
Science, Religion, and the Human Future

Leon R. Kass

WESTERN CIVILIZATION would not be Western civilization were it not for biblical religion, which reveres and trusts in the one God, Who has made known what He wants of human beings through what is called His revelation—that is, through Scripture. Western civilization would not be Western civilization were it not also for science, which extols and trusts in human reason to disclose the workings of nature and to use the knowledge gained to improve human life. These twin sources of Western civilization—religion and science (or, before science, philosophy), divine revelation and human reason—are, to say the least, not easily harmonized. One might even say that Western civilization would not be Western civilization without the continuing dialectical tension between the claims and demands of biblical religion and the cultivation of autonomous human reason.

In the United States today, the age-old tension between science and scriptural religion is intensifying. Recent debates over stem-cell research and the teaching of evolution are but small skirmishes in a larger contest of worldviews, a contest heating

LEON R. KASS, *the Hertog fellow at the American Enterprise Institute and professor in the Committee on Social Thought at the University of Chicago, served from 2001 through 2005 as chairman of the President's Council on Bioethics. In somewhat different form, this essay will appear in a volume on religion and the American future to be published later this year by the American Enterprise Institute.*

up especially because of the triumphant emergence of the new sciences of genetics, neurobiology, and evolutionary psychology. As the findings of these biological sciences are elevated into scientific challenges to traditional understandings of human nature and man's standing in the universe, religious teachings are increasingly under attack and suspicion. Biblical religion finds itself intellectually on the defensive, in the face of assaults from an aggressive scientific and intellectual elite eager to embarrass it.¹

Make no mistake: the stakes in this contest are high. At issue are the moral and spiritual health of our nation, the continued vitality of science, and our own human self-understanding as human beings and as children of the West.

IN THIS essay, I will examine the challenge of the scientific worldview and consider whether biblical religion can meet that challenge. Before proceeding, however, I need to enter a few preliminary stipulations about the terms "religion" and "science," each of which is complicated and ambiguous.

The world knows innumerable religions, and even the so-called great religions, East and West,

¹ See, for example, recent books by the biologist and bio-prophet Richard Dawkins (*The God Delusion*) and the philosophy professor Daniel Dennett (*Breaking the Spell: Religion as a Natural Phenomenon*). Both offer purely naturalistic and evolutionary accounts of the origin of human religions and document what they regard as the evils that belief in God has wrought.

differ profoundly in their conceptions of divinity, nature, man, reason, morals, spirituality, and the purpose of it all. Nor is it correct to characterize our subject as a contest between *faith* and *reason*. Religions are about much more than faith, and many of the teachings of biblical religion are neither irrational nor unreasonable. It is true that Christianity emphasizes the supreme importance of belief and the affirmation of doctrine and creed as compared with matters of practice, ritual, and lawful observance. But Enlightenment rationalism, for its part, has welcomed this dichotomy, which serves the purpose of an attack on religion as “irrational.”

“Science,” too, is supremely ambiguous, referring (in its modern meanings) both to a methodical art for gaining knowledge and to the accumulated knowledge itself. Both need to be distinguished from a strictly scientific *outlook* on life and the world, which in its full form has been called “scientism,” a quasi-religious faith in the sufficiency of modern science to give a complete account of our world, human life included. One need not be scientific to practice science, and most scientists are not. Indeed, many a scientist is also a self-identified member of one or another religious community, though part of what is at issue here is whether any easy-going compatibility of, for example, Darwinism during the week and Judaism or Christianity on the Sabbath is rationally defensible and free of contradiction.

In what follows, I will use “religion” to refer to both Judaism and Christianity, overlooking for the most part all of the important differences between them (and within each). By “science” I will mean modern Western science, the globally successful effort to understand how things work—of which mathematical physics is the jewel and foundation—based on a method of discovery uniquely invented for this purpose, and ultimately imbued with a philanthropic aspiration to use that knowledge for the relief of man’s estate and the betterment of human life.

Finally, a word about my approach. The relation between religion and science is, of course, neither a scientific nor a religious question. Insofar as it is a genuine question, it is a philosophical one, both the subject and object of a quest for wisdom. My philosophical approach carries its own hazards of distortion, since it risks treating science and (especially) the various religions from the outside, and not in the way they understand themselves; accordingly, thoughtful believing Jews and Christians and knowledgeable scientists may well not recognize themselves in my account. Nevertheless, looking in

the mirror that I am providing should, I hope, stimulate salutary self-reflection.

Although any religion as a human (and more-than-human) institution comprises much more than the knowledge or truths it propounds, the primary point of contact and contest between science and religion happens to be about truth. Hence the central question is this: how do matters stand between the truths discovered by science and the truths revealed by biblical religion, between the truths that can send a man to the moon and the truth spoken in the Torah or the truth that shall make you free?

My answer is divided into three parts: first, some remarks about scientific knowledge and truth in general, and its implications for religious teachings; second, remarks about knowledge of man and his place in the whole; and third, remarks about knowledge of how human beings ought to live.

II

WHAT KIND of knowledge is science, and how is it related to the truths promulgated by biblical religion? Are these, as the late Stephen Jay Gould argued, “non-overlapping magisteria,” each with its own canons of evidence and legitimate claims, but—despite apparent contradictions between them—perfectly compatible domains, neither one capable of refuting or replacing the other? Or should we rather insist that there cannot be contradictory “truths” about the one world? For either the world is eternal or it came into being; if it came into being, either it was created by God or it was not; if there is divinity, either there is one God or many gods; either man is the one god-like creature (in the “image of God”) or he is not; either his soul is immortal or it is not; either he has free will or he does not; either God has made known to man what He requires of him or He has not. It is, I trust, not just the residual scientist in me that insists that there cannot be more than one truth about the one world, even if we human beings can never know it to the bottom.

This premise of a single, universal truth is indeed one of the starting points of modern science, and it is science’s reliance on methodical reason to discover such truth that makes possible its transnational and trans-religious appeal.

If Buddhists or Muslims or Christians want to describe the relation of pressure to volume in a gas at constant temperature or the motion of falling bodies, they will necessarily embrace the equations that are Boyle’s law or the law of universal gravita-

tion. Indeed, the quest for *indubitable* knowledge, universally accessible and rationally expressible, was the radical new goal of modern science, rebelling against a 2,000-year history of intellectual controversy and disagreement on nearly all matters hitherto discussed by scholars. As Descartes put it, “There is nothing imaginable so strange or so little credible that it has not been maintained by one philosopher or other.”

By the stringent standard of indubitability, a critique similar to Descartes’ could be applied now as well as then to some of the central teachings of the world’s great religions. Anyone can doubt or deny creation or immortality or the resurrection of the dead without self-contradiction; but no one can deny that the square built on the hypotenuse of a right triangle is equal to the sum of the squares built on the other two sides. In order to gain knowledge as indubitable as mathematics, the founders of modern science had to re-conceive nature in objectified (mathematical) terms and to change the questions being asked: no longer the big questions regarding the nature of things, pursued by rare wisdom-seekers, but quantifiable problems regarding an objectified nature, soluble by ordinary mathematical problem-solvers. If the history of modern science could be viewed not retrospectively from the present, but prospectively from its origins in the early 17th century, we would be absolutely astonished at what science has been able to learn about the workings of nature, objectively reconceived.

Nevertheless, despite its universality, its quest for certainty, its reliance on reason purified from all distortions of sensation and prejudice by the use of mathematical method, and the reproducibility of its findings, science does not—and cannot—provide us with absolute knowledge. The reasons are not only methodological but also substantive, and not merely substantive but also intrinsic and permanent.

The substantive limits of science follow from certain fundamental aspects of scientific knowledge and from science’s assumptions about what sorts of things are scientifically knowable. They stem from science’s own self-proclaimed conceptual limitations—limitations to which neither religious nor philosophical thought is subject. This is not because, science being rational, it is incapable of dealing with the passionate or sub-rational or spiritual or supernatural aspects of being. It is, on the contrary, because the rationality of science is but a partial and highly specialized rationality, concocted for the purpose of gaining only that kind of knowledge for which it was devised, and applied to only those

aspects of the world that can be captured by such rationalized notions. The peculiar reason of science is not the natural reason of everyday life captured in ordinary speech, and it is also not the reason of philosophy or religious thought, both of which are tied to—even as they seek to take us beyond—the world as we experience it.²

CONSIDER THE following features of science and their contrast with the realm of ordinary experience. First, science at its peak seeks laws of nature, ideally expressed mathematically in the form of equations that describe precisely the relationships among changing measurable variables; science does not seek to know beings or their natures, but rather the regularities of the changes that they undergo. Second, science—especially in biology—seeks to know how things work and the mechanisms of action of their workings; it does not seek to know what things are, and why. Third, science can give the histories of things but not their directions, aspirations, or purposes: science is, by self-definition, non-teleological, oblivious to the natural purposiveness of all living things. Fourth, science is wonderful at quantifying selected *external* relations of one object to another, or an earlier phase to a later one; but it can say nothing at all about the *inner* states of being, not only of human beings but of any living creature. Fifth, and strangest of all, modern science does not care much about causation; because it knows the regularities of change, it can often predict what will happen if certain perturbations occur, but it eschews explanations in terms of causes, especially of ultimate causes.

In a word, we have a remarkable science of nature that has made enormous progress precisely by its metaphysical neutrality and its indifference to

² It is therefore worth calling into question the arguments offered by those who seek to harmonize science and religion by assimilating the rationality of science with the rationality of the biblical God and His creation. They will point out, correctly, that God’s creation according to Genesis 1, based on intelligible principles, proceeds through acts of intelligible speech. Or they will point out that the Christian God is a God of reason because “In the beginning was the *logos* and the *logos* was with God.” But neither the intelligible principles of creation in Genesis 1 (separation, place, motion, and life) nor the *logos* spoken of in the Gospel of John are anything like the principles or mathematized *logoi* (ratios) of science. The former are tied to the distinctions of ordinary speech, which names qualitatively different natural kinds; the latter are tied to the concept of quantity, which homogenizes the differences of natural beings (and even the difference between discrete and continuous quantity, between multitudes and magnitudes).

For more on the conceptual peculiarities of modern science, and its radical difference both from ancient science and from ordinary human reasoning about life and the world, see the Appendix at the end of this article.

questions of being, cause, purpose, inwardness, hierarchy, and the goodness or badness of things, scientific knowledge included.

Let me illustrate these abstract generalizations with a few concrete examples. In cosmology, we have seen wonderful progress in characterizing the temporal beginnings as a “big bang” and elaborate calculations to characterize what happened next. But from science we get complete silence regarding the status quo ante and the ultimate cause. Unlike a normally curious child, a cosmologist does not ask, “What was *before* the big bang?” or “*Why* is there something rather than nothing?” because the answer must be an exasperated “God only knows!”

In genetics, we have the complete DNA sequence of several organisms, including man, and we are rapidly learning what many of these genes “do.” But this analytic approach cannot tell us how the life of a cockroach differs from that of a chimpanzee, or even what accounts for the special unity and active wholeness of cockroaches or chimpanzees or the purposive effort each living thing makes to preserve its own specific integrity.

In neurophysiology, we know vast amounts about the processing of visual stimuli, their transformation into electrochemical signals, and the pathways and mechanisms for transmitting these signals to the visual cortex of the brain. But the nature of sight itself we know not scientifically but only from the inside, and then only because we are not blind. As Aristotle pointed out long ago, the eyeball (and, I would add, the brain) has extension, takes up space, can be held in the hand; but neither sight (the capacity) nor seeing (the activity) is extended, and you cannot hold them in your hand or point to them. Although absolutely dependent on material conditions, they are in their essence immaterial: they are capacities and activities of *soul*—hence, not an object of knowledge for an objectified and materialist science.

III

WHAT ARE the implications of all this for scriptural religion?

On the one hand, the self-limited character of scientific knowledge is very good news for Christians and Jews. Eschewing philosophical speculation and metaphysical matters, science leaves those activities and domains free for complementary activities. Human beings will always ask questions of what and why, as well as of when and how. Human beings will always ask questions about the first cause and the end of days. Speculative philosophy

and religion address these concerns and offer their own answers—albeit on grounds that must of necessity be “unscientific.” If, for example, Genesis 1 offers a picture of the hierarchy of being, with man perched at its apex, the truth of that claim will not be based on scientific evidence; nor, as I will suggest at the end, is that truth likely to be confirmed or denied by scientific findings.

But, on closer examination, Stephen Jay Gould’s live-and-let live suggestion of complementary truths has its own limitations for the seriously religious. This is especially the case for those whose reading of Scripture is not only literal but literalist: those who think that the truths of Scripture belong to the same category of knowledge as that which can be demonstrated or falsified by science or historical research—a misguided hypothesis, in my opinion, but popular nonetheless. So, for example, those who, like Bishop Ussher in the 17th century, would learn the precise age of the earth from Scripture may be compelled to reconsider the veracity of the Bible, given the abundant evidence regarding the vast age of the cosmos. The fossil record, despite its lacunae, is an embarrassment to those who believe that the Bible teaches correctly the near-instantaneous appearance of all God’s creatures—unless, of course, they retreat to the position (proposed seriously in the 19th century) that God seeded the earth’s layers with fossils of creatures that never existed, precisely in order to test the faithful.

And then, finally, there is that old chestnut, still hard to crack, of miracles. Few of us, creatures of the present age, believe in miracles—in occurrences that suspend the laws of nature—events that we must hold to be, according to the regularities that science describes for us, “impossible.” In this respect, we are all children of science, at least regarding our contemporary life on earth. So little do we believe in the possibility of miracles that many of us even have trouble imagining any occurrence so unusual or momentous that would shake our faith in the *impossibility* of miracles.

I ONCE DISCUSSED this issue with a class of brilliant high-schoolers studying Descartes’s *Discourse on Method*, where the students were dogmatically insisting that their faith in nature’s abiding lawfulness could never be shaken, come what may. “What if,” I confidently asked, “Descartes himself were suddenly to appear in the flesh right before us, not some Madame Tussaud dummy but the real René? Would you change your mind?” To my astonishment, no one was the least bit moved. In-

stead, invoking the laws of probability and the always-finite chance of even the rarest of events, the smart scientists in the class averred that the molecules that once accompanied the genius that was Descartes might, on their own, accidentally reunite to give us his reincarnation. I found their faith as touching as it was preposterous.

Yet the irrationality of their zeal does not solve the problem for believing Christians and Jews, for whom big miracles surely matter, and attempts to harmonize science and religion cannot make this issue disappear. Either God gave the law to the Israelites at Mount Horeb or He didn't; if not, the 600,000 witnesses were deluded, and those who accept that His Torah was His gift may need to reconsider. Either the Red Sea parted and the sun stood still, or they didn't, in which case God's providence on behalf of His people is less than it is cracked up to be—not an uncommon opinion among some post-Holocaust Jews. And, abundant claims for the harmony of faith and reason notwithstanding, either Jesus rose from the dead or he did not—a miracle from the point of view not only of science but of all reasonable human experience. Yet on the truth of his resurrection rests the deepest ground for the Christian faith in the divinity of Jesus and the promise of man's ultimate salvation in him.

About such astounding "irregularities," science not only casts doubt: it cannot abide them. This is, for science, no idle prejudice. And the reason is plain. If a willful and powerful God were capable of intervening in worldly affairs and suspending the laws of nature, genuine science would be impossible.³ Its regularities would be mere probabilities, and its predictions would be entirely contingent on God's being out to lunch.

To my mind, it is a limping rejoinder to this challenge to say that an omnipotent God could still perform miracles and may someday do so again, but that He binds His power by His will for His own good purposes—hence, among other things, making science possible. This is too neat and too ad-hoc to be satisfying. And there is, I should add, nothing in Scripture to support these apologetic fancies.

On top of this rather old difficulty about miracles in general—a difficulty Christians and Jews have apparently learned to live with—biblical religious teachings today face newer and more particular difficulties in relation to specific scientific developments, of which the possible tension between evolution and the Bible is only the most well-known example. Here I have in mind present and projected discoveries in genetics and neuroscience, and, even more, the *interpretations* of these findings in the the-

oretical (and often explicitly anti-religious) pronouncements of evolutionary psychologists: interpretations and pronouncements that are supported but, in my view, hardly necessitated by those scientific discoveries. Today and tomorrow, major challenges are coming that affect not only specific religious dogmas, unique to each faith, but also the biblical understanding of human nature and human dignity, central ideas in all scriptural religion.

This is where the next big battles may be anticipated, and where we may next turn.

IV

THE LIMITATIONS of the scientific understanding of the world are, for most of us all of the time and for all of us most of the time, not a source of disquiet. Who cares, really, that according to our physics this most solid table at which I am writing is largely empty space, or that beautiful colors are conceived of as mere mathematized waves? Almost no one even notices that science ignores the being of things, even living things, and approaches them in objectified and mechanistic terms. We start to fret only when the account comes home to roost, to challenge our self-understanding as free and self-conscious beings with a rich inner life.

This venerable self-conception, rooted in everyday human experience, has been reinforced by centuries of philosophical and religious teachings. Yet the challenge to it has been coming for a long time; indeed, it emerged with the origins of modern science in the 17th century and has been there for all to see. For several centuries, giants of Western philosophy, including Leibniz, Spinoza, and Kant, labored mightily to find a home for human freedom and dignity, now that all of nature had to be ceded to mechanistic physics. Today, those philosophical defenses are no longer being attempted, whereas the challengers—all adherents of scientism—have become increasingly bold.

The strongest summonses today come from an increasingly unified approach to biology and human biology—evolutionist, materialist, determinist, mechanistic, and objectified—combining powerful ideas from genetics, developmental biol-

³ Although Descartes has gained a great deal of fame for his proofs of the existence of God, the god to whose "existence" he is "devoted" is not the God of Scripture. Far from being omnipotent, the god of physics is "himself" bound by nature's immutable laws and nature's lawful motion. The divine, decisively defined as "eternal changelessness," is in fact indistinguishable from eternal, unchanging nature, acting according to those immutable laws and therefore utterly immune to the sorts of miracles that are indispensable to scriptural teaching.

ogy, neuroscience, and evolutionary biology and psychology. At issue are not only what we think we are, but also our standing vis-à-vis the rest of living nature. Already Darwinism, in its original version 150 years ago, appeared to challenge our special standing: how could any being descended from sub-human origins, rather than created directly by the hand of God, claim to be a higher animal, never mind a godlike one? Indeed, orthodox evolutionary theory even denies that animals should be called “higher” or “lower,” rather than just more or less complex: since all animals are finally in the same business—individual survival, for the sake of perpetuating their genes—the apparent differences among them are, at bottom, merely more or less complicated ways of getting the job done.

Materialistic explanations of vital events, even psychic events, leave no room for soul, understood as life’s animating principle. Remarkably, our science of life has no interest in the question of what life is or what is responsible for it. Likewise, our science of the psyche has no interest in its proper subject: does any psychologist ask, “What is soul, that we are mindful of it?” Deterministic and mechanistic accounts of brain functions seem to do away with the need to speak of human freedom and purposiveness. The fully objectified and exterior account of our behavior—once the province of B.F. Skinner, today the grail sought by neuroscience—diminishes the significance of our felt inwardness. Feeling, passion, awareness, imagination, desire, love, hate, and thought are, scientifically speaking, equally and merely “brain events.”

Never mind “created in the image of God”: what elevated *humanistic* view of human life or human goodness is defensible against the belief, trumpeted by biology’s most public and prophetic voices, that man is just a collection of molecules, an accident on the stage of evolution, a freakish speck of mind in a mindless universe, fundamentally no different from other living—or even nonliving—things? What chance have our treasured ideas of freedom and dignity against the reductive notion of “the selfish gene” (or, for that matter, “genes for altruism”), the belief that DNA is the essence of life, or the teaching that all human behavior and our rich inner life are rendered intelligible only in terms of neurochemistry and their contributions to species survival and reproductive success?

MANY OF our leading scientists and intellectuals, truth to tell, are eager to dethrone traditional understandings of man’s special place, and use every available opportunity to do battle. For

example, in 1997, the luminaries of the International Academy of Humanism—including the biologists Francis Crick, Richard Dawkins, and E.O. Wilson and the humanists Isaiah Berlin, W.V. Quine, and Kurt Vonnegut—issued a statement in defense of cloning research in higher mammals and human beings. Their reasons were revealing:

What moral issues would human cloning raise? Some world religions teach that human beings are fundamentally different from other mammals—that humans have been imbued by a deity with immortal souls, giving them a value that cannot be compared to that of other living things. Human nature is held to be unique and sacred. Scientific advances which pose a perceived risk of altering this “nature” are angrily opposed. . . . [But] as far as the scientific enterprise can determine . . . [h]uman capabilities appear to differ in degree, not in kind, from those found among the higher animals. Humanity’s rich repertoire of thoughts, feelings, aspirations, and hopes seems to arise from electrochemical brain processes, not from an immaterial soul that operates in ways no instrument can discover. . . . Views of human nature rooted in humanity’s tribal past ought not to be our primary criterion for making moral decisions about cloning. . . . The potential benefits of cloning may be so immense that it would be a tragedy if ancient theological scruples should lead to a Luddite rejection of cloning.

In order to justify ongoing research, these intellectuals and others like them today are willing to shed not only traditional religious views but *any* view of human distinctiveness and special dignity, their own included. They fail to see that the scientific view of man they celebrate does more than insult our vanity. It undermines our self-conception as free, thoughtful, and responsible beings, worthy of respect because we alone among the animals have minds and hearts that aim far higher than the mere perpetuation of our genes. It undermines, as well, the beliefs that sustain our mores, practices, and institutions—including the practice of science.

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

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

One hardly knows which is the more impressive, the height of Pinker's arrogance or the depth of his shallowness. He appears ignorant of the fact that "soul" need not be conceived as a "ghost in the machine" or as a separate "thing" that survives the body, but can be understood (à la Aristotle) to be the integrated powers of the naturally organic body. He has evidently not pondered the relationship between "the brain" and the whole organism, or puzzled over the difference between "the brain" of the living and "the brain" of the dead. He seems unaware of the fact of emergent properties, powers and activities that do not reside in the materials of the organism but emerge only when the materials are formed and organized in a particular way; he does not understand that the empowering organization of materials—the vital form—is not itself material.

But Pinker speaks with the authority of science, and few are able and willing to dispute him on his own grounds.

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

As a cultural matter, the challenge of soulless scientism is surely daunting, even dispiriting. With philosophical anthropology in hibernation, only religious teachings appear to support the intuitions of uninstructed human experience of the human. And as the passages quoted above indicate, our secular elite, all in the service of a rational, uni-

versal science, is only too happy to charge these teachings with parochialism, dogmatism, and narrow cultural prejudice. The same elite is above all determined to banish all such teachings and (especially) their proponents from public discourse about such "scientific" matters as cloning or euthanasia.

But take heart: as a philosophical matter, these challenges should not bother us. Without for a moment calling into question the elegance or accuracy of any genuine scientific findings, each of these challenges can be met, and even without turning to religion. An adequate philosophy of nature would know what to say.

Although the subject is too long to be adequately dealt with here, the following summary points show once again the limits of any merely scientific approach.⁴ First, regarding our origins: a history of coming-into-being is no substitute for knowing directly the being that has come. To know man, we must study him especially as he is (and through what he does), not how he got to be this way. For understanding either our nature—what we are—or our standing, it matters not whether our origin was from the primordial slime or from the hand of a creator God: even with monkeys for ancestors, what has emerged is more than monkey business.

Second, regarding our inwardness, freedom, and purposiveness, we must repair to our inside knowledge. For even if scientists were to "prove" to their satisfaction that inwardness, consciousness, and human will or purposive intention were all illusory—at best, epiphenomena of brain events—or that what we call loving and wishing and thinking are merely electrochemical transformations of brain substance, we should proceed to ignore them. And for good reason. Life's self-revelatory testimony with regard to its own vital activity is more immediate, compelling, and trustworthy than are the abstracted explanations that evaporate meaningful lived experience by identifying it with some correlated bodily event. The most unsophisticated child knows red and blue more reliably than a physicist with his spectrometers. And anyone who has ever loved knows that love cannot be reduced to neurotransmitters. Regarding our life—passionate, re-

⁴ Interested readers should see, among others, Hans Jonas, *The Phenomenon of Life: Toward a Philosophical Biology* (1982); Adolf Portmann, *Animal Forms and Patterns* (1964, paperback 1967) and *Animals as Social Beings* (1961); Erwin Straus, *Phenomenological Psychology* (1966) and *The Primary World of Senses* (1968); Oliver Sacks, *Awakenings* (1987); E. S. Russell, *The Directiveness of Organic Activities* (1945); and Marjorie Grene, *Approaches to a Philosophical Biology* (1968). For my own efforts, see *Toward a More Natural Science: Biology and Human Affairs* (1985; paperback 1988), especially chapters 10-13, and *The Hungry Soul: Eating and the Perfecting of Our Nature* (1994, second edition 1999).

sponsive, appetitive, thoughtful, and active—we have inside knowledge that cannot be denied.

Third, on the scientists' own grounds, they will be unable to refute our intransigent insistence on our own freedom and psychic awareness. For how are they going to explain our resistance to their subversive ideas, save by conceding that we must just be hard-wired by nature to resist them? If all truth claims of science—and the philosophical convictions that some people derive from them—are merely the verbalized expressions of certain underlying brain states in the scientists who offer these claims, then there can be no way to refute the contrary opinions of those whose nervous systems, differently wired, see things the opposite way. And why, indeed, should anyone choose to accept as true the results of someone else's "electrochemical brain processes" over his own? Truth and error, no less than human freedom and dignity, become empty notions when the soul is reduced to chemicals.

The possibility of science itself depends on the immateriality of thought. It depends on the mind's independence from the bombardment of matter. Otherwise, there is no truth, there is only "it seems to me." Not only the possibility for recognizing truth and error, but also the *reasons* for doing science rest on a picture of human freedom and dignity (of the sort promulgated by biblical religion) that science itself cannot recognize. Wonder, curiosity, a wish not to be self-deceived, and a spirit of philanthropy are the *sine qua non* of the modern scientific enterprise. They are hallmarks of the living human soul, not of the anatomized brain. The very enterprise of science—like all else of value in human life—depends on a view of humanity that science cannot supply and that foolish scientific prophets deny at their peril, unaware of the embarrassing self-contradiction.

V

YET THE deepest limitation of a scientized account of the human condition concerns not man as knower but man as an ethical and spiritual being—a being whose existence is defined not only by Kant's first great question, "What can I know?" but by his second and third great questions: "What ought I do?" and "What may I hope?" For man alone among the animals goes in for ethicizing, for concerning himself with how to live, and with better and worse answers to this question. Science, notwithstanding its great gifts to human life in the form of greater comfort and safety, is notoriously

unhelpful in satisfying these great longings of the human soul.

One should acknowledge straightaway that science is not an immoral or non-moral activity. On the contrary, although the motivations and characters of individual scientists run the usual human gamut, the enterprise of science taken as a whole is animated by noble human purpose: a philanthropic desire to alleviate human misery and to improve human life. In addition, the successful practice of science requires the exercise of many virtues: enterprise (in imagining new possibilities), self-discipline and perseverance (in doggedly pursuing a line of experimentation), courage (in risking failure), measure and judiciousness (in weighing evidence), and intellectual probity and integrity (in reporting data, crediting others, and giving an honest account to one's sources of financial support).

Science is also a social activity: much scientific research involves direct collaboration, and nearly all of it rests on explicit and tacit networks of cooperation; it therefore requires openness, trust, and (within the limits of scientific competition) generous sharing of materials and data. In my own experience, I have found that personal integrity, group morale, and the ease of interpersonal relations in a research laboratory are several cuts above what I have encountered in any other domain of academic life (including philosophy departments and divinity schools).

But these private virtues of scientists, as well as the overall ethical character of the scientific project, are not themselves the product of science. Science is notoriously (and deliberately) morally neutral, silent on the distinction between better and worse, right and wrong, the noble and the base. And although it hopes that the uses made of its findings will be, as Francis Bacon prophesied, governed in charity, it can do nothing to insure that result. It can offer no standards to guide the use of the awesome powers it places in human hands. Though it seeks universal knowledge, it has no answer to moral relativism. It does not know what charity is, what charity requires, or even whether and why it is good. Science cannot provide either confirmation of or support for its own philanthropic assumptions.

Such moral poverty need not be embarrassing, either to science or to religion. After all, science never claimed to speak on moral matters, and religion remains available to speak where science is silent—to teach us our duties, to restrain our vices, to lead us to righteousness and holiness. But the ability of religion to guide us in these ways depends

in part on its ability to withstand not the morally neutral discoveries of science but the morally freighted, anti-religious campaigns that rely on and make use of a strictly scientific view of human life. And here, the news is hardly good.

No one should underestimate the growing cultural power of scientific materialism and reductionism. As we have seen, the materialism of science, useful as a heuristic hypothesis, is increasingly being peddled as the one true account of human life, citing as evidence the powers obtainable on the basis of just such reductive approaches. Many laymen, ignorant of any defensible scientific alternative to materialism, are swallowing and regurgitating the shallow doctrines of “the selfish gene” and “the mind is the brain,” because they *seem* to be vindicated by scientific advance. The cultural result is likely to be serious damage to human self-understanding and the subversion of all high-minded views of the good life.

NOWHERE WILL this challenge be more readily felt than in the proposed uses of biotechnical power for purposes beyond the cure of disease and the relief of suffering. Going beyond therapy, we stand on the threshold of major efforts to “perfect” human nature and to “enhance” human life by direct biotechnical alterations of our bodies and minds. We are promised better children, superior performance, ageless bodies, and happy souls—all with the help of the biotechnologies of “enhancement.” Bio-prophets tell us that we are en route to a new stage of evolution, to the creation of a post-human society, a society based on science and built by technology, a society in which traditional teachings about human nature will be passé and religious teachings about how to live will be irrelevant.

But what, then, will guide this evolution? How do we know whether any of these so-called enhancements is in fact an improvement? Why ought any human being embrace a *post*-human future? Scientism has no answers to these critical moral questions. Deaf to nature, to God, and even to moral reason, it can offer no standards for judging scientific progress—or for judging anything else. Instead, it tacitly preaches its own version of faith, hope, and charity: faith in the goodness of scientific progress, hope in the promise of transcendence of our biological limitations, charity in promising everyone ultimate relief from, and transcendence of, the human condition. No religious faith rests on flimsier ground. And yet the project for the mastery of human nature proceeds apace, and most people stand on the sidelines and cheer.

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

Despite the fact, as I have argued, that there is no philosophical reason to despair and that a philosophical and religious anthropology could meet the challenge of scientism, there are in fact large cultural reasons to worry. Can our religious traditions rise to the challenge?

VI

TO THIS point, I have largely addressed the relation between religion and science by focusing on the limitations of science. But what about the limits of biblical religion? What new difficulties does it face in the age of science? Can it survive and surmount them?

As an empirical matter, there can be no doubt that the growth of secularism and atheism in the West over the past few centuries, especially in the last fifty prosperous years, is at least in part connected with the success of science and technology—and of modern rationalism more generally—and also to the uses that have been made of science in explicit attempts to embarrass religious beliefs. Just as Lucretius long ago used Epicurus’ doctrine of atomistic materialism to combat religious beliefs and to cure men of the fear of the gods, so many modern epicureans enlist the teachings of evolution and neuroscience as battering rams against the teachings of the Bible and the religions built upon it.

Measuring the success of this assault would be a very complicated enterprise, not only sociologically but also philosophically. But it may be helpful, as a test case, to look at what has been a chief target of scientism, the opening chapter of the Bible and its account of creation. How should the teachings of Genesis 1 be affected by the discoveries of science? Can one still affirm the truths that it pur-

ports to teach? Conversely, can the biblical account of creation—including man’s place in it—answer the shortcomings of the scientific account? The answers to these questions depend entirely on what Genesis 1 actually says and what it aims to accomplish in the hearts and minds of its readers.

In writing elsewhere on this subject, I have argued that the teachings of Genesis 1 are indeed untouched by the scientific findings that allegedly make them “plumb unbelievable.”⁵ Here is a summary of the major points. First, Genesis 1 is not a freestanding historical or scientific account of what happened and how, but rather a (literally) *awe*-inspiring prelude to a lengthy and comprehensive teaching about how we are to live. Second, it is not an account that can be either corroborated or falsified by scientific or historical studies: neither so-called “creation science” or arguments about “intelligent design,” on the one hand, nor evidence regarding the age of the universe or man’s evolutionary origins and the workings of his brain, on the other hand, can strengthen or weaken decisively what one is supposed to learn from the creation story.

This is partly because, third, the Bible addresses its readers not as detached, rational observers moved primarily by curiosity and the desire for mastery over nature, but as existentially engaged human beings who need first and foremost to make sense of their world and their task within it. Genesis speaks immediately and truly to the deepest concerns of human hearts and minds in their normal—and permanent—existential condition. The first human question is not “How did this come into being?” or “How does it work?” The first human question is “What does all this mean?” and (especially) “What am I to do here?”

The specific claims of the biblical account of creation begin to nourish the human longing for answers to these questions. The world that you see around you, you human being, is orderly and intelligible (albeit against a background of chaos and threat of dissolution), an articulated whole comprising distinct kinds. The order of the world is as rational as the speech that you use to describe it and that, right before your (reading) eyes, summoned it into being. Most importantly, this noetic (rather than sensual) order of created things means mainly to demonstrate that, contrary to the belief of uninstructed human experience, the sun, the moon, and the stars are not divine, despite their sempiternal beauty and power and their majestic perfect motion. Nature is neither eternal nor divine;⁶ its beginnings are owed neither to the sexual

couplings nor to the warring struggles of gods and goddesses. Moreover, being is *hierarchical*, and man is the highest being in creation—although not perfect (unlike all other created things save the heavenly firmament, man is not said by God to be “good”). And man is likewise alone in being *in the image* of God.

WHAT DOES this mean? And can it be true? In the course of recounting God’s creation, Genesis 1 introduces us to His *activities* and *powers*: God speaks, commands, names, blesses, and hallows; God makes and makes freely; God looks at and beholds the world; God is concerned with the goodness or perfection of things; God addresses solicitously other living creatures and provides for their sustenance. In short, God exercises speech and reason, freedom in doing and making, and the powers of contemplation, judgment, and care.

Doubters may wonder whether this is truly the case about God—after all, it is only on biblical authority that we regard God as possessing these powers and activities. But it is indubitably clear, even to atheists, that we human beings have them, and that they lift us above the plane of a merely animal existence. Human beings, alone among the creatures, speak, plan, create, contemplate, and judge. Human beings, alone among the creatures, can articulate a future goal and use that articulation to guide them in bringing it into being by their own purposive conduct. Human beings, alone among the creatures, can think about the whole, marvel at its many-splendored forms and articulated order, wonder about its beginning, and feel awe in beholding its grandeur and in pondering the mystery of its source.

Note well: these self-evident truths do *not* rest on biblical authority. Rather, the biblical text enables us to confirm them by an act of self-reflection. Our reading of this text, addressable and intelligible only to us human beings, and our responses to it, possible only for us human beings, provide all the proof we need to confirm the text’s assertion of our special being. The very act of *reading* Genesis 1 demonstrates the truth of its claims about the superior ontological standing of the

⁵ See my *The Beginning of Wisdom: Reading Genesis* (2003, paperback 2006), chapter 1, “Awesome Beginnings.” See also my “Evolution and the Bible: Genesis 1 Revisited,” COMMENTARY, November 1988.

⁶ One cannot exaggerate the importance the Bible attaches to this teaching, for the worship of nature is the “natural way” of human beings in the absence of biblical instruction (see also Deuteronomy 4:15-19). The point has been beautifully made by Harvey Flaumenhaft in “Quest for Order,” *Humanities*, January/February 1992.

human. This is not anthropocentric prejudice, but cosmological truth. And nothing we shall ever learn from science about *how* we came to be this way could ever make it false.⁷

In addition to holding up a mirror in which we see reflected our special standing in the world, Genesis 1 teaches truly the bounty of the universe and its hospitality in supporting terrestrial life. Moreover, we have it on the highest authority that the whole—the being of all that is—is “very good”:

And God saw every thing that He had made, and, behold, it was very good. (Genesis 1:31)

The Bible here teaches a truth that cannot be known by science, even as it is the basis of the very possibility of science—and of everything else we esteem. For it truly *is* very good that there is something rather than nothing. It truly is very good that this something is intelligibly ordered rather than dark and chaotic. It truly is very good that the whole contains a being who can not only discern the intelligible order but who can recognize that it is “very good”—who can *appreciate* that there is something rather than nothing and that he exists with the reflective capacity to celebrate these facts with the mysterious source of being itself. As Abraham Joshua Heschel put it in *Who Is Man?* (1965):

The biblical words about the genesis of heaven and earth are not words of information but words of appreciation. The story of creation is not a description of how the world came into being but a song about the glory of the world’s having come into being. “And God saw that it was good.” This is the challenge: to reconcile God’s view with our experience.

THERE IS more. The purpose of the song is not only to celebrate. It is also to summon us to awe and attention. For just as the world as created is a world summoned into existence under command, so to be human beings in that world is to live in search of our summons. It is to recognize, first of all, that we are here not by choice or on account of merit, but as an undeserved gift from

powers not at our disposal. It is to feel the need to justify that gift, to make something out of our indebtedness for the opportunity of existence. It is to stand in the world not only in awe of its and our existence but under an obligation to answer a call to a worthy life, a life that does honor to the divine-likeness with which our otherwise animal existence has been—no thanks to us—endowed. It is explicitly to feel the need to find a way of life for which we should be pleased to answer at the bar of justice when our course is run, in order to vindicate the blessed opportunity and the moral-spiritual challenge that is the essence of being human.

The first chapter of Genesis—like no work of science, no matter how elegant or profound—invites us to hearken to a transcendent voice. It provides a perfect answer to the human need to know not only how the world works but also what we are to do here. It is the beginning of a Bible-length response to the human longing for meaning and whole-hearted existence. The truths it bespeaks—and which are enacted when the text is read responsively—are more than cognitive. They point away from the truths of belief to the truths of action—of song and praise and ritual, of love and procreation and civic life, of responsible deeds in answering the call to righteousness, holiness, and love of neighbor. Such truths speak more deeply and permanently to the souls of men than any mere doctrine, whether of science or even of faith. As long as we understand our great religions as the embodiments of such truths, the friends of religion will have nothing to fear from science, and the friends of science who are still in touch with their humanity will have nothing to fear from religion. That we should have been given such a life-affirming teaching is, to speak plainly, a miracle.

⁷ Modern science should have no real difficulty with this conclusion. The sempiternal heavenly bodies may outlast and outshine us and move in beautiful circular paths; or, if you prefer a modern equivalent, matter-energy may be virtually indestructible. But only we, not they, can know these facts. Not until there are human beings does the universe become conscious of itself—a remarkable achievement that should surely inspire awe and wonder, even in atheists.

Appendix

MY DISCUSSION of the permanent limitations of science may be helped by some additional observations, beginning with the radical differences between modern science and ancient science, against which modern science deliberately revolted. The most important differences concern the purpose of science and, therefore, the character of knowledge sought.

Although it is commonplace to distinguish applied from pure science (or technology from science), it is important to grasp the essentially practical, social, and technical character of modern science as such. Ancient science had sought knowledge of *what things are*, to be contemplated as an end-in-itself satisfying to the knower. In contrast, modern science seeks knowledge of *how they work*, to be used as a means for the relief and comfort of all humanity. Though the benefits were at first slow in coming, this practical intention has been at the heart of all of modern science right from the start.

But modern science is practical and artful not only in its end. In contrast with ancient science, its very notions and ways manifest a conception of the interrelation of knowledge and power. Nature is conceived energetically and mechanistically, and explanation of change is given in terms of (at most) efficient or moving causes; in modern science, to be responsible means to produce an effect. Knowledge itself is obtained productively: hidden truths are gained by acting on nature, through experiment, twisting its arm to make it cough up its secrets.

The so-called “empirical” science of nature is, as actually experienced, a highly contrived encounter with apparatus, measuring devices, pointer readings, and numbers; nature in its ordinary course and as humanly experienced is virtually never encountered directly. Inquiry is made “methodical,” through the imposition of order and schemes of measurement “made” by the intellect. Knowledge, embodied in laws rather than (as in ancient science) theorems, becomes “systematic” under rules of a new mathematics expressly invented for this purpose.

This mathematics orders an “unnatural” world that has been intellectually “objectified,” re-presented or projected before the knowing subject as pure homogeneous extension, ripe for the mind’s grasping—just as the world itself will be grasped by the techniques that science will later provide. Even the modern word “concept” means “a grasping-together,” implying that the mind itself, in its act of knowing, functions like the intervening hand (in contrast to its ancient counterpart, “idea,” “that which can be beheld,” which implies that the mind functions like the receiving eye). And modern science rejects, as meaningless or useless, questions that cannot be answered by the application of method. Science becomes not the representation and demonstration of truth, but an art: the art of *finding* the truth—or, rather, that portion of truth that lends itself to be artfully found. Finally, the truths modern science finds—even about human beings—are value-neutral, in no way restraining and indeed perfectly adapted for technical application.

In short, as Hans Jonas put it, modern science contains manipulability at its theoretical core—and this remains true even for those great scientists who are themselves motivated by the desire for truth and who have no interest in that mastery over nature to which their discoveries nonetheless contribute and

for which science is largely esteemed by the rest of us and mightily supported by the state.

ONE SPECIAL feature of modern biology, and a cardinal premise of modern science altogether, is both most powerful in yielding new knowledge of biological events and, paradoxically, most untrue to life. This is the principle of objectification. Understanding this fact is the intellectual key to understanding the gulf between scientific knowledge and the world it purports to capture and explain.

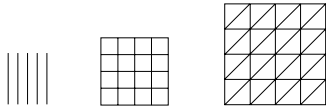
The term “objective” has a common colloquial meaning and a precise philosophical meaning, the former descending from the latter but without our knowing the distortions we have swallowed in the process. In common speech, we use “objective” as a synonym for “true” or “real.” Not only scientists but any fair-minded person is supposed to be “objective”: unprejudiced, disinterested, rational, free from contamination of merely personal—that is, “subjective”—bias or perspective, and able therefore to capture “objective reality.” “Objective reality” is the domain especially of the sciences, because the methodical pursuit of reproducible and shareable findings guarantees their objective status.

But this common view is misleading: “the objective” is not synonymous with “the true” or “the real.” Pursuit of the distinction discloses, surprisingly, an unbridgeable gap between science and reality, and, of greater moment for us, between the science of biology and the living nature it studies. The so-called objective view of nature is not nature’s own, but one imposed on nature, imposed by none other than the interested human subject.

Here is how it works. An “object,” literally, means that which is “thrown-out-before-and-against” us—thrown by, thrown-before-and-against, and existing for and relative to the human subject who does the throwing. Not the natural world but the self-thinking human subject is the source of objectivity. The interested subject’s demand for clear and distinct and certain “knowledge” leads him to re-present the given world before his mind, in an act of deliberate projection, through concepts (invented for the purpose) that allow him to operate mentally on the world with utmost (usually quantitative) precision. What cannot be grasped through such conceptual re-presentation drops from view. Only those aspects of the world that can be “objectified” (or quantified) become objects for scientific study. As the given, visible, and tangible world of our experience is banished into the shadows, the shadowy world of “concepts” gains the limelight and reconfigures everything in sight, giving them an “objectified” character that is at best only partially true to what they are.

A concrete example can make more vivid this abstract account of the abstracting character of scientific objectification. The classic instance of objectifying the world in fact concerns the world as visible and, by implication, ourselves as its experiencing viewers. In a revolution-making passage in the *Rules for the Direction of the Mind*, Descartes sets the program of all modern science by transforming how we should approach the study of color:

Thus whatever you suppose color *to be*, you cannot deny that it is *extended* and in consequence possessed of figure. Is there then any *disadvantage*, if, while taking care not to admit any new entity uselessly, or rashly to imagine that it exists . . . but merely abstracting from every other feature except that it possesses the nature of figure, *we conceive* the *diversity* existing among white, blue, and red, etc., as being like the difference among the following similar figures?



The same argument applies to *all* cases; for it is certain that the *infinitude of figures* suffices to *express* all the differences in sensible things. [Emphasis added.]

Note the following crucial points:

1. We are told by Descartes to ignore the *being* or *nature* of color, and concentrate instead only on the “fact” that, because colored *things* are extended (that is, take up space), all *color* has figure or shape. (Never mind, says Descartes, what color really is. You cannot deny that *it* has figure.)*

2. From “cannot deny” to “forget about everything else”: we must *abstract* from every other feature of color *except* for its having figure. Why? For an advantage in knowing; yet this is a kind of knowing that is indifferent to existence or essence, to what something really is. The knowledge gained by objectification is indifferent or neutral to the being or reality of things.

3. Far from representing a reading of nature’s own phenomena, objectification is a willful act of mind: Descartes *decides* or *chooses* to conceive color under the concept of figure. We do not, as knowers, try to catch the natural looks of visible things; instead, by decision, we choose to *conceive* (“to grasp together”) or represent before our grasping minds only certain aspects of the world.

4. Which aspects? Not the natures of colors, not the being of colors, but the merely the *differences* among them (“the diversity existing among white, blue, and red”). We do not seek to know *things* through and through, but only their external—and measurable—relations.

5. These natural differences are “translated”—or, rather, symbolized—by mathematical ones: the differences of color are re-presented by differences among similar figures. Why? Because if we con-figure things, we can then “figure them out.” We can take their mathematical measure, using the radically new mathematics of quantity (featuring the number line and analytic geometry) that Descartes has invented for this purpose, a mathematics that introduced terms of arithmetic (traditionally the study of discrete multitudes) into the study of geometry (the study of continuous magnitudes). The analytic geometry of Cartesian space is the perfect vehicle for precise measurement of anything—space, time, mass, density, volume, velocity, energy, temperature, blood pressure, drunkenness, intelligence, or scholastic achievement—that can be treated as a quantity or dimension.

6. Descartes’s geometrical figures, standing for the differences among the colors white, blue, and red, may be *passé*, but the principle he proposes is not: today we still treat color in terms of “wave lengths,” purely mathematical representations

from which *all the color is sucked out*. This tells the whole story: the objective is purely quantitative. All quality disappears.

7. Objectification can be universalized: says Descartes, *all* the differences (that is, changes or relations) in sensible things—that is, in every being of the natural world—can be expressed mathematically. The world—or more accurately, changes in the world—can be represented objectively, as differences among figures (or, eventually, in equations). The multifaceted and profound world of things is replaced by a shadowy network of mathematized relations.

IN THIS classic example, we have the touchstone of all so-called objective knowledge. The objectified world is, by deliberate design, abstract, purely quantitative, homogeneous, and indifferent to the question of being or existence. Objectified knowledge is, to say the least, ghostly. “Things” are “known” only externally and relationally. Moreover, unlike the signifiers of ordinary speech that are its general nouns, the symbolic representations used to handle the objectified world bear absolutely no relation to the things represented; a wave length or a mathematical equation neither resembles nor points to color.

No one gets very excited about the objectification of color, but we become suspicious when science tries to objectify the *viewing* of color or, worse, the viewer. And now we see why. By its very principle, “objective knowledge” will not be—because it *cannot* be—true to lived experience; for lived experience is always qualitative, concrete, heterogeneous, and suffused with the attention, interest, and engaged concern of the living soul. Real sight and seeing can never be captured by wavelengths, absorption spectra of retinal cells, or electrical discharges in the objectified brain. The same goes for the inwardness of life, including awareness, appetite, emotion, and the genuine and interested relations between one living being and others, both friend and foe; or the engaged, forward-pointed, outward-moving tendencies of living beings; or the uniqueness of each individual life as lived in living time, from birth to death; the concern of each animal (conscious or not) for its own health, wholeness, and well-being—none of these essential aspects of nature alive fall within the cramped and distorting boundaries of nature objectified.

Honesty compels me to add one last and, indeed, astounding part of this tale, one that, I suspect, the reader already knows. Objectification works! For some reason, the many-splendored world of nature allows itself to be grasped by the anemic concepts of objective science. Never mind that it is partial, distorted, and abstract; the quantitative approach has put men on the moon, lights on the ceiling, and pacemakers in our hearts. Somehow, it must be capturing well at least one aspect of being. But this aspect of being is not the whole or the heart of being; not by a long shot.

* Compare the relation of color and shape (*schema*) suggested by Socrates in Plato’s *Meno*: “Shape is that which, alone among all things, always accompanies color.” Appealing to our primary experience of the visible world, this account integrates shape and color as the two most evident and always related aspects of any visible body, whose shaped surface we come to see only because of color differences between it and its surroundings. To put it crudely, Socrates’ philosophizing deepens lived experience; Descartes’ turns its back on lived experience.