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The Folly of Scientism

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When I decided on a scientific career, one of the things that appealed to me about science was the modesty of its practitioners. The typical scientist seemed to be a person who knew one small corner of the natural world and knew it very well, better than most other human beings living and better even than most who had ever lived. But outside of their circumscribed areas of expertise, scientists would hesitate to express an authoritative opinion. This attitude was attractive precisely because it stood in sharp contrast to the arrogance of the philosophers of the positivist tradition, who claimed for science and its practitioners a broad authority with which many practicing scientists themselves were uncomfortable.

The temptation to overreach, however, seems increasingly indulged today in discussions about science. Both in the work of professional philosophers and in popular writings by natural scientists, it is frequently claimed that natural science does or soon will constitute the entire domain of truth. And this attitude is becoming more widespread among scientists themselves. All too many of my contemporaries in science have accepted without question the hype that suggests that an advanced degree in some area of natural science confers the ability to pontificate wisely on any and all subjects.

Of course, from the very beginning of the modern scientific enterprise, there have been scientists and philosophers who have been so impressed with the ability of the natural sciences to advance knowledge that they have asserted that these sciences are the only valid way of seeking knowledge in any field. A forthright expression of this viewpoint has been made by the chemist Peter Atkins, who in his 1995 essay "Science as Truth" asserts the "universal competence" of science. This position has been called *scientism*—a term that was originally intended to be pejorative but has been claimed as a badge of honor by some of its most vocal proponents. In their 2007 book *Every Thing Must Go: Metaphysics Naturalized*, for example, philosophers James Ladyman, Don Ross, and David Spurrett go so far as to entitle a chapter "In Defense of Scientism."

Modern science is often described as having emerged from philosophy; many of the early modern scientists were engaged in what

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they called "natural philosophy." Later, philosophy came to be seen as an activity distinct from but integral to natural science, with each addressing separate but complementary questions—supporting, correcting, and supplying knowledge to one another. But the status of philosophy has fallen quite a bit in recent times. Central to scientism is the grabbing of nearly the entire territory of what were once considered questions that properly belong to philosophy. Scientism takes science to be not only better than philosophy at answering such questions, but the *only* means of answering them. For most of those who dabble in scientism, this shift is unacknowledged, and may not even be recognized. But for others, it is explicit. Atkins, for example, is scathing in his dismissal of the entire field: "I consider it to be a defensible proposition that no philosopher has helped to elucidate nature; philosophy is but the refinement of hindrance."

Is scientism defensible? Is it really true that natural science provides a satisfying and reasonably complete account of everything we see, experience, and seek to understand—of every phenomenon in the universe? And is it true that science is more capable, even singularly capable, of answering the questions that once were addressed by philosophy? This subject is too large to tackle all at once. But by looking briefly at the modern understandings of science and philosophy on which scientism rests, and examining a few case studies of the attempt to supplant philosophy entirely with science, we might get a sense of how the reach of scientism exceeds its grasp.

The Abdication of the Philosophers

If philosophy is regarded as a legitimate and necessary discipline, then one might think that a certain degree of philosophical training would be very useful to a scientist. Scientists ought to be able to recognize how often philosophical issues arise in their work—that is, issues that cannot be resolved by arguments that make recourse solely to inference and empirical observation. In most cases, these issues arise because practicing scientists, like all people, are prone to philosophical errors. To take an obvious example, scientists can be prone to errors of elementary logic, and these can often go undetected by the peer review process and have a major impact on the literature—for instance, confusing correlation and causation, or confusing implication with a biconditional. Philosophy can provide a way of understanding and correcting such errors. It addresses a largely distinct set of questions that natural science alone cannot answer, but that must be answered for natural science to be properly conducted.

These questions include how we define and understand science itself. One group of theories of science—the set that best supports a clear distinction between science and philosophy, and a necessary role for each—can broadly be classified as "essentialist." These theories attempt to identify the essential traits that distinguish science from other human activities, or differentiate true science from nonscientific and pseudoscientific forms of inquiry. Among the most influential and compelling of these is Karl Popper's criterion of falsifiability outlined in *The Logic of Scientific Discovery* (1959).

A falsifiable theory is one that makes a specific prediction about what results are supposed to occur under a set of experimental conditions, so that the theory might be falsified by performing the experiment and comparing predicted to actual results. A theory or explanation that cannot be falsified falls outside the domain of science. For example, Freudian psychoanalysis, which does not make specific experimental predictions, is able to revise its theory to match any observations, in order to avoid rejecting the theory altogether. By this reckoning, Freudianism is a pseudoscience, a theory that purports to be scientific but is in fact immune to falsification. In contrast, for example, Einstein's theory of relativity made predictions (like the bending of starlight around the sun) that were novel and specific, and provided opportunities to disprove the theory by direct experimental observation. Advocates of Popper's definition would seem to place on the same level as pseudoscience or nonscience every statement—of metaphysics, ethics, theology, literary criticism, and indeed daily life—that does not meet the criterion of falsifiability.

The criterion of falsifiability is appealing in that it highlights similarities between science and the trial-and-error methods we use in everyday problem-solving. If I have misplaced my keys, I immediately begin to construct scenarios—hypotheses, if you will—that might account for their whereabouts: Did I leave them in the ignition or in the front door lock? Were they in the pocket of the jeans I put in the laundry basket? Did I drop them while mowing the lawn? I then proceed to evaluate these scenarios systematically, by testing predictions that I would expect to be true under each scenario—in other words, by using a sort of Popperian method. The everyday, commonsense nature of the falsifiability criterion has the virtue of both showing how science is grounded in basic ideas of rationality and observation, and thereby also of stripping away from science the aura of sacred mystery with which some would seek to surround it.

An additional strength of the falsifiability criterion is that it makes possible a clear distinction between science properly speaking and the

opinions of scientists on nonscientific subjects. We have seen in recent years a growing tendency to treat as "scientific" anything that scientists say or believe. The debates over stem cell research, for example, have often been described, both within the scientific community and in the mass media, as clashes between science and religion. It is true that many, but by no means all, of the most vocal defenders of embryonic stem cell research were scientists, and that many, but by no means all, of its most vocal opponents were religious. But in fact, there was little science being disputed: the central controversy was between two opposing views on a particular ethical dilemma, neither of which was inherently more scientific than the other. If we confine our definition of the scientific to the falsifiable, we clearly will not conclude that a particular ethical view is dictated by science just because it is the view of a substantial number of scientists. The same logic applies to the judgments of scientists on political, aesthetic, or other nonscientific issues. If a poll shows that a large majority of scientists prefers neutral colors in bathrooms, for example, it does not follow that this preference is "scientific."

Popper's falsifiability criterion and similar essentialist definitions of science highlight the distinct but vital roles of both science and philosophy. The definitions show the necessary role of philosophy in undergirding and justifying science—protecting it from its potential for excess and self-devolution by, among other things, proposing clear distinctions between legitimate scientific theories and pseudoscientific theories that masquerade as science.

By contrast to Popper, many thinkers have advanced understandings of philosophy and science that blur such distinctions, resulting in an inflated role for science and an ancillary one for philosophy. In part, philosophers have no one but themselves to blame for the low state to which their discipline has fallen—thanks especially to the logical positivist and analytic strain that has been dominant for about a century in the English-speaking world. For example, the influential twentieth-century American philosopher W. V. O. Quine spoke modestly of a "philosophy continuous with science" and vowed to eschew philosophy's traditional concern with metaphysical questions that might claim to sit in judgment on the natural sciences. Science, Quine and many of his contemporaries seemed to say, is where the real action is, while philosophers ought to celebrate science from the sidelines.

This attitude has been articulated in the other main group of theories of science, which rivals the essentialist understandings—namely, the "institutional" theories, which identify science with the social institution

of science and its practitioners. The institutional approach may be useful to historians of science, as it allows them to accept the various definitions of fields used by the scientists they study. But some philosophers go so far as to use "institutional factors" as the criteria of *good* science. Ladyman, Ross, and Spurrett, for instance, say that they "demarcate good science—around lines which are inevitably fuzzy near the boundary—by reference to institutional factors, not to directly epistemological ones." By this criterion, we would differentiate good science from bad science simply by asking which proposals agencies like the National Science Foundation deem worthy of funding, or which papers peer-review committees deem worthy of publication.

The problems with this definition of science are myriad. First, it is essentially circular: science simply is what scientists do. Second, the high confidence in funding and peer-review panels should seem misplaced to anyone who has served on these panels and witnessed the extent to which preconceived notions, personal vendettas, and the like can torpedo even the best proposals. Moreover, simplistically defining science by its institutions is complicated by the ample history of scientific institutions that have been notoriously unreliable. Consider the decades during which Soviet biology was dominated by the ideologically motivated theories of the geneticist Trofim Lysenko, who rejected Mendelian genetics as inconsistent with Marxism and insisted that acquired characteristics could be inherited. An observer who distinguishes good science from bad science "by reference to institutional factors" alone would have difficulty seeing the difference between the unproductive and corrupt genetics in the Soviet Union and the fruitful research of Watson and Crick in 1950s Cambridge. Can we be certain that there are not sub-disciplines of science in which even today most scientists accept without question theories that will in the future be shown to be as preposterous as Lysenkoism? Many working scientists can surely think of at least one candidate—that is, a theory widely accepted in their field that is almost certainly false, even preposterous.

Confronted with such examples, defenders of the institutional approach will often point to the supposedly self-correcting nature of science. Ladyman, Ross, and Spurrett assert that "although scientific progress is far from smooth and linear, it never simply oscillates or goes backwards. Every scientific development influences future science, and it never repeats itself." Alas, in the thirty or so years I have been watching, I have observed quite a few scientific sub-fields (such as behavioral ecology) oscillating happily and showing every sign of continuing to do so for the foreseeable

future. The history of science provides examples of the eventual discarding of erroneous theories. But we should not be overly confident that such self-correction will inevitably occur, nor that the institutional mechanisms of science will be so robust as to preclude the occurrence of long dark ages in which false theories hold sway.

The fundamental problem raised by the identification of "good science" with "institutional science" is that it assumes the practitioners of science to be inherently exempt, at least in the long term, from the corrupting influences that affect all other human practices and institutions. Ladyman, Ross, and Spurrett explicitly state that most human institutions, including "governments, political parties, churches, firms, NGOs, ethnic associations, families…are hardly epistemically reliable at all." However, "our grounding assumption is that the specific institutional processes of science have inductively established peculiar epistemic reliability." This assumption is at best naïve and at worst dangerous. If any human institution is held to be exempt from the petty, self-serving, and corrupting motivations that plague us all, the result will almost inevitably be the creation of a priestly caste demanding adulation and required to answer to no one but itself.

It is something approaching this adulation that seems to underlie the abdication of the philosophers and the rise of the scientists as the authorities of our age on all intellectual questions. Reading the work of Quine, Rudolf Carnap, and other philosophers of the positivist tradition, as well as their more recent successors, one is struck by the aura of hero-worship accorded to science and scientists. In spite of their idealization of science, the philosophers of this school show surprisingly little interest in science itself—that is, in the results of scientific inquiry and their potential philosophical implications. As a biologist, I must admit to finding Quine's constant invocation of "nerve-endings" as an all-purpose explanation of human behavior to be embarrassingly simplistic. Especially given Quine's intellectual commitment to behaviorism, it is surprising yet characteristic that he had little apparent interest in the actual mechanisms by which the nervous system functions.

Ross, Ladyman, and Spurrett may be right to assume that science possesses a "peculiar epistemic reliability" that is lacking in other forms of inquiry. But they have taken the strange step of identifying that reliability with the institutions and practitioners of science, rather than with any particular rational, empirical, or methodological criterion that scientists are bound (but often fail) to uphold. Thus a (largely justifiable) admiration for the work of scientists has led to a peculiar, unjustified role for

scientists themselves—so that, increasingly, what is believed by scientists and the public to be "scientific" is simply any claim that is upheld by many scientists, or that is based on language and ideas that sound sufficiently similar to scientific theories.

The Eclipse of Metaphysics

There are at least three areas of inquiry traditionally in the purview of philosophy that now are often claimed to be best—or only—studied scientifically: metaphysics, epistemology, and ethics. Let us discuss each in turn.

Physicists Stephen Hawking and Leonard Mlodinow open their 2010 book *The Grand Design* by asking:

> What is the nature of reality? Where did all this come from? Did the universe need a creator? . . . Traditionally these are questions for philosophy, but philosophy is dead. Philosophy has not kept up with modern developments in science, particularly physics. Scientists have become the bearers of the torch of discovery in our quest for knowledge.

Though physicists might once have been dismissive of metaphysics as mere speculation, they would also have characterized such questions as inherently speculative and so beyond their own realm of expertise. The claims of Hawking and Mlodinow, and many other writers, thus represent a striking departure from the traditional view.

In contrast to these authors' claims of philosophical obsolescence, there has arisen a curious consilience between the findings of modern cosmology and some traditional understandings of the creation of the universe. For example, theists have noted that the model known as the Big Bang has a certain consistency with the Judeo-Christian notion of creation *ex nihilo*, a consistency not seen in other cosmologies that postulated an eternally existent universe. (In fact, when the astronomer-priest Georges Lemaître first postulated the theory, he was met with such skepticism by proponents of an eternal universe that the name "Big Bang" was coined by his opponents—as a term of ridicule.) Likewise, many cosmologists have articulated various forms of what is known as the "anthropic principle"—that is, the observation that the basic laws of the universe seem to be "fine-tuned" in such a way as to be favorable to life, including human life.

It is perhaps in part as a response to this apparent consilience that we owe the rise of a large professional and popular literature in recent

decades dedicated to theories about multiverses, "many worlds," and "landscapes" of reality that would seem to restore the lack of any special favoring of humanity. Hawking and Mlodinow, for example, state that

> the fine-tunings in the laws of nature can be explained by the existence of multiple universes. Many people through the ages have attributed to God the beauty and complexity of nature that in their time seemed to have no scientific explanation. But just as Darwin and Wallace explained how the apparently miraculous design of living forms could appear without intervention by a supreme being, the multiverse concept can explain the fine-tuning of physical law without the need for a benevolent creator who made the universe for our benefit.

The multiverse theory holds that there are many different universes, of which ours is just one, and that each has its own system of physical laws. The argument Hawking and Mlodinow offer is essentially one from the laws of probability: If there are enough universes, one or more whose laws are suitable for the evolution of intelligent life is more or less bound to occur.

Physicist Lee Smolin, in his 1997 book *The Life of the Cosmos*, goes one step further by applying the principles of natural selection to a multiverse model. Smolin postulates that black holes give rise to new universes, and that the physical laws of a universe determine its propensity to give rise to black holes. A universe's set of physical laws thus serves as its "genome," and these "genomes" differ with respect to their propensity to allow a universe to "reproduce" by creating new universes. For example, it happens that a universe with a lot of carbon is very good at making black holes—and a universe with a lot of carbon is also one favorable to the evolution of life. In order for his evolutionary process to work, Smolin also assumes a kind of mutational mechanism whereby the physical laws of a universe may be slightly modified in progeny universes. For Smolin, then, not only is our universe bound to occur because there have been many rolls of the dice, but the dice are loaded in favor of a universe like ours because it happens to be a particularly "fit" universe.

Though these arguments may do some work in evading the conclusion that our universe is fine-tuned with us in mind, they cannot sidestep, or even address, the fundamental metaphysical questions raised by the fact that something—whether one or many universes—exists rather than nothing. The main fault of these arguments lies in their failure to distinguish between necessary and contingent being. A contingent being is one that might or might not exist, and thus might or might not have

certain properties. In the context of modern quantum physics, or population genetics, one might even assign probability values to the existence or non-existence of some contingent being. But a necessary being is one that must exist, and whose properties could not be other than they are.

Multiverse theorists are simply saying that our universe and its laws have merely contingent being, and that other universes are conceivable and so also may exist, albeit contingently. The idea of the contingent nature of our universe may cut against the grain of modern materialism, and so seem novel to many physicists and philosophers, but it is not in fact new. Thomas Aquinas, for example, began the third of his famous five proofs of the existence of God (a being "necessary in itself") with the observation of contingent being ("we find among things certain ones that might or might not be"). Whether or not one is convinced by Aquinas, it should be clear that the "discovery" that our universe is a contingent event among other contingent events is perfectly consistent with his argument.

Writers like Hawking, Mlodinow, and Smolin, however, use the contingent nature of our universe and its laws to argue for a very different conclusion from that of Aquinas—namely, that some contingent universe (whether or not it turned out to be our own) *must* have come into being, without the existence of any necessary being. Here again probability is essential to the argument: While any universe with a particular set of laws may be very improbable, with enough universes out there it becomes highly probable. This is the same principle behind the fact that, when I toss a coin, even though there is some probability that I will get heads and some probability that I will get tails, it is certain that I will get *heads or tails*. Similarly, modern theorists imply, the multiverse has necessary being even though any given universe does not.

The problem with this argument is that certainty in the sense of probability is not the same thing as necessary being: If I toss a coin, it is certain that I will get heads or tails, but that outcome depends on my tossing the coin, which I may not necessarily do. Likewise, any particular universe may follow from the existence of a multiverse, but the existence of the multiverse remains to be explained. In particular, the universe-generating process assumed by some multiverse theories is itself contingent because it depends on the action of laws assumed by the theory. The latter might be called meta-laws, since they form the basis for the origin of the individual universes, each with its own individual set of laws. So what determines the meta-laws? Either we must introduce meta-meta-laws, and so on in infinite regression, or we must hold that the meta-laws themselves are necessary—and so we have in effect just changed our understanding

of what the fundamental universe is to one that contains many universes. In that case, we are still left without ultimate explanations as to why *that* universe exists or has the characteristics it does.

When it comes to such metaphysical questions, science and scientific speculation may offer much in fleshing out details, but they have so far failed to offer any explanations that are fundamentally novel to philosophy—much less have they supplanted it entirely.

The Eclipse of Epistemology

Hawking and Mlodinow, in the chapter of their book called "The Theory of Everything," quote Albert Einstein: "The most incomprehensible thing about the universe is that it is comprehensible." In response, Hawking and Mlodinow offer this crashing banality: "The universe is comprehensible because it is governed by scientific laws; that is to say, its behavior can be modeled." Later, the authors invite us to give ourselves a collective pat on the back: "The fact that we human beings—who are ourselves mere collections of fundamental particles of nature—have been able to come this close to an understanding of the laws governing us and our universe is a great triumph." Great triumph or no, none of this addresses Einstein's paradox, because no explanation is offered as to *why* our universe is "governed by scientific laws."

Moreover, even if we can be confident that our universe has unchanging physical laws—which many of the new speculative cosmologies call into question—how is it that we "mere collections of particles" are able to discern those laws? How can we be confident that we will continue to discern them better, until we understand them fully? A common response to these questions invokes what has become the catch-all explanatory tool of advocates of scientism: evolution. W. V. O. Quine was one of the first modern philosophers to apply evolutionary concepts to epistemology, when he argued in *Ontological Relativity and Other Essays* (1969) that natural selection should have favored the development of traits in human beings that lead us to distinguish truth from falsehood, on the grounds that believing false things is detrimental to fitness. More recently, scientific theories themselves have come to be considered the objects of natural selection. For example, philosopher Bastiaan C. van Fraassen argued in his 1980 book *The Scientific Image*:

> the success of current scientific theories is no miracle. It is not even surprising to the scientific (Darwinist) mind. For any scientific theory is born into a life of fierce competition, a jungle red in tooth and claw.

> Only the successful theories survive—the ones which *in fact* latched onto actual regularities in nature.

Richard Dawkins has famously extended this analysis to ideas in general, which he calls "memes."

The notion that our minds and senses are adapted to find knowledge does have some intuitive appeal; as Aristotle observed long before Darwin, "all men, by nature, desire to know." But from an evolutionary perspective, it is by no means obvious that there is always a fitness advantage to knowing the truth. One might grant that it may be very beneficial to my fitness to know certain facts in certain contexts: For instance, if a saber-toothed tiger is about to attack me, it is likely to be to my advantage to be aware of that fact. Accurate perception in general is likely to be advantageous. And simple mathematics, such as counting, might be advantageous to fitness in many contexts—for example, in keeping track of my numerous offspring when saber-toothed cats are about. Plausibly, even the human propensity for gathering genealogical information, and with it an intuitive sense of degrees of relatedness among social group members, might have been advantageous because it served to increase the propensity of an organism to protect members of the species with genotypes similar to its own. But the general epistemological argument offered by these authors goes far beyond any such elementary needs. While it may be plausible to imagine a fitness advantage to simple skills of classification and counting, it is very hard to see such an advantage to DNA sequence analysis or quantum theory.

Similar points apply whether one is considering the ideas themselves or the traits that allow us to form ideas as the objects of natural selection. In either case, the "fitness" of an idea hinges on its ability to gain wide adherence and acceptance. But there is little reason to suppose that natural selection would have favored the ability or desire to perceive the truth in all cases, rather than just some useful approximation of it. Indeed, in some contexts, a certain degree of self-deception may actually be advantageous from the point of view of fitness. There is a substantial sociobiological literature regarding the possible fitness advantages of self-deception in humans (the evolutionary biologist Robert L. Trivers reviewed these in a 2000 article in the *Annals of the New York Academy of Sciences*).

These invocations of evolution also highlight another common misuse of evolutionary ideas: namely, the idea that some trait *must* have evolved merely because we can imagine a scenario under which possession of that trait would have been advantageous to fitness. Unfortunately, biologists as

well as philosophers have all too often been guilty of this sort of invalid inference. Such forays into evolutionary explanation amount ultimately to storytelling rather than to hypothesis-testing in the scientific sense. For a complete evolutionary account of a phenomenon, it is not enough to construct a story about how the trait might have evolved in response to a given selection pressure; rather, one must provide some sort of evidence that it really *did* so evolve. This is a very tall order, especially when we are dealing with human mental or behavioral traits, the genetic basis of which we are far from understanding.

Evolutionary biologists today are less inclined than Darwin was to expect that every trait of every organism must be explicable by positive selection. In fact, there is abundant evidence—as described in books like Motoo Kimura's *The Neutral Theory of Molecular Evolution* (1983), Stephen Jay Gould's *The Structure of Evolutionary Theory* (2002), and Michael Lynch's *The Origins of Genome Architecture* (2007)—that many features of organisms arose by mutations that were fixed by chance, and were neither selectively favored nor disfavored. The fact that any species, including ours, has traits that might confer no obvious fitness benefit is perfectly consistent with what we know of evolution. Natural selection can explain much about why species are the way they are, but it does not necessarily offer a specific explanation for human intellectual powers, much less any sort of basis for confidence in the reliability of science.

What van Fraassen, Quine, and these other thinkers are appealing to is a kind of popularized and misapplied Darwinism that bears little relationship to how evolution really operates, yet that appears in popular writings of all sorts—and even, as I have discovered in my own work as an evolutionary biologist, in the peer-reviewed literature. To speak of a "Darwinian" process of selection among culturally transmitted ideas, whether scientific theories or memes, is at best only a loose analogy with highly misleading implications. It easily becomes an interpretive blank check, permitting speculation that seems to explain any describable human trait. Moreover, even in the strongest possible interpretation of these arguments, at best they help a little in explaining why we human beings are capable of comprehending the universe—but they still say nothing about why the universe itself is comprehensible.

The Eclipse of Ethics

Perhaps no area of philosophy has seen a greater effort at appropriation by advocates of scientism than ethics. Many of them tend toward a position

of moral relativism. According to this position, science deals with the objective and the factual, whereas statements of ethics merely represent people's subjective feelings; there can be no universal right or wrong. Not surprisingly, there are philosophers who have codified this opinion. The positivist tradition made much of a "fact-value distinction," in which science was said to deal with facts, leaving fields like ethics (and aesthetics) to deal with the more nebulous and utterly disparate world of values. In his influential book *Ethics: Inventing Right and Wrong* (1977), the philosopher J. L. Mackie went even further, arguing that ethics is fundamentally based on a false theory about reality.

Evolutionary biology has often been seen as highly relevant to ethics, beginning in the nineteenth century. Social Darwinism—at least as it came to be explained and understood by later generations—was an ideology that justified laissez-faire capitalism with reference to the natural "struggle for existence." In the writings of authors such as Herbert Spencer, the accumulation of wealth with little regard for those less fortunate was justified as "nature's way." Of course, the "struggle" involved in natural selection is not a struggle to accumulate a stock portfolio but a struggle to reproduce—and ironically, Social Darwinism arose at the very time that the affluent classes of Western nations were beginning to limit their reproduction (the so-called "demographic transition") with the result that the economic struggle and the Darwinian struggle were at cross-purposes.

Partly in response to this contradiction, the eugenics movement arose, with its battle cry, "The unfit are reproducing like rabbits; we must do something to stop them!" Although plenty of prominent Darwinians endorsed such sentiments in their day, no more incoherent a plea can be imagined from a Darwinian point of view: If the great unwashed are out-reproducing the genteel classes, that can only imply that it is the great unwashed who are the fittest—not the supposed "winners" in the economic struggle. It is the genteel classes, with their restrained reproduction, who are the unfit. So the foundations of eugenics are complete nonsense from a Darwinian point of view.

The unsavory nature of Social Darwinism and associated ideas such as eugenics caused a marked eclipse in the enterprise of evolutionary ethics. But since the 1970s, with the rise of sociobiology and its more recent offspring evolutionary psychology, there has been a huge resurgence of interest in evolutionary ethics on the part of philosophers, biologists, psychologists, and popular writers.

It should be emphasized that there is such a thing as a genuinely scientific human sociobiology or evolutionary psychology. In this field,

falsifiable hypotheses are proposed and tested with real data on human behavior. The basic methods are akin to those of behavioral ecology, which have been applied with some success to understanding the behavioral adaptations of nonhuman animals, and can shed similar light on aspects of human behavior—although these efforts are complicated by human cultural variability. On the other hand, there is also a large literature devoted to a kind of pop sociobiology that deals in untested—and often untestable—speculations, and it is the pop sociobiologists who are most likely to tout the ethical relevance of their ostensible discoveries.

When evolutionary psychology emerged, its practitioners were generally quick to repudiate Social Darwinism and eugenics, labeling them as "misuses" of evolutionary ideas. It is true that both were based on incoherent reasoning that is inconsistent with the basic concepts of biological evolution; but it is also worth remembering that some very important figures in the history of evolutionary biology did not see these inconsistencies, being blinded, it seems, by their social and ideological prejudices. The history of these ideas is another cautionary tale of the fallibility of institutional science when it comes to getting even its own theories straight.

Just the same, what evolutionary psychology was about, we were told, was something quite different than Social Darwinism. It avoided the political and focused on the personal. One area of human life to which the field has devoted considerable attention is sex, spinning out just-so stories to explain the "adaptive" nature of every sort of behavior, from infidelity to rape. As with the epistemological explanations, since natural selection "should" have favored this or that behavior, it is often simply concluded that it *must* have done so. The tacit assumption seems to be that merely reciting the story somehow renders it factual. (There often even seems to be a sort of relish with which these stories are elaborated—the more so the more thoroughly caddish the behavior.) The typical next move is to deplore the very behaviors the evolutionary psychologist has just designated as part of our evolutionary heritage, and perhaps our instinct: To be sure, we don't approve of such things today, lest anyone get the wrong idea. This deploring is often accompanied by a pious invocation of the fact-value distinction (even though typically no facts at all have made an appearance—merely speculations).

There seems to be a thirst for this kind of explanation, but the pop evolutionary psychologists generally pay little attention to the philosophical issues raised by their evolutionary scenarios. Most obviously, if "we now know" that the selfish behavior attributed to our ancestors is morally reprehensible, how have "we" come to know this? What basis do we have

for saying that anything is wrong at all if our behaviors are no more than the consequence of past natural selection? And if we desire to be morally better than our ancestors were, are we even free to do so? Or are we programmed to behave in a certain way that we now, for some reason, have come to deplore?

On the other hand, there is a more serious philosophical literature that attempts to confront some of the issues in the foundations of ethics that arise from reflections on human evolutionary biology—for example, Richard Joyce's 2006 book *The Evolution of Morality*. Unfortunately, much of this literature consists of still more storytelling—scenarios whereby natural selection might have favored a generalized moral sense or the tendency to approve of certain behaviors such as cooperation. There is nothing inherently implausible about such scenarios, but they remain in the realm of pure speculation and are essentially impossible to test in any rigorous way. Still, these ideas have gained wide influence.

Part of this evolutionary approach to ethics tends toward a debunking of morality. Since our standards of morality result from natural selection for traits that were useful to our ancestors, the debunkers argue, these moral standards must not refer to any objective ethical truths. But just because certain beliefs about morality were useful for our ancestors does not make them necessarily false. It would be hard to make a similar case, for example, against the accuracy of our visual perception based on its usefulness to our ancestors, or against the truth of arithmetic based on the same.

True ethical statements—if indeed they exist—are of a very different sort from true statements of arithmetic or observational science. One might argue that our ancestors evolved the ability to understand human nature and, therefore, they could derive true ethical statements from an understanding of that nature. But this is hardly a novel discovery of modern science: Aristotle made the latter point in the *Nicomachean Ethics*. If human beings are the products of evolution, then it is in some sense true that everything we do is the result of an evolutionary process—but it is difficult to see what is added to Aristotle's understanding if we say that we are able to reason as he did as the result of an evolutionary process. (A parallel argument could be made about Kantian ethics.)

Not all advocates of scientism fall for the problems of reducing ethics to evolution. Sam Harris, in his 2010 book *The Moral Landscape*, is one advocate of scientism who takes issue with the whole project of evolutionary ethics. Yet he wishes to substitute an offshoot of scientism that is perhaps even more problematic, and certainly more well-worn: utilitarianism.

Under Harris's ethical framework, the central criteria for judging if a behavior is moral is whether or not it contributes to the "well-being of conscious creatures." Harris's ideas have all of the problems that have plagued utilitarian philosophy from the beginning. As utilitarians have for some time, Harris purports to challenge the fact-value distinction, or rather, to sidestep the tricky question of values entirely by just focusing on facts. But, as has also been true of utilitarians for some time, this move ends up being a way to advance certain values over others without arguing for them, and to leave large questions about those values unresolved.

Harris does not, for example, address the time-bound nature of such evaluations: Do we consider only the well-being of creatures that are conscious at the precise moment of our analysis? If yes, why should we accept such a bias? What of creatures that are going to possess consciousness in the near future—or would without human intervention—such as human embryos, whose destruction Harris staunchly advocates for the purposes of stem cell research? What of comatose patients, whose consciousness, and prospects for future consciousness, are uncertain? Harris might respond that he is only concerned with the well-being of creatures now experiencing consciousness, not any potentially future conscious creatures. But if so, should he not, for example, advocate expending all of the earth's nonrenewable resources in one big here-and-now blowout, enhancing the physical well-being of those now living, and let future generations be damned? Yet Harris claims to be a conservationist. Surely the best justification for resource conservation on the basis of his ethics would be that it enhances the well-being of future generations of conscious creatures. If those potential future creatures merit our consideration, why should we not extend the same consideration to creatures already in existence, whose potential future involves consciousness?

Moreover, the factual analysis Harris touts cannot nearly bear the weight of the ethical inquiry he claims it does. Harris argues that the question of what factors contribute to the "well-being of conscious creatures" is a factual one, and furthermore that science can provide insights into these factors, and someday perhaps even give definitive accounts of them. Harris himself has been involved in research that examines the brain states of human subjects engaged in a variety of tasks. Although there has been much overhyping of brain imaging, the limitations of this sort of research are becoming increasingly obvious. Even on their own terms, these studies at best provide evidence of correlation, not of causation, and of correlations mixed in with the unfathomably complex interplay of cause and effect that are the brain and the mind. These

studies inherently claim to get around the problems of understanding subjective consciousness by examining the brain, but the basic unlikeness of first-person qualitative experience and third-person events that can be examined by anyone places fundamental limits on the usual reductive techniques of empirical science.

We might still grant Harris's assumption that neuroscience will someday reveal, in great biochemical and physiological detail, a set of factors highly associated with a sense of well-being. Even so, there would be limitations on how much this knowledge would advance human happiness. For comparison, we know a quite a lot about the physiology of digestion, and we are able to describe in great detail the physiological differences between the digestive system of a person who is starving and that of a person who has just eaten a satisfying and nutritionally balanced meal. But this knowledge contributes little to solving world hunger. This is because the factor that makes the difference—that is, the meal—comes from outside the person. Unless the factors causing our well-being come primarily from within, and are totally independent of what happens in our environment, Harris's project will not be the key to achieving universal well-being.

Harris is aware that external circumstances play a vital role in our sense of well-being, and he summarizes some research that addresses these factors. But most of this research is soft science of the very softest sort—questionnaire surveys that ask people in a variety of circumstances about their feelings of happiness. As Harris himself notes, most of the results tell us nothing we did not already know. (Unsurprisingly, Harris, an atheist polemicist, fails to acknowledge any studies that have supported a spiritual or religious component in happiness.) Moreover, there is reason for questioning to what extent the self-reported "happiness" in population surveys relates to real happiness. Recent data indicating that both states and countries with high rates of reported "happiness" also have high rates of suicide suggest that people's answers to surveys may not always provide a reliable indicator of societal well-being, or even of happiness.

This, too, is a point as old as philosophy: As Aristotle noted in the *Nicomachean Ethics*, there is much disagreement between people as to what happiness is, "and often even the same man identifies it with different things, with health when he is ill, with wealth when he is poor." Again, understanding values requires philosophy, and cannot simply be sidestepped by wrapping them in a numerical package. Harris is right that new scientific information can guide our decisions by enlightening our application of moral principles—a conclusion that would not have been troubling to Kant or Aquinas. But this is a far cry from scientific

information shaping or determining our moral principles themselves, an idea for which Harris is unable to make a case.

A striking inconsistency in Harris's thought is his adherence to determinism, which seems to go against his insistence that there are right and wrong choices. This is a tension widely evident in pop sociobiology. Harris seems to think that free will is an illusion but also that our decisions are really driven by thoughts that arise unbidden in our brains. He does not explain the origin of these thoughts nor how their origin relates to moral choices.

Harris gives a hint of an answer to this question when, in speaking of criminals, he attributes their actions to "some combination of bad genes, bad parents, bad ideas, and bad luck." Each of us, he says, "could have been dealt a very different hand in life" and "it seems immoral not to recognize just how much luck is involved in morality itself." Harris's reference to "bad genes" puts him back closer to the territory of eugenics and Social Darwinism than he seems to realize, making morality the privilege of the lucky few. Although Harris admits that we have a lot to learn about what makes for happiness, he does advance his understanding that happy people have "careers that are intellectually stimulating and financially rewarding" and "basic control over their lives."

This view undermines the possibility of happiness and moral behavior for those who are dealt a bad hand, and so does more to degrade than uplift at the individual level. But worse, it does little to advance the well-being of society as a whole. The importance of good circumstances, and guaranteeing these for as many as possible, is one that is already widely understood and appreciated. But the question remains how to bring about these circumstances for everyone, and no economic system has yet been devised to ensure this. Short of this, difficult discussions of philosophy, justice, politics, and all of the other fields concerned with public life will be required to understand what the good life is and how to provide it to many given the limitations and inequalities of what circumstance brings to each of us. On these points, as with so many others, scientism tends to present as bold, novel solutions what are really just the beginning terms of the problem as it is already widely understood.

The Persistence of Philosophy

The positivist tradition in philosophy gave scientism a strong impetus by denying validity to any area of human knowledge outside of natural science. More recent advocates of scientism have taken the ironic but

logical next step of denying any useful role for philosophy whatsoever, even the subservient philosophy of the positivist sort. But the last laugh, it seems, remains with the philosophers—for the advocates of scientism reveal conceptual confusions that are obvious upon philosophical reflection. Rather than rendering philosophy obsolete, scientism is setting the stage for its much-needed revival.

Advocates of scientism today claim the sole mantle of rationality, frequently equating science with reason itself. Yet it seems the very antithesis of reason to insist that science can do what it cannot, or even that it has done what it demonstrably has not. As a scientist, I would never deny that scientific discoveries can have important implications for metaphysics, epistemology, and ethics, and that everyone interested in these topics needs to be scientifically literate. But the claim that science and science alone can answer longstanding questions in these fields gives rise to countless problems.

In contrast to reason, a defining characteristic of superstition is the stubborn insistence that something—a fetish, an amulet, a pack of Tarot cards—has powers which no evidence supports. From this perspective, scientism appears to have as much in common with superstition as it does with properly conducted scientific research. Scientism claims that science has already resolved questions that are inherently beyond its ability to answer.

Of all the fads and foibles in the long history of human credulity, scientism in all its varied guises—from fanciful cosmology to evolutionary epistemology and ethics—seems among the more dangerous, both because it pretends to be something very different from what it really is and because it has been accorded widespread and uncritical adherence. Continued insistence on the universal competence of science will serve only to undermine the credibility of science as a whole. The ultimate outcome will be an increase of radical skepticism that questions the ability of science to address even the questions legitimately within its sphere of competence. One longs for a new Enlightenment to puncture the pretensions of this latest superstition.