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## In Defense of Scientism

Mario Bunge

By “scientism” I mean the thesis that all cognitive problems are best tackled by adopting a scientific approach, also called “the scientific method,” “the spirit of science,” and “the scientific attitude.” While most contemporary philosophers reject scientism, arguably all scientists *practice* it, even if they have never encountered the word. This article

offers a defense of a particular kind of scientism: the view that science is the truest and deepest kind of knowledge of nature and society.

### Scientism, Anti-scientism, and Hemi-scientism

The set of people who have written about science can be split into three groups: scientific, anti-scientific, and hemi-scientific. For example, the polymath Nicolas Condorcet, the psychologist and sociologist Jean Piaget, and the sociologist Robert K. Merton belong in the first group, while Hegel, Nietzsche, and Heidegger belong in the second. Finally, the group of hemi-scientific thinkers includes Kant, Marx, and the logical positivists. All of these latter thinkers praised science, in particular its rationality and universality, while remaining attached to antiscientific dogmas: phenomenalism in the cases of Kant and the logical positivists and Hegel’s hermetic dialectics in the case of Marx.

The word *scientism* was popularized by the embryologist Félix le Dantec circa 1912. By 1939, it had received a clear definition in André Lalande’s classical *Vocabulaire*. However, the concept had been hatched much earlier by the radical wing of the French Enlightenment. And both word and concept occurred in other contexts—particularly in religious propaganda, where it was used pejoratively.

In a 2013 article, Peter Schöttler reported that at the turn of the twentieth century, the words science and *scientism* were usually accompanied by the following epithets in the relevant French literature: *abstract*, *antireligious*, *bankrupt*, *cold*, *dogmatic*, *exaggerate*, *false*, *gross*, *heavy*, *laïc*, *lame*, *materialist*, *narrow*, *pedantic*, *positivist*, *pretentious*, *rationalist*, *socialist*, *stupid*, and *vulgar*—as well as *Durkheimian* and *German*. A contemporary study might yield a similar result: after one century, *science* and *scientism* continue to be two of the *bêtes noires* of obscurantists.

Scientism has often been equated with positivism, in particular Comte’s. While it is true that

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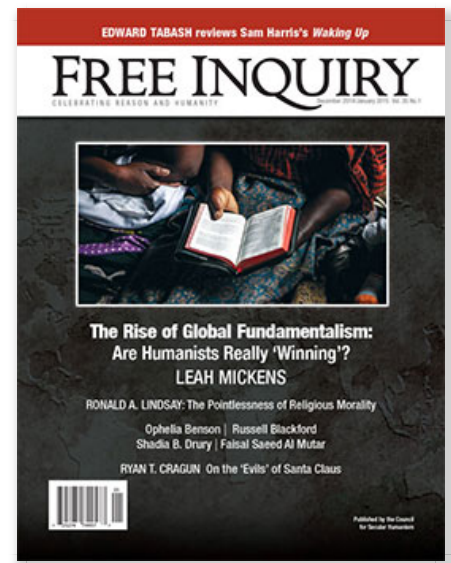
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Comte asserted that sociology (a word he coined) can be rendered scientific, he made no contributions to doing so. Nor did he appreciate Condorcet's essays in mathematical social science. Moreover, Comte believed that sociology and biology should test their hypotheses by comparison rather than experiment. Worse, in line with the phenomenalism of Hume and Kant, Comte (and later Ernst Mach) condemned all talk of atoms, the interiors of stars, intentions, and other items that do not appear to human senses by means of outward appearances. On this view, all there is (or at least all that can be known) is appearance (to someone). (For this reason, the learned Émile Meyerson missed no occasion to criticize Comte.) Even so, until recently, positivism was kept alive by behaviorist psychologists such as B. F. Skinner, who studied behaviors alone because motives, intentions, and subjective experience were considered unknowable. Too many nuclear physicists also paid lip service to this naïve concept—even while they devoted themselves to the exploration of imperceptible things.

Friedrich Hayek—who, in line with the Austrian tradition, disliked the French Enlightenment—ignored classical definitions of scientism. In its place he offered his own idiosyncratic definition: for him, scientism would be “the attempt to ape the natural sciences” in social matters. This malicious concept of scientism is the one that has prevailed in the humanities, particularly since the postmodernist counterrevolution that started about 1950 and recruited those left behind by the rapid progress of science, as well as those who blamed science for the sins of the “establishment.” To understand this radical change in the evaluation of scientism, we must take a closer look at its historical background, as well as at the reaction it elicited.

## Enlightenment Scientism

Along with secularism, egalitarianism, humanism, and materialism, scientism was a component of the views popular among members of the radical wing of the French Enlightenment, including Denis Diderot; Claude Adrien Helvétius; Thiry d'Holbach; Julien Offray de La Mettrie; Anacharsis Cloots; Condorcet; Honoré Gabriel Riqueti, count of Mirabeau; and Sylvain Maréchal. This strand was at odds with both the moderate wing of the same vast movement (including Jean-Baptiste le Rond d'Alembert, Montesquieu, Jean-Jacques Rousseau, Anne-Robert-Jacques Turgot, and Voltaire) and the far smaller and paler Scottish Enlightenment, embodied by David Hume, Adam Smith, and Francis Hutcheson. (Jonathan Israel has written eloquently of the vast differences between the two French wings.)

Whereas the above-mentioned French radicals were revolutionaries both philosophically and politically—albeit of the armchair kind—the Voltaireans and the Scots were reformists. In particular, they did not share the atheism and republicanism of the French radicals. Nor did they approve of the scientific manifesto contained in Condorcet's reception speech at the French Academy in 1782. There, Condorcet declared his trust that the “moral [social] sciences” would eventually “follow the same methods, acquire an equally exact and precise language,” and “attain the same degree of certainty” as the physical (natural) sciences. Condorcet did not merely praise scientism: he practiced it by founding mathematical political science. (It is worth noting that the students of this discipline still discuss Condorcet's theory of voting.)

Condorcet's scientism did not involve the sort of ontological reductionism we have seen exemplified in recent years by sociobiology, evolutionary psychology, neuroeconomics, and the rest of the purely programmatic “neuro-hype.” Unlike Condorcet, these latter-day projects ignore the fact that we sculpt our brains as we learn and that all social norms are made, not found. Of course, mind and society must be studied scientifically—but not as if they were just as natural and physical as, say, hearts.

In the same lecture, Condorcet noted that in the “moral” (social) sciences, “the observer himself forms part of the society that he observes.” Therefore, presumably, he would have welcomed the so-called Thomas theorem, according to which in social matters appearance *is* reality, in that



people react not to external stimuli but to the way they “perceive” them. Therefore, Condorcet’s scientism was not naturalistic: he knew that machines and social systems, though material rather than spiritual, were artificial or man-made, hence, just as *unnatural* as science, ethics, and the law. (Note that I distinguish naturalism from materialism. Whereas naturalism holds that all existents are natural, materialism includes in reality artificial things and processes, from building to computing to managing. So, while naturalism, strictly defined, is reductionist, materialism may make room for emergence, hence, for “hierarchical” [multilevel] worldviews.)

Similar views were put forth by Condorcet’s philosophical comrades-in-arms, in particular d’Holbach, who treated the two branches of factual science in two different volumes: *Système de la nature* (1770) and *Système social* (1773). This scientism was methodological, not ontological, which is why it is wrong to call it “methodological naturalism” the way Karl Popper did in 1960. (Incidentally, the French Enlightenment was a particular blind spot of Popper’s, as it tended to be for the entire Austrian cultural tradition to which Popper belonged. Austria had, after all, missed the Renaissance, the Reformation, the Scientific Revolution, and the Enlightenment; only in the mid–nineteenth century did it leap from the Middle Ages to its own Industrial Revolution and a “Late Enlightenment” marked by such figures as Bernard Bolzano, Gregor Mendel, Mach, and Ludwig Boltzmann.)

The Vienna Circle, which operated from 1929 to 1936, adopted all of the principles of the radical wing of the French Enlightenment except for materialism: it remained shackled to the phenomenalism of Hume, Kant, Comte, and Mach. In addition, with the exception of Otto Neurath, the Circle’s members were indifferent to social science, which on the whole paid at least lip service to the Enlightenment’s scientific tradition.

Meanwhile, the standard economic theorists—in particular Carl Menger, Frank Byron Jevons, Léon Walras, and Alfred Marshall—had practiced scientism in the pejorative sense of the word: their scientism is best described as “mock science.” They produced a voluminous body of work—namely, neoclassical microeconomics—bristling with symbols that intimidated nonmathematicians but were not mathematically well defined or empirically supported. In particular, the members of this school did not subject their hypotheses to empirical tests the way Daniel Kahneman and the Zürich group of experimental economists have been doing in recent years—alas, with bad results for economic orthodoxy.

### Counter-Enlightenment Anti-scientism

The German philosopher Wilhelm Dilthey (1833–1911) wrote an 1883 anti-scientism manifesto that proved to be hugely influential. Heavily indebted to both Kant and Hegel, Dilthey’s work had both an ontological and a methodological component. The former consisted in the thesis that everything social is *geistig* (spiritual, moral) rather than material. Its methodological partner is obvious: the social studies are *Geisteswissenschaften* (spiritual sciences), hence deserving a method of their own. Dilthey dubbed this method *Verstehen*—comprehension, or interpretation—in contrast to explanation in terms of mechanisms and laws.

According to Dilthey, *Verstehen* consists in the intuitive or empathic “understanding” of an actor’s mental processes. The tacit reasoning underlying Dilthey’s view is this: according to vulgar opinion, history is the doing of great men—mostly strongmen and geniuses. Hence, one must empathize with them or put oneself in their shoes if one hopes to understand events. According to Dilthey, *Verstehen* consists in empathy or fellow feeling (*mit-gefühl*); Max Weber used the same term with a slightly different emphasis, defining *Verstehen* as guessing intentions or goals.

Given this view, it is understandable that Dilthey argued for the necessity of doing *verstehende* (interpretive) or “humanistic,” rather than scientific, studies of the social. Of course, neither Dilthey nor his followers suspected that the problem of “inferring” (actually, guessing) mental

states from observed behavior is an inverse problem and, as such, one for which no algorithms are available, so that any proposed solution to it is speculative, as I observed in my 2006 book *Chasing Reality*. Just think of the various ways a wink or a street riot can be “interpreted!”

It is usually assumed that Weber was the most famous of the practitioners of “interpretive sociology,” reflecting the subtitle of his 1921 magnum opus, *Wirtschaft und Gesellschaft: Grundriss der verstehende Soziologie*. Elsewhere, Weber identified himself explicitly as a follower of Dilthey. But, at least since his admirable defense of objectivism or realism (1904), Weber tried to practice the scientific method. In a 1907 article, he subjected historical idealism to a devastating attack; by 1924, he had even proposed a materialist explanation of the decline of ancient Rome.

In short, Weber began his sociological career as an opponent of scientism, only to become an occasional if inconsistent practitioner of it. By contrast, his rival, Émile Durkheim, was all his life a vocal defender—and a consistent practitioner—of scientism. As such, he would be the object of much of the harsh anti-scientistic rhetoric of his time.

But back to Wilhelm Dilthey and the long, strange afterlife of his ideas. Hermeneutics, or textualism, emerged from Dilthey’s theses that (1) everything social is spiritual or cultural and (2) that the hub of social life is the production and circulation of symbols, which should be interpreted the way theologians interpret cryptic scriptures. That is why his main followers—Claude Lévi-Strauss, Paul Ricoeur, and Charles Taylor—held that societies are “languages or like languages.” Hence, the study of society should *concentrate on the symbolic* and aim at catching “meanings,” whatever these may be. (In colloquial German, *Deutung* [interpretation] may denote either sense or intention—an equivocation that facilitates jumping from the *goal* of an agent to the *meaning* of his or her utterances and actions. Similarly, obscurantist is the ritual invocation of Franz Brentano of “intentionality” fame, just because he confused “reference” or “aboutness” with “intension” [or sense, or connotation] and “intention” in its psychological sense.)

But of course if one focuses on words rather than on basic needs and vested interests, one can never understand why people work, cooperate, or fight. No wonder hermeneutics had nothing to say about the main social issues of our time, from oil wars to the vanishing of jobs, from the rise of China to the decline of empires.

Worse, hermeneutics has diverted the attention of students of the social from deeds to words—for example, from *politics* to *political narrative*. It has thus been an important ingredient of the obscurantist movement known as “postmodernism”—rightly criticized as so much pompous and empty verbiage by Paul R. Gross and Norman Levitt in their masterful *Higher Superstition: The Academic Left and Its Quarrels with Science* (1994). By contrast, a social science that is scientific in the sense that I champion—one focused on groups rather than individuals and armed with statistics instead of literary metaphors—should have much to say about those huge social events. As Hans Albert observed in 1988, hermeneutics is sheer bookish escapism and as such utterly useless to social scientists.

## The Science Wars

Scientism presupposes the strict conception of science that Robert K. Merton, the father of the sociology of science, proposed in his classic paper “Science and the Social Order” (1938). Merton argued that the peculiarities of basic science are disinterestedness, universality, epistemic communism, and organized skepticism—not the doubt of the isolated researcher but the critical scrutiny of a whole community.

Merton’s view of science prevailed until Thomas Kuhn and Paul Feyerabend launched their slogan “Anything goes!” Michel Foucault and his followers (in particular, Bruno Latour) issued their own outrageous thesis: “Science is politics by other means.”

Both obscurantist groups avoided using words such as *knowledge* and *truth*. They denied that scientific research was primarily the search for objective truth, claiming instead that it sought riches or power. They also denied that scientific controversies, though sometimes distorted by political authority, are never terminated by it. In reality, of course, eventually truth wins out. When it does not, scientific research grinds to a halt. This is why those who wish to gain power go into politics or business, not science. But obvious truths such as these have no place in the fantasy worlds of the postmodernists.

The ideas that science is merely the handmaiden of political power and that scientists work primarily to attain power are preposterous. For one thing, scientists are motivated by curiosity, as Aristotle said, and by peer recognition, as Merton added. But they usually avoid assuming power positions because these can destroy their scientific agendas. Second, science tends to empower people other than scientists: technologists, managers, statesmen, and others. Third, the power elite can nurture or starve science, but it cannot *produce* it, for scientific ideas are born in well-trained brains working in favorable environments, not in state offices. In short, the main direction of flow between the two activities in question is Science → Power, not the reverse.

However, on rare occasions, politics has fought science and even overpowered it. Suffice it to recall the early Christians' assault on pagan culture, in particular Greek science; the radical politics of the Jacobins, buttressed by the adoption of Rousseau's exaltation of "feeling" over reason; the successful Nazi penalization of scientism, banning social research and rejecting abstract theories on the grounds that they were Jewish; the Stalinist attempt to pass off its own outdated and distorting ideology as scientism, while rejecting scientific novelties such as genetics, the synthetic theory of evolution, general and special relativity, quantum physics, and sociology; and the youth counterculture, which erupted violently in the Parisian student revolt in May 1968, combining hedonism with rejection of the Establishment and, in particular, the scientific method.

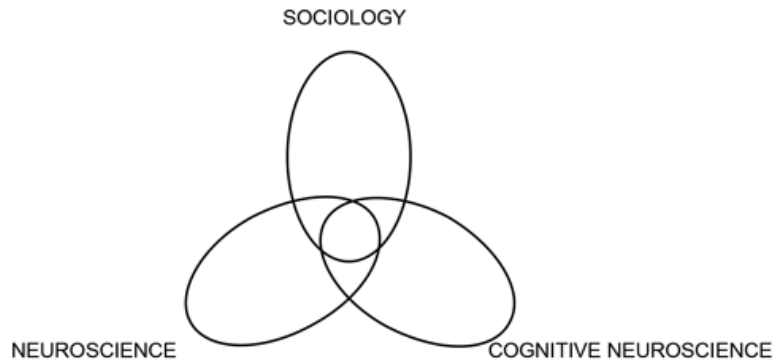
Finally, the so-called science wars, which have raged since Kuhn published *The Structure of Scientific Revolutions* in 1962, have engaged a great number of scientists, journalists, and ideologues both on the traditional Right and the new Left. Regrettably, most philosophers have kept safely above that philosophical fray, and few if any scholarly journals have published articles either for or against science and scientism. What a contrast with the earlier science war that culminated in the trial of Galileo or with the fight waged by Enlightenment thinkers and Darwinians against the ruling ideas of their respective times!

## Testing Anti-scientism

How has the interpretive or humanist approach fared? Let us evaluate the pivotal contentions of the anti-scientism movement, from Dilthey's *Verstehen* to mid-twentieth-century hermeneutics.

1. *The supposed natural/cultural dichotomy was stillborn.* Indeed, even when Dilthey proclaimed this dichotomy in 1883, a number of hybrid sciences had already come into existence, notably human geography, psychophysics, epidemiology, and demography. Not long after, still further hybrid sciences emerged, among them medical sociology, physiological psychology, developmental cognitive neuroscience, social cognitive neuroscience, and socioeconomics.

For example, explaining such bottom-up processes as Puberty → Altered feelings → Changed social behavior and top-down ones such as Subordination → Higher corticoid level → Lower immunity call for the merger of neuroscience, cognitive neuroscience, and sociology (see figure 1).



**Figure 1.** The merger of a biological science, a biosocial one, and a social one—a clear breach of the natural/cultural divide decreed by anti-scientism.

The preceding examples should refute the charge that scientism involves reductionism, such as in physicalism or biologism. On the contrary, when accompanied by a science-oriented ontology such as the author's (see my *The Furniture of the World* and *A World of Systems*), scientism favors the merger or convergence of different disciplines rather than a simplistic leveling down. (I argued this in my *Emergence and Convergence*.) The reason is that a scientific worldview is systemic rather than either individualistic or holistic, a clear suggestion that the frontiers among disciplines are partly artificial. In any event, the emergence of the biosocial sciences shows that the nature/culture wall erected by the interpretive or humanistic school obstructs the advancement of science.

2. *The Verstehen method has proven fruitless.* Indeed, no interpretive (or humanistic) student of society has ever come up with true conjectures about any important economic, political, or cultural process, such as the rise and corruption of democracy. Max Weber, the most eminent member of the school, missed most of the epoch-making events of his time: the rise of democracy, trade unionism, colonialism, corporations, science, and technology—along with the decline of religion. (After all, he fathered the sociology of religion, not of science.) Nowadays, the writings of members of this school are published only in marginal journals.

However, a few students of society in the humanist camp have produced some insightful work. Suffice it to recall the brilliant essays of Norberto Bobbio, Albert O. Hirschman, and Thorstein Veblen. For their part, Bronislaw Malinowsky, Margaret Mead, Clifford Geertz, and Napoléon Chagnon have written highly readable, if hotly disputed, descriptions of certain exotic practices. However, their conclusions have been criticized, and not one of these writers was particularly interested in ordinary life, aside from sex: their subjects seemed to subsist on thin air. (See Bruce G. Trigger's *Artifacts and Ideas* [2003] for an explicitly realist and materialist counterbalance.)

To see modern social studies at their best, one must look at the work of anthropologists, archaeologists, sociologists, and historians of the scientific persuasion. Examples include the *Annales* school, Gunnar Myrdal's monumental and influential *American Dilemma*, the inventory of archaeological pieces done before their drowning by the Aswan High Dam, and the massive study *The American Soldier*. The publication of the latter work in 1949 elicited the anger of the humanistic school, but it also marked the coming of age of the scientific strand of American sociology, with Robert Merton at its head and the *American Sociological Review* as its flagship.

Why has anti-scientism failed? Arguably, it failed because it condemned the scientific method, which has characterized all scientific endeavors since the scientific revolution. Moreover, when tackling new cognitive problems, every contemporary investigator takes scientism for granted, as will be argued below.

## The Philosophical Matrix of Scientific Research

Most philosophers take it for granted that science and philosophy do not intersect: that scientists start from data, or from hypotheses, which they handle without any philosophical preconceptions. A glance at the history of science should suffice to indict this thesis as a myth. A quick examination of a few open problems will corroborate this harsh verdict.

Let us imagine how a scientist would tackle an open problem such as (a) whether “dark matter” and “dark energy” defy all known physical laws; (b) which, if any, acquired characteristics are heritable; (c) whether some animals can be in conscious states; (d) how to manage social systems, such as business firms and armies, in a rational fashion; and (e) whether the law and the courts can and should use scientific evidence in addition to traditional methods and procedures.

Would our hypothetical scientist refuse to investigate these problems, joining Chomsky and his new fellow “mysterians” (radical skeptics) in holding that matter and mind are mysterious and will forever remain so? Would he or she jump into *medias res* instead of starting by reviewing the relevant background knowledge? Would he or she fantasize about anomalous events and abnormal or even supernatural powers or filter out spiritualist fantasies? Would he or she remain satisfied with compiling lists of appearances or symptoms or conjecture possible patterns and their underlying mechanisms? Would he or she remain satisfied with hunches or seek empirical corroboration? Would he or she confine attention to the object of his or her research or place it into its context or wider system? Finally, would he or she dismiss out of hand all concerns about the possible harmful effect of any resulting findings?

Admittedly, all of the previous questions are loaded. But this is the point of our exercise: to suggest that genuine scientists *do not investigate the first guess that comes to mind*, just as they *do not question all antecedent knowledge*. Let us see how a pro-scientism student is likely to tackle the five problems listed above.

1. *Is “dark matter” anomalous or just little-known matter?* The only way to find out whether it exists and if it does, what it is, is to use the known theoretical and experimental tools to catch samples of it and try to detect some of its properties. At the time of writing, this is a “hot” question, and there is growing consensus that dark matter is the debris left by cosmic rays when going through ordinary matter, rather than tiny black holes as had been conjectured earlier. Stay tuned.

2. *Was Lamarck right after all?* In recent years, genetics and evolutionary biology have been enriched with epigenetics, the newest branch of genetics. This has shown conclusively that some experiences, such as maternal nurturing (or neglect), cause the methylation of DNA molecules, a heritable chemical change. However, this discovery did not vindicate Lamarck: it only showed that the Darwinian mechanism (variation-selection) comes in more than one version.

3. *Can animals be in conscious states?* The popular literature, starting with Aesop, is full of anecdotes about consciousness in animals of various species. But anecdotes are not hard scientific data. Some of the best such data have recently been obtained by effecting reversible thalamic and cortical inactivations—delicate interventions that are beyond the ken of the “humanistic” psychologists. It turns out that there is mounting evidence for the hypothesis that animals of various species can be conscious.

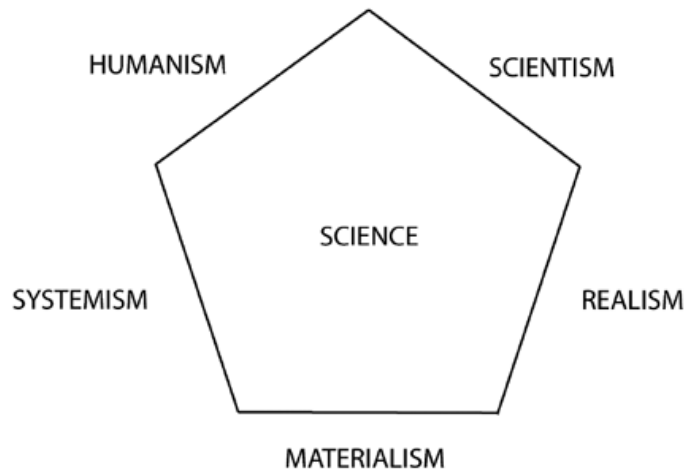
4. *Can social systems be scientifically managed?* Operations research, the most sophisticated phase of management science, was born overnight from the work of a multidisciplinary team assembled at the beginning of World War II by the British Admiralty to confront the great losses German submarines were then inflicting on the merchant navy transporting food and ammunition to England. The problem was to determine the optimal size of a naval convoy. The mathematical model built by the team, led by physicist Patrick Blackett, showed that size to be middling: large

enough to justify air coverage but not so large as to invite a great concentration of enemy submarines—a result that must have disappointed the economists who loved to maximize. The navy accepted this result—obtained by newcomers to military strategy but not to science and mathematics—and naval losses decreased significantly. This result encouraged business experts to construct mathematical models for similar problems, such as finding the optimal size of inventories. Thus, scientism scored another victory over the traditional or humanistic party, this time in the field of sociotechnology.

5. *Can the law become scientific?* In recent years, criminology and jurisprudence, as well as their practice in the courts of law, have benefited from biology, psychology, and sociology. Indeed, DNA testing is now admissible in the courts, juvenile criminal justice is slowly changing for the better as we learn that the adolescent frontal cortex is not yet fully mature, and criminal law as a whole is changing as the social causes of crime are being unveiled and techniques of rehabilitation are being perfected. All these are accomplishments of scientism.

Indeed, all five of these problems are currently being investigated *on the scientific assumption that the scientific method is the royal road to objective truth and efficiency in any scientific or technological field*. Moreover, in all five cases more than scientism is being presupposed: realism, materialism, systemism, and humanism too are being taken for granted, as I noted in my 2012 book *Evaluating Philosophies*. For instance, the study of animal consciousness assumes (a) the *realist* hypothesis that the processes in the experimental animals are real, rather than figments of the experimenter's imagination; (b) the *materialist* thesis that mental states are brain states; (c) the *systemic* principle that the problem under study, like all of the big questions, is part of a bundle of problems to be tackled anatomically as well as behaviorally; and (d) the *humanist* injunction to respect animal welfare—which in turn suggests refraining from prodding at random the animal's brain just to see what happens.

I suggest that all of the four above principles join scientism to constitute no less than the *philosophical matrix of scientific research*: see figure 2.



**Figure 2.** The philosophical matrix of scientific progress. From Mario Bunge, *Matter and Mind* (2010).

If scientific research presupposes the above-mentioned philosophical theses that habitually accompany scientism, then this view does not oppose the humanities, as is often claimed. What the proponents of scientism oppose is the antiscientific stance adopted by Hegel, Schopenhauer, Nietzsche, Dilthey, Bergson, Husserl, Heidegger, the Frankfurt School, and the structuralists,



hermeneuticians, and postmodernists from Althusser to Derrida and Deleuze. Do these enemies of rationality deserve to be called “humanists” if we accept Aristotle’s definition of “man” as “the rational animal”?

## Pseudoscientism

It is well known that anything can be faked. The main reason is that the gullible by far outnumber skeptics. Besides, fakeries are often more profitable than the genuine articles. This holds even for science: witness the commercial success of psychoanalysis and alternative medicine.

As with science, so with scientism. Pseudoscientism is the practice of parading pseudosciences as genuine sciences just because they wear some of the accoutrements of science—in particular the conspicuous use of mathematical symbols—while lacking its peculiarities, in particular compatibility with antecedent knowledge and concern for empirical testing.

Pseudoscientism is particularly harmful when allied with political power: witness the fight of Soviet philosophers against “bourgeois” science and the reputation that the accountant Robert McNamara, the U.S. Secretary of Defense in the Kennedy and Johnson administrations, gained for guaranteeing that his team would win the Vietnam War because they would wage it “scientifically.” What he called “scientific warfare” was computer programming using theories that looked scientific but actually were not.

Decision theory and game theory were key pieces in McNamara’s intellectual tool kit. These theories presuppose the individualist notions that society is a collection of free individuals driven by personal interest, imbued with the ability to estimate both the probability and the utility of the outcome of every possible course of action, plus the capacity to figure out the best strategy to maximize the product of both numbers. There is no science in any application of these theories to politics, because (a) the individuals it postulates are imaginary; (b) what matters in politics is not the isolated individual but the social group or system; and (c) the numbers involved in these calculations are all invented, and experiment with real people has not confirmed the maximization conjecture.

In any event, if the American invaders actually applied those theories in the Vietnam War, they grossly overrated their own utilities and probabilities while underrating those of “the enemy.” This was noted even before the American defeat—for instance, by the author in a 1973 journal article. But of course America’s Vietnam debacle was not a defeat for science, much less for scientism: the real losers were imperial arrogance and mock science.

## What’s So Special about Science?

Why should scientism be preferred to its “humanistic” alternative? The usual answer is that the scientific approach works far better than its alternatives: tradition, intuition, or gut feeling (in particular *Verstehen*), trial and error, and navel-contemplation (in particular *a priori* mathematical modeling). But this answer begets in turn the question, *Why does science work best?*

My own answer is this: scientific research works best at finding objective or impersonal truths about the world because *it matches both the world and our cognitive apparatus*. Indeed, the world is not a patchwork of disjointed appearances, as Ptolemy, Hume, Kant, Comte, Mill, Mach, Pierre Duhem, Bertrand Russell, and Carnap believed; rather, the world is *the system of all material systems*. And humans can learn to use not only their senses—which yield no more than appearances—but their imaginations as well to check the world in four different ways: through *observation, experimentation, computation, and consilience*, which is to say, compatibility with other items in the fund of antecedent knowledge, as I observed in my 1967 *Scientific Research*.

Besides, unlike superstition, ideology, or hit-and-miss speculation, science can grow exponentially

through the well-known mechanism of *positive feedback*—where some of the output is fed back into the system, such as interest flowing back into a savings account. But of course, the continuation of this process requires that a nation spend close of 3 percent of GDP on research and development, something that politicians sold on anti-scientism won't support.

This applies, in particular, to research in political science, which the National Science Foundation ceased to support following a restriction on “wasteful” spending imposed by the U.S. Senate in 2013. (Is it not emblematic that Condorcet, a great political scientist and the author of the first scientific manifesto, took his own life to avoid being guillotined by the sanguinary Robespierre, a fan of Rousseau's, who had preferred feeling to reasoning?)

In short, adherence to scientism has been repaying handsomely, economically as well as culturally, whereas betting on anti-scientific dogmas threatens the growth of knowledge that has been ongoing, albeit with some temporary setbacks, since the time of Galileo, Descartes, and William Harvey.

## Acknowledgment

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Mario Bunge is the Frothingham Professor of Logic and Metaphysics at McGill University and a Laureate of the International Academy of Humanism. Over the course of his long and distinguished career, he has received sixteen honorary doctorates and four honorary professorships. He has won numerous awards and is a member of several professional societies. Dr. Bunge's writings include eighty books and four hundred articles, including several for *Free Inquiry*.

Written by Mario Bunge. Posted by The Council for Secular Humanism on 11/13 at 10:36 AM

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