that rummages through the tattered pages of history's closed cases. It is, to use their words, a kind of end of the line. And it is a great pity, for some of the questions raised and insights provided by this book deserve much better than yet another partisan tract. One reason for its failure may be that, as the authors observe in another connection, "today's specialized academics, with notable exceptions, write with a set of intellectual assumptions and a vocabulary shared only by their colleagues." And, as time passes and new thoughts are thought and old fallacies exposed, by fewer of their colleagues.

Richard John Neuhaus is director of the Rockford Institute Center on Religion and Society, New York City.

After the Biological Revolution

NEIL M. RIBE


We are now in the second decade of what has been called the "biological revolution": the development of new technologies for the control of biological processes. It is well known that these new technologies—such as genetic screening and abortion, laboratory fertilization and embryo culture, gene splicing, and cloning—raise unprecedented and seemingly insoluble ethical dilemmas. Yet the biological revolution also poses a more serious if less obvious challenge: It forces us to reconsider our traditional notions of morality itself and of man's place in the world. This challenge is the subject of Leon Kass's Toward a More Natural Science, which aims "to search out the human significance of the presently new biology, and to search for a yet newer and richer biology that will do justice to matters of human significance." Kass, who teaches in the College and in the Committee on Social Thought at the University of Chicago, was trained as a physician and a molecular biologist, and for the past fifteen years has been one of the most perceptive analysts of the human consequences of the new biology. Toward a More Natural Science offers a selection of thirteen essays written during this period, three of which originally appeared in The Public Interest.

Today's biological revolution is no accident, for it was first envisioned by the founders of modern science in the seventeenth century. Modern science began by rejecting the natural science of the ancients (primarily Aristotle) which had prevailed in the West
for nearly two millennia. As Kass notes, “ancient science had sought knowledge of what things are, to be contemplated as an end in itself . . . modern science seeks knowledge of how things work, to be used as a means for the relief and comfort of all humanity . . . .” The possibility of knowledge for the “relief of man’s estate” was announced by Francis Bacon in 1620, and Descartes’s *Discourse on Method* (1637) held out the promise that the new science would render men “masters and possessors of nature.”

Nature, however, includes human nature; and both Descartes and Bacon foresaw that the new science would eventually give man the power to master his very self. Descartes suggested that this would come about through advances in medicine: “For the mind depends so much on the temperament and disposition of the bodily organs that, if it is possible to find a means of rendering men wiser and cleverer than they have hitherto been, I believe that it is in medicine that it must be sought.” Bacon’s posthumous *New Atlantis* describes a future utopia whose “jewel” is a secret scientific society called Salomon’s House or the College of the Six Days Works, which, among other things, produces new species by genetic engineering: “By art likewise, we make them greater or taller than their kind is; and contrariwise dwarf them, and stay their growth . . . we make them differ in colour, shape, activity . . . we find means to make commixtures and copulations of different kinds . . . neither do we this by chance, but we know beforehand of what matter and commixture what kind of those creatures will arise.”

The source of the ethical dilemmas of biotechnology is a tension at the very heart of the scientific project inaugurated by Bacon and Descartes. These men were guided by a moral imperative, the relief of man’s estate. Yet modern science has rejected as outside its purview all questions of what is good for man. The moral imperative of modern science therefore has no foundation within that science itself. This difficulty was easy to ignore as long as science was confined to serving ends (such as health and material comfort) that took “human nature,” as traditionally defined, for granted. The new biological technologies, however, have now given man the power to change human nature. Hence the central dilemma of the biological revolution that Kass examines: seemingly limitless power with no standards to guide its use.

Unlike many participants in the sometimes noisy bioethical debate, Kass seeks no transcendent or religious justification for his views (although he is sympathetic to those who do), and is not concerned to declare the use of a particular technology either “right” or “wrong.” Instead, he suggests, we do best if we seek to understand the significance of the technologies in question for our conception of what is human. For Kass, the greatest danger of the new technologies is that they threaten to erode the naturally given attributes and relations that define human life: such things as birth, gender, lin-
eage, selfhood and identity, health, aging, and death. Concerning laboratory fertilization and embryo transfer, for example, he asks: "What does 'mother' mean—and what can and should it mean for human affairs—if one woman donates the egg, another houses it for insemination, a third hosts the transferred embryo and gives birth to the baby, a fourth nurses it, a fifth rears it, and a sixth has legal custody?" He bids us consider whether cloning (the production of genetically identical human beings) is consistent with the idea of the identity and dignity of the individual, and asks: "If the attempts to clone a man result in the production of a defective 'product,' who will or should care for it, and what status or rights will it have? If the offspring is subhuman, are we to consider it murder to destroy it?" For Kass, the greatest danger of biotechnology is not that it can be abused for evil purposes, but that it may lead to a "voluntary dehumanization."

**THE QUESTION OF DEHUMANIZATION** is raised perhaps most forcefully in a provocative and troubling chapter, "Perfect Babies: Prenatal Diagnosis and the Equal Right to Life," which examines the ethics of selective abortion of fetuses with genetic defects. Kass notes that genetic abortion provides a good test case for ethical reflection because the practice can be defended on at least three serious grounds: avoiding the burden to society of genetically defective individuals (the "social" standard), preventing family suffering (the "familial" standard), and preventing the birth of individuals who will be unable to live a fully human life (the "natural" standard). Yet Kass argues that it is precisely because genetic abortion appears so "reasonable" that it raises such difficult issues. How does one decide if a defect is severe enough to warrant abortion? Is genetic abortion compatible with the principle that all human beings are endowed by nature with certain "inalienable rights"? Will the widespread practice of genetic abortion cause us to regard the "defectives" already among us—or those who escape detection before birth—as second-class citizens? Moreover, Kass concludes that each of the three standards used to justify genetic abortion simultaneously justifies the killing of defective individuals already born. Yet he does not condemn genetic abortion out of hand, and expresses his own sympathy for parents who feel compelled to choose this course.

**THE ESSAYS** grouped under the heading "Holding the Center: The Morality of Medicine" consider the traditional goals of medicine in light of the new biology. Biotechnology's power to alter human functioning implicitly threatens the autonomy of medicine as an art whose end is the preservation of the natural state of wholeness or "well-working" that we call health. Indeed, Kass points out that modern scientific biology does not even tell us that health is good and disease is bad, since both healthy and diseased processes equally obey the universal laws of nature. Yet perhaps, Kass suggests, medicine can teach us things about nature, and about the
nature of ethics, that our biologists do not know. He argues that, in spite of the ever-increasing technological powers wielded by physicians, medicine remains an art in service, not mastery, of nature. Moreover, he suggests that medicine is an inherently moral activity, and that medical ethics therefore has its source in the very definition or nature of medicine itself. This view is developed most fully in “Is There a Medical Ethic? The Hippocratic Oath and the Sources of Ethical Medicine,” a commentary on and defense of the Hippocratic Oath, in which Kass argues that the practice of medicine—as distinct from scientific research—can provide a model for a renewed understanding of man’s relation to nature.

For if medicine teaches what our scientific biology cannot support—that living nature is not indifferent to the distinction between health and disease—we are invited to seek for a richer and more adequate biology that, in Kass’s words, “affirms about life what life knows about itself.” The search for a new biology, however, must face the challenge posed by the theory of evolution, which Kass takes up in “Teleology, Darwinism, and the Place of Man: Beyond Chance and Necessity?” The Darwinian (and neo-Darwinian) theory of evolution is of course one of the foundations of modern biology, and its revolutionary effect on man’s self-understanding is well known. Less familiar, however, is the fact that the validity of the basic assumptions of Darwinism is still the subject of lively debate among serious scientists and philosophers. One of the most important issues in this debate is the question of “teleology”: Do living organisms have natural purposes or goals? Kass shows that the concept of teleology is an empirical one, grounded in the observed directedness and self-organization of living things, and requires neither divine “special creation” nor the imputation of intelligence to plants and animals. He further suggests that Darwin’s theory of natural selection, which appears to give an entirely nonteleological account of living nature, is in fact based on covert teleological premises (namely, that organisms are engaged in a “struggle for existence” and tend to reproduce themselves). Moreover, Kass sees evidence for a broader teleology in the upward trend of evolution towards progressively “higher” forms of life, and suggests that man with his unique faculties of self-consciousness may represent the peak of the evolutionary process.

In the remaining chapters Kass attempts to provide a framework for a new understanding of nature consistent with the genuine discoveries of modern biology while at the same time accounting for the distinctive capacities and concerns of man. Kass’s approach owes much to a long tradition of philosophical biology stretching from Aristotle through Lamarck and Goethe to such modern thinkers as the biologist Adolf Portmann and the psychologist Erwin Straus. This tradition has been largely ignored in the English-speaking world because of the influence of Darwinism, and Kass has performed a great service by bringing it to the attention of a wider
audience. Broadly speaking, this tradition may be characterized as a “phenomenological” biology: Its central concern is to understand the meaning of the manifold forms and appearances of organisms. Kass considers several such “forms” in these chapters, among them the upright posture, attitudes toward nakedness, and human funeral practices. One of the finest essays in the book is “Mortality and Morality: The Virtues of Finitude,” in which Kass explores the meaning of death and argues that finitude is in fact our sine qua non. Perhaps the most provocative chapter, however, is “Looking Good: Nature and Nobility,” in which Kass analyzes the phenomenon of blushing and shame in humans and animals. For Kass, the phenomenon of blushing shows that man is naturally concerned with self-esteem and hence with the ethical, and that ethics therefore has its roots in nature itself. In closing, Kass invites us to consider the possibility that a richer understanding of nature might even provide some guidance for how we are to live.

Although the “biological essay” seems to be a popular genre these days—witness the success of Lewis Thomas and Stephen Jay Gould, for example—it would be a mistake to regard Kass as just another entry in an already crowded field. Few essayists focusing on science today can match Kass’s philosophical depth and ability to offer new insights into fundamental questions—the philosopher Hans Jonas is among the few who come to mind. The form Kass has chosen—the essay—should not be allowed to obscure the magnitude of his ultimate aim, which is nothing less than the philosophical reconstruction of natural science. Although Toward a More Natural Science claims to be no more than a first step toward this goal, it is a major contribution to the renewal of natural philosophy which is so urgently needed in our time.

Neil M. Ribe is an assistant professor of Geophysics at Yale University.

The City that Never Sweeps

NATHAN GLAZER


Not long ago, a writer who had left New York City and was living in the South was interviewed in the New York Times. She said she had left because all discussion in New York—even among