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BOOK REVIEW

Exploring the hinterland of science

Massimo Pigliucci: Nonsense on stilts: How to tell science from bunk. Chicago and London: University of Chicago Press, 2010, 332pp, $20.00 PB

Maarten Boudry

In a foreword to Michael Shermer's *Why people believe weird things*, the late Stephen Jay Gould wrote that "[s]kepticism or debunking often receives the bad rap reserved for activities—like garbage disposal—that absolutely must be done for a safe and sane life, but seem either unglamorous or unworthy of overt celebration." The attitude of many scientists and philosophers toward modern scepticism tends to be a little condescending, not because they are sympathetic to pseudoscience, but because they believe that some ideas are so obviously wrong that they are not even worth arguing about. In addition, following the influential critiques of the likes of Larry Laudan, many philosophers shy away from branding theories as pseudoscience and philosophical enthusiasm for the demarcation problem has waned significantly over the last decades. Rejecting some theories as pseudoscientific, as sceptics are wont to do, suggests a naive conception of the nature of science and seems to presuppose a simple dividing line between science and pseudoscience.

However, just because there is no strict and straightforward demarcation between science and non-science, it does not follow that there is no difference at all. The distinction between science and pseudoscience may be "vague" in a technical sense: while there are borderline cases, we can readily point to clear-cut examples of both categories. Luckily, not all philosophers take the demise of the demarcation project as a reason to neglect the problem of pseudoscience altogether. Philosopher and notable sceptic Massimo Pigliucci has now published a very welcome and philosophically sophisticated contribution to the critical evaluation of pseudoscience.

Nonsense on Stilts takes a broad approach, covering a wide range of bona fide science, fringe science, and outright bunk. The main motivation behind this sceptical book, as Pigliucci himself sees it, is that "rampant irrationality in a society can be highly wasteful and destructive." (57) In the opening statements of his book, Pigliucci states that we have a "moral duty to distinguish sense from nonsense". In

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the process of exploring the hinterland of pseudoscience, however, Pigliucci not only performs his moral duties in combating dangerous nonsense (e.g. AIDS denialism) but he also offers the reader valuable insights into the nature of the scientific enterprise itself, the epistemic limitations of scientists qua human agents, and the status of scientific knowledge.

Pigliucci acknowledges that there is no sharp dividing line between science and pseudoscience and that there is no such thing as 'the' scientific method which can be put to work as a yardstick for evaluating theories. While maintaining that testability is the hallmark of scientific theories, he avoids the pitfalls of naïve falsificationism. After an interesting chapter on the alleged difference between hard and soft science, in which he defends a heterogeneity of scientific methods, Pigliucci goes on to discuss three fields of inquiry that he regards as "not quite science": the search for extraterrestrial intelligence (SETI), string theory in physics, and evolutionary psychology. Not all readers will concur with Pigliucci's assessment of these theories. For example, while he is right to argue that the field of evolutionary psychology is particularly susceptible to "just so stories", one might argue that he underestimates the multiple sources of circumstantial evidence that are available to (good) evolutionary psychologists. Defenders of string theory might argue that they are on the verge of an empirical breakthrough and that currently the theory is based on more than mathematically elegant speculations, as its critics have maintained. In any case, Pigliucci allows that, in the future, these theories may move out of the scientific twilight zone one way or the other.

After discussing these borderline cases, Pigliucci forthrightly delves into the sheer nonsense to which his book's title refers. Each of the theories he discusses would of course merit a book-length treatment, as Pigliucci himself acknowledges, but his rebuttal of such notable pseudosciences as astrology, AIDS denialism, and psi research is poignant and effective. Echoing Gould's sentiments, Pigliucci begins by noting that skeptics are often regarded as "asocial curmudgeons bent on denying any positive knowledge unless it comes through the 'orthodox channels' of anointed science" (57) For this reason, philosophers are often reluctant to play the role of science's sceptical watchdogs. To his credit, Pigliucci has no such qualms, although he does acknowledge the downside of scepticism, if it boils down to a knee-jerk dismissal of anything new and out of the ordinary. In his view, science and philosophy can make a joint effort in combating pseudoscience and superstition, each from their respective point of view and with their different emphases. Philosophers will focus more on the internal inconsistencies and conceptual problems in pseudoscience, while scientists will be more concerned with direct empirical refutations. These two approaches may well supplement and strengthen each other, as Pigliucci nicely demonstrates with such examples as astrology and out-of-body experiences (230–232).

Particularly valuable in Pigliucci's book is his positive view of the role of philosophy in society at large and the contribution of philosophers to science and scepticism. He has no patience with the view that philosophy is just idle speculation that can be safely ignored by scientists and allows for a notion of progress in philosophy similar to that in science. According to him, philosophy has often been the "placeholder for areas of intellectual inquiry that have subsequently moved to

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the domain of science" (31). But of course, even when a field of inquiry has 'matured' into science, philosophers can make valuable contributions, as long as they do not pretend to prescribe how scientists should go about their business. Pigliucci distinguishes three contributions of philosophy in this regard: conceptual and methodological analysis of scientific methods and inferences; research into the nature of science, pseudoscience and everything in between; and solving theoretical problems in specific scientific disciplines.

As a prime example of the contribution of philosophers to science, Pigliucci mentions the decision in Kitzmiller v. Dover, the landmark case that ruled the injection of Intelligent Design theory in biology classrooms as unconstitutional and which condemned ID theory as religiously motivated pseudoscience. Although I completely agree with Pigliucci on the important role of philosophers in these situations, this example illustrates also one of the points on which I most disagree with Pigliucci. Following philosophers of science Robert Pennock and Barbara Forrest, Judge John E. Jones ruled that ID by definition is not science because it "fails to meet the essential ground rules that limit science to testable, natural explanations." Pigliucci lauds the reasoning of Jones as a "must-read in any discussion of science and religion" (176). He agrees with Judge Jones that science is by definition limited to natural explanations and that it has no authority on things supernatural. Therefore, according to Jones, the claim that evolution is antithetical to religion is "utterly false". However, even if theism is logically compatible with evolution and modern science in general (logical consistency being a very weak criterion for belief), evolutionary theory has still dramatically undermined one of the most forceful arguments for the existence of a deity (the biological design argument), which convinced countless knowledgeable persons before Darwin. Moreover, the picture that emerges from modern evolutionary theory—random variations and blind selective forces, huge wastefulness, imperfect and botched design—clearly sits uncomfortably with the idea of a loving and caring Creator.

Although elsewhere in his book Pigliucci offers an excellent rebuttal of Stephen Jay Gould's Non-Overlapping Magisteria (NOMA) solution to the science/religion problem, I think he fails to notice that the position adopted in the ruling of Judge Jones is itself more politically convenient than philosophically accurate. In fact, Pigliucci's own discussion of psi research at the PEAR laboratory (Princeton Engineering Anomalies Research) indirectly attests to the fact that science is well capable of investigating allegedly supernatural phenomena, provided these are supposed to have empirically detectable consequences (as an interfering Designer would undoubtedly have).

Even if one disagrees with Pigliucci on the role of naturalism in science, his spirited defense of the combined use of both philosophy and science as "the most formidable intellectual weapon against nonsense" (232) has a lot to recommend it. After two historical chapters in which he traces the origin of modern science and philosophy, Pigliucci ventures into the notorious science wars that have been waged especially in the 90s. Although he rightfully dismisses the more radical pronouncements of postmodernists, he grants some of their concerns and is equally critical of the arrogant 'scientism' of some of his scientific colleagues. By spending considerable time on the ideological biases of scientists and the blunders of science

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in the past, while still outlining a picture of science as a self-corrective enterprise that yields reliable knowledge, Pigliucci actually takes the sting out of much inflated postmodernist or social constructivist criticism of science.

Pigliucci's attack of high stilted nonsense not only offers a great service in a world that is littered with irrational beliefs and pseudoscience, it is also an incisive and philosophically informed analysis of the nature of science and the pursuit of reliable knowledge. With books like these on the shelf, it is clear that there is more to scepticism than intellectual garbage disposal.

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