

doubting what reason “clearly and distinctly” perceives (Fourth Meditation).

Descartes’s methodic doubt raises the famous problem of the “Cartesian circle.” Given his initial posture of suspicion, Descartes cannot trust any individual clear and distinct PERCEPTION until he knows that reason is reliable, but he cannot know reason is reliable until he can trust some of his clear and distinct perceptions—namely, the premises about causation from which he argues for God’s existence. Therefore, Descartes cannot be certain of anything. With all beliefs in doubt, any argument that he gives will rest on a suspicious premise, and will be an exercise of a suspicious faculty: reason. Descartes claims to have reasoned his way out of his doubt about the reliability of reason, but doing so on his grounds is clearly impossible. Descartes himself responded to this criticism by suggesting that his initial doubts were not as radical as they may seem, because he always trusted what reason clearly and distinctly perceives. He uses methodic doubt merely to ensure that he examines all of his opinions by the light of reason, just as one would completely empty a barrel containing bad apples, in order to keep the good and remove the bad.

Even this less radical version of methodic doubt may undermine FAITH, for Descartes insists that one should not believe anything unless it is either self-evident or based on sufficiently clear evidence. Many later thinkers accepted this rule for belief, but rejected Descartes’s contention that God’s existence can be demonstrated; hence, they concluded that reason excludes faith. Descartes himself thought that many doctrines of the faith are in themselves neither self-evident nor demonstrable, but can become sufficiently clear to believers by the light of grace. This position raises questions about how to distinguish between genuine divine ILLUMINATION and dangerous enthusiasm. Though Descartes was educated by JESUITS and seems to have remained a faithful Catholic throughout his life, many view the legacy of his methodic doubt as problematic for the faith.

SEE ALSO CARTESIANISM; CERTITUDE.

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## METHODOLOGICAL MATERIALISM

SEE *Methodological Naturalism*.

## METHODOLOGICAL NATURALISM

In contrast to metaphysical naturalism (the thesis that material nature is all that there is), methodological naturalism is a procedural commitment to describing, representing, and explaining PHENOMENA in exclusively natural, as opposed to SUPERNATURAL, terms. Unlike metaphysical naturalism, which denies the existence of supernatural beings, methodological naturalism is not a thesis that can be either true or false. It is instead a research strategy that can be adopted or rejected. The idea that SCIENCE is constrained by methodological naturalism, conceived as a regulative principle or policy of describing and explaining phenomena in terms of purely natural entities and processes, has played an influential role in public discourse about the nature of science and science education since the 1980s. However, questions about the scope, status, and influence of methodological naturalism are by no means limited to the natural sciences (including, for example, study of the origin of LIFE and COSMOLOGY), but extend to academic research more generally, including such disciplines as history, biblical scholarship, and human PSYCHOLOGY.

**Early History.** Explicit attempts to sharply distinguish methodological from metaphysical forms of naturalism are a relatively recent development, albeit one with important historical precursors. The aim of accounting for observable phenomena in exclusively quotidian terms dates to pre-Socratic Greece. Even in medieval Christian Europe, THIERRY OF CHARTRES (d. c. 1150); WILLIAM OF CONCHES (c. 1100–1154), tutor of HENRY II Plantagenet (1133–1189); and ADELARD OF BATH (c. 1080–1150) advocated what David Lindberg calls “the new naturalism” of the twelfth century: an insistence that divine intervention should only be countenanced after exhausting all attempts to explain phenomena by way of natural causes. Natural philosophers who set about the task of understanding the causal relations obtaining between members of the created UNIVERSE increasingly found theological legitimation for this practice in the classical distinction between primary and secondary causes (GOD’s direct creating and sustaining activity versus indirect action through the NATURAL ORDER established by God), particularly as developed by St.

THOMAS AQUINAS (1225–1274). Minim friar Marin Mersenne (1588–1648), Robert Boyle (1627–1691), and others defended mechanical philosophies as part of the backdrop of ordinary law-like operations of nature presupposed by any special miraculous interventions by God.

Although Isaac Newton (1642–1727) had explicitly appealed to the direct action of God for the periodic correction of instabilities in planetary orbits, by the time biblical critic David Friedrich Strauss (1808–1874) penned his *Das Leben Jesu* (1835) efforts to naturalize methods were well underway in many disciplines, including THEOLOGY as well as physics and medicine. The theorizing of mainstream geologists was still pervaded by biblical narratives of the Noachian deluge in the mid-nineteenth century. Under the influence of Charles Lyell (1797–1875) and Charles DARWIN (1809–1882), however, this practice was largely abandoned and, before the end of the century, geology and biology were effectively naturalized as well. For Herbert SPENCER (1820–1903), naturalism implied not only Strauss's notion of mechanistic chains "of causes and effects, which suffer no interruption" (quoted in Brooke 1991, 270) but also a chaotic struggle for existence that paradoxically undergirded the progressive order apparent in the world. While agreeing that there were no gaps in nature to be filled by the actions of nonnatural beings, Thomas H. Huxley (1825–1895) insisted that "scientific Naturalism" did not deny in principle the existence of "Supernature" but did dispute the veracity of evidence "adduced in favour of this, or of that, form of Supernaturalism" (1894, 39). Instead, Huxley advocated AGNOSTICISM regarding metaphysical issues, an attitude that fit well with antimetaphysical sentiments that influenced positivist and logical empiricist reflection on science in the late nineteenth and early twentieth century.

Contemporary references to naturalism in science and in discussions of the place of RELIGION in the public sphere have often followed Huxley's lead by segregating scientific practice from metaphysical interpretation. In the wake of the *McLean v. Arkansas Board of Education* (1982) creation science trial, Wheaton College philosopher Paul de Vries reminded readers that naturalism in the sciences did not necessarily entail an antisupernatural worldview. Methodological naturalism played a more prominent and explicit role in expert testimony for the *Kitzmiller v. Dover* (2005) trial, and the U.S. federal court's final opinion reiterated the point that by virtue of the practice of science, scientific explanations are methodologically naturalistic and thus are ill-equipped to make global metaphysical claims.

**Issues and Criticism.** Although references to methodological naturalism are common in the early twenty-first century, significant differences in characterization on

specific issues arguably render it a label for a family of related views rather than a single well-defined position. A number of philosophical issues stand in need of clarification. One issue is the problem of stating what precisely methodological naturalism, which rests on a distinction between the natural and supernatural, excludes or includes. If what counts as natural is itself defined with respect to the content of current science, would it have ruled out appeals to ACTION AT A DISTANCE, ASTROLOGY, conscious agency, dark energy, electromagnetic fields, ENTELECHY, functional explanations, HYLOZOISM, immaterial souls, PANTHEISM, space-time, vital forces, or yet unforeseen metaphysical categories and, if so, would it have served to advance or hinder the best scientific work of the day? Are its restrictions substantive enough to provide any real guidance, and are these constraints that have changed over time?

A second set of issues concerns the status of methodological naturalism. As a descriptive sociological matter, how closely does methodological naturalism conform to norms that are at least implicit in past or current scientific practices? Is the conspicuous absence of reference to God in peer-reviewed science articles an indication of consensus on methodological naturalism as opposed, say, to a lack of evidence for nonnaturalistic theories? Does methodological naturalism play an important role in scientific research, or is it only relevant when science comes up in philosophical, religious, or legal discussions? Normatively, must or ought scientific inquiry to proceed in this way, or should it be abandoned and replaced by something else, perhaps something more neutral, more free, or more religious?

A third set of issues concerns the arguments and motivations for and against methodological naturalism. Attempts to articulate and defend methodological naturalism in the *McLean v. Arkansas Board of Education* trial maintained that supernatural hypotheses were not testable and that science, by definition, had to proceed without recourse to the supernatural. Critics were quick to point out both that hypotheses such as *God created the universe in 4004 BC* were not only falsifiable but, in fact, false and that, historically, work that indisputably counted as scientific, such as Newton's, had availed itself of supernatural causes. Another rationale for methodological naturalism, evident in the historical discussion above, argues that appeals to unnatural causes are "science stoppers" in the sense that they cut off inquiry prematurely. At least in the context of scientific inquiry, to the extent that affirmations of miraculous recoveries or demon possession make no predictions or that explanations such as "because God chose to do it that way" are empirically rather unconstrained (perhaps so unconstrained as to be compatible with any or nearly any possible outcome), they do not advance theoretical

understanding of the physical processes involved in the phenomenon in question. One practical argument for methodological naturalism is that bracketing certain questions or claims that might occasion disagreement enables a form of cooperative empirical inquiry that can be the collective endeavor of a diverse public. On this view, precisely because mathematicians, chemists, biologists, and historical Jesus scholars proceed in a manner largely independent of controversial metaphysical or religious assumptions, their activities can yield theories and results that command near universal assent. Perhaps the strongest argument in favor of methodological naturalism points to its strikingly successful track record. The success that science has had in actually providing detailed naturalistic explanations for a vast array of phenomena, particularly over the last several centuries, surely provides some grounds for continuing the practice.

However, methodological naturalism is not without critics. Some of these objections, but by no means all, are motivated by religious concerns. It is easy enough to see why metaphysical naturalists or even deists might like science, or perhaps all academic disciplines, to proceed in this way, but why should nonnaturalists take this as the research agenda? Some philosophers, such as Alvin Plantinga, have argued that methodological naturalism is functionally equivalent to the adoption of a working assumption that things are “as if” metaphysical naturalism were true and hence a form of provisional ATHEISM. Despite lip service to the ideal of neutrality, in practice, it is often difficult to disentangle science from metaphysical outlooks that may inform it. Discussions in SOCIOBIOLOGY, anthropology, or psychology, for example, are arguably often more enmeshed in metaphysical naturalism than proponents of methodological naturalism acknowledge. Plantinga proposes that theists engage in science or closely related forms of inquiry in a manner that allows for the possibility of, or even presupposes, an understanding of the world as created by a God who sometimes directly or miraculously intervenes in particular human affairs.

Another concern is that a commitment to methodological naturalism as a constraint on inquiry forfeits the claim that science aims open-endedly at truth, settling instead for some such goal as coming up with the most empirically adequate naturalistic theories possible. A related objection is that to adopt methodological naturalism conflicts with the ideal of free and open empirical inquiry. Why should scientists not be free to investigate whatever testable implications hypotheses about ghosts or fairies, for example, might have, unencumbered by assumptions about what they are or are not permitted to find? If the visible stars suddenly arranged themselves to read “Made by Yahweh,” it would seem dogmatic or willfully neglectful of the evidence to remain closed to the possibility of divine causation. The basis for this sort

of critique might be found in another core attitude common among naturalists and empiricists, a rejection of a priori constraints of any kind on the scientific enterprise. Against the idea that methodological naturalism is an a priori or unrevisable constraint, one might point to historical episodes in which similar alleged constraints on inquiry changed rather than the theory, such as when the Cartesian rejection of action-at-a-distance as an appeal to “occult forces” was superseded by Newton’s theory of gravitation. At the very least, such considerations should inform continued attempts to assess the proper place and status of methodological naturalism.

SEE ALSO BIOLOGICAL NATURALISM; NATURALISM.

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## METHODOLOGY (PHILOSOPHY)

Method is a “way toward” (derived from the Greek term μέθοδος, which combines μετά, “toward” or “in the direction of,” and ὁδός, “road” or “way”). It is a term applied both to the process or art of investigation and to the ordering of material within a treatise or body of knowledge that results from investigation.