lives of high quality, the benefits for human flourishing could be vast, but the power

that underlies these improvements will, like all sources of power, be a matter of contention. In the midst of these struggles for control, both the legitimacy of the life sciences as governable and trust in the goals and practices of scientists themselves will be at risk.

In the past few years a handful of thinkers and activists have explicitly and implicitly recognized the new biology as a new way of organizing around political values. The questions raised by all sides in biopolitical debates are of ultimate importance to the way we see ourselves as a society and so, unlike many political questions, the usual ideological labels are poor predictors of policy positions. The anti-genetic-engineering crusader Jeremy Rifkin was perhaps the first political organizer to notice that anxieties about the implications of modern biology cut across the familiar left-right political spectrum.

The current debate over embryo stem cell research, as well as the debates over patents on life, genetically modified foods, designer babies, and other biotech issues, is beginning to reshape the whole political landscape in ways no one could have imagined just a few years ago.

Although reluctant to acknowledge it, both social conservatives and left activists are beginning to find common ground on a range of biotech-related concerns. . . . The threads that unite these two groups are their belief in and commitment to the intrinsic value of life and their growing opposition to what they perceive as a purely utilitarian perspective on biotech matters being extolled by scientists, politicians and market libertarians.

These issues have already begun to make for strange political bedfellows. Some on the left oppose these changes as further threats to human equality, while some on the right worry about the implications for human dignity. Alliances of convenience will develop as people with differing political sympathies make common cause when these issues arise. All but a few libertarians, radical technophiles, and probusiness capitalists have at least some reservations about these kinds of developments. As Rifkin notes, “[i]f the convergence [between social conservatives and left activists] continues to pick up momentum, conventional politics could be torn asunder in the biotech era.”

In a telling foretaste of the new biopolitical alliances to come, consider the shortage of organs for transplant. The medical and bioethical

establishments favor altruistic kidney donation. This has been the mainstream view ever since transplants from living donors have been feasible. But there is not nearly enough supply to satisfy demand, leaving thousands to die of kidney disease each year. Recently, however, a prominent conservative intellectual has joined forces with a well-known pro-choice advocate to challenge the public policy that prohibits compensating organ donors. Meanwhile, most cultural conservatives and social liberals worry about the moral and social implications of paying for organs, even though lives could be saved.

The philosophical intersections that grow out of the new biopolitics can be mapped. Mainstream bioprogressives align with traditional business conservatives in favoring private enterprise. Bioprogressives on the left emphasize regulation, equality, and the common good, while bioprogressives on the right are often of a libertarian cast, emphasizing free enterprise as the most reliable source of innovation. Bioconservatives include both religious traditionalists, mainly Christian, and secular neoconservatives who do not appeal directly to religion but rather to certain traditional religious values in their critique of science, which they regard as a threat to human dignity and moral equality; some appeal to a core concept of human nature itself. “Green” progressives harbor deep doubts about the implications of science for social justice, often striking a distinctly bioconservative note. A small but growing and vocal philosophical movement, transhumanism or “Humanity+”, largely embraces technological change as promoting, rather than jeopardizing, the very values cherished by bioconservatives. In spite of some important dangers, transhumanists see the possibilities for enhancing human nature, while bioconservatives regard human nature as too precious and fragile to withstand manipulation.

Quite different understandings of the history and implications of science and technology and the ability of human beings to adapt to moral challenges are at the core of these philosophical differences. Perhaps with more dialogue about the core differences, the policy disagreements may be ameliorated. After all, if many on the left harbor doubts about science, they have nonetheless not been driven into the arms of social conservatives. Nor are many social conservatives as negative about science as some rhetoric would suggest. We might hold out the hope that all sides could be convinced that science, within carefully negotiated limits, can enhance and enrich the quality of our spiritual as

well as our material lives. This is, in essence, the mainstream liberal and progressive view. Yet I think important differences among these novel biopolitical alliances will remain, differences rooted in quite different understandings of the relationship between scientific ways of thinking and human rights, as well as lingering and characteristically post-Enlightenment reservations about the trustworthiness of scientists themselves.

In a way, of course, these political realignments are only new ways of shuffling an old deck. Like generals, political organizers are good at fighting the last war. For those perceptive enough to identify them, however, the new biopolitics also creates opportunities for novel forms of organization and innovative social movements. As is true of the new biopolitics in general, there are already clear signals of what is to come. Take the case of advocacy concerning the needs of persons with certain diseases, disorders, or disabilities. Polio sufferers and their families, persons in wheelchairs, cancer patients, and others have come to be powerful interest groups, securing funding and publicity for massive public health programs, accessibility measures like curb cuts and ramps, and government support of cutting-edge research programs. It is now common to speak of “disease communities,” a twentieth-century form of affiliation and self- and mutual identification. Those advocating on behalf of research funding for diseases that are too uncommon to have much political clout on their own have organized into rare disease coalitions. Perhaps the most vivid examples of the legislative possibilities of these efforts are the long-term growth of the National Institutes of Health budget and the passage of the Rehabilitation Act in 1973.

One group that has explored the implications of this new kind of movement is the Little People of America (LPA). Since its founding in 1957, the group has scored impressive gains in both concrete public policies and intangible public attitudes toward those of short stature. Increasingly, members find themselves at the interface of prevalent conceptions of the “normal body” and the growing number of ways to use biotechnology on behalf of a chosen bodily identity. At least some couples who both have achondroplasia, a genetic anomaly that causes short stature, would prefer to have children with the same condition. They want their children to feel fully part of the culture of their community, as they define it. Similarly, there is long-standing division among people with hearing impairments about whether

cochlear implants are culturally acceptable or reinforce a stigmatizing notion of disability.

Short stature and hearing impairments are physical conditions that have opened the door to political organization, a sense of community, and even a redefinition of culture. Still more profoundly, genetic knowledge is creating a novel sense of deep kinship that is founded on genetic identity itself. As Rabinow puts it, “There already are, for example, neurofibromatosis groups who meet to share their experiences, lobby for their disease, educate their children, redo their home environment, and so on. . . . [I]t is not hard to imagine groups formed around the chromosome 17, locus 16,256, site 654,376 allele variant with a guanine substitution.” Not only does modern genetics create a sense of community among those with certain conditions, it makes it possible for people to select for children with the same conditions. Some conditions will be physically manifest, some will not, but in either case they will change the ways that people view their shared interests. In other words, politics will increasingly become biopolitics.

Though of course moral questions about reproduction stand in the background of much of our biopolitics, we may be confident that these questions will themselves be transformed by events we cannot anticipate, in both science and public affairs. Some of the emerging topics I will discuss are directly related to the politics of reproduction, others to the ways that we die, and still others to the remarkable prospects for new directions in health care, in knowledge about our biological nature, and for the enhancement of “natural” capacities in ourselves or our children. Formerly clear lines will be blurred; inquiry has a familiar and sometimes annoying tendency to upset comfortable ways of thinking. Although the results will almost certainly not conform to our most confident predictions, both our reasonable expectations and the surprises in store will force reexamination of the ways we think of ourselves as individuals and about the ways we arrange to live together.

America/Future/Progress/Science

Consider, finally, the constellation of these ideas. The American dream is inextricably tied to the vision of a future of progress founded on science. To the extent those prospects are threatened, so is the dream

and so, therefore, is American's civic religion, its *raison d'être*. That is why, especially in America, new biological knowledge aggravates our cultural tensions, stimulates further debate about the legacy of science in our sense of national purpose, and challenges our political system and the values implicit in our public life. Over the horizon, there are still other plausible developments that, if they come to pass, could fundamentally transform human society. How will America define itself in the century of biology? If politics is, as I believe it is, ultimately the only alternative to violence, these matters are worthy of the best politics we can muster.

Excerpt from *The Body Politic: The Battle Over Science in America*.
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