Ideal Code, Real World resulta numa combinação rara de concisão, acessibilidade e inovação científica. Em virtude das duas primeiras características, o livro pode ser utilizado proveitosamente mesmo em disciplinas de ética de uma licenciatura. Em virtude da terceira, tornou-se já uma referência incontornável na literatura de ética normativa. Uma leitura complementar imprescindível é a colecção de ensaios *Morality, Rules, and Consequences* (Edimburgo: Edinburgh University Press: 2000), organizada por Brad Hooker, Elinore Mason e Dale E. Miller. Este livro inclui diversos ensaios que criticam a teoria desenvolvida em *Ideal Code, Real World*, bem como uma resposta do próprio Hooker às objecções.

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***Defending Science — Within Reason*: *Between Scientism and Cynicism,* by Susan Haack.** Amherst, NY: Prometheus Books, 2003, 411 pp., $28.00.

Susan Haack's latest book promises 'a new, and hopefully a true understanding of what science is and does' (p. 9). Haack seeks to chart a middle way between what she calls the 'old deferentialism' of the logical positivists, Popperian falsificationists, and Bayesians, and the 'new cynicism' of a variety of social constructivists, irrealists, proponents of the strong programme in the sociology of science, anthropologists of science, and feminist science critics. Haack aims to present a realistic view of science, in the ordinary, non-philosophical sense of 'realistic.' Contrary to the old deferentialists, she argues that questions about the goodness of scientific evidence cannot be answered with the resources of logic and probability theory alone, that there is no such thing as *the* scientific method, and that there is room for a fruitful collaboration between epistemologists and sociologists of science. Contrary to the new cynics, she contends that science is a rational and progressive enterprise, insists that evidence can be objectively better or worse, and defends a version of scientific realism.

Haack uses the following analogy to characterize her view:

> Perhaps it's not too fanciful to think of the twin themes of Innocent Realism, in metaphysics, and Critical Common-Sensism, in epistemology, as forming the double-helical backbone of my model, intertwined around the series of conceptual base pairs … (p. 125).

The first of these two backbones, Haack's critical common-sensism, has three main components. First, she holds that truth is the goal of any empirical inquiry, including scientific inquiry. 'Genuine inquiry,' she writes, 'is a good faith effort to arrive at the truth of the matter in question, whatever the color of that truth may be' (p. 96). Later she adds that the goal of inquiry is not merely to accumulate as many truths as possible, but to arrive at 'substantial, significant, explanatory' truths. The second component of her critical common-sensism is the claim that the so-called scientific method is largely a myth of the old deferentialism. There is no such thing as *the* scientific method. She claims instead that 'scientific inquiry is continuous with everyday empirical inquiry—only more so' (p. 94). Scientific inquiry just *is* ordinary empirical investigation that is supplemented by a number of 'helps to inquiry.' These helps to inquiry evolve as scientists refine, revise, and replace their theories, and they include: (1) analogies, metaphors, models, and other helps to the imagination; (2) instruments and other technological helps to observation; (3) mathematical and statistical helps to the intellect; as well as (4) social and institutional helps that encourage the most fruitful kinds of cooperation and competition among inquirers. Haack goes to considerable length to describe these and other 'ways in which scientists have managed to extend, deepen, and strengthen ordinary everyday inquiry' (p. 98).

The third component of critical common-sensism is the theory of epistemic warrant that Haack presented at greater length and with more technical detail in her earlier book, *Evidence and Inquiry* (Oxford: Blackwell, 1993). According to that foundherentist theory, the degree to which a claim is warranted for a person at a time is partly a matter of that person's experiential evidence (i.e., partly a matter of its resting on secure foundations), and partly a matter of its relationship to other claims that the person accepts (i.e., partly a matter of coherence). In order to illustrate and motivate this view, Haack relies heavily on the analogy between conducting an empirical inquiry and working a crossword puzzle: the degree of confidence that we are

entitled to place in any given crossword entry is partly a matter of how well the entry fits the relevant clue (i.e., partly a matter of foundations), and partly a matter of how well it interlocks with other entries in the puzzle (i.e., partly a matter of coherence). Haack then shows how her own account of epistemic warrant can help to cut through some old puzzles about scientific confirmation, such as the raven paradox and the new riddle of induction. She argues that these problems resulted from the narrowly logical approach to the epistemology of science favored by the old deferentialists.

Haack is so enthusiastic about the crossword puzzle analogy, and so confident of its aptness, that she returns to it time and again, as in the following passage:

> Picture a scientist as working on part of an enormous crossword puzzle: making an informed guess about some entry, checking and double-checking its fit with the clue and already-completed intersecting entries, of those with their clues and yet other entries, weighing the likelihood that some of them might be mistaken, trying new entries in the light of this one, and so on. Much of the crossword is blank, but many entries are already completed, some in almost-indelible ink, some in regular ink, some in pencil, some heavily, some faintly. Some are in English, some in Swahili, some in Flemish … Now and then a long entry, intersecting with numerous others which intersect with numerous others, gets erased by a gang of young turks insisting that the whole of this area of the puzzle must be reworked … (pp. 93-4).

Now, Haack recognizes that this analogy has its limits. For example, she acknowledges that in science, there is nothing corresponding to the answer key to the crossword that will be published in the next day's newspaper. Nevertheless, she is right that the analogy does help us to see how science can be a rational and progressive enterprise and how there can be better or worse evidence, even though it is at the same time 'messy, fallible, and fumbling' (p. 9). And interestingly, she resists certain conclusions that the analogy might seem to support. For example, one reason why Kuhn likened normal scientific research to puzzle-solving was to suggest that scientists are not necessarily motivated by a concern for truth; instead, they are more like puzzle addicts who take pleasure in a certain sort of intellectual exercise. Haack warns us not to draw this Kuhnian conclusion from her crossword metaphor. The purpose of that metaphor, after all, is to help us

understand the nature of epistemic warrant, not the motivations of scientists.

One potential defect of Haack's work on the epistemology of science is that she never shows how her account of epistemic warrant, as illustrated by the crossword analogy, might link up with the literature on explanatory unification in science, beginning with Michael Friedman's suggestion that scientists unify the phenomena by reducing the number of them that must be taken as brute (Michael Friedman, 'Explanation and Scientific Understanding', *Journal of Philosophy* LXXI, 1974, pp. 5-19). Every so often Haack talks about explanatory integration as involving something analogous to the mutual support relations among intersecting entries in a crossword puzzle. Here she seems to rely on the crossword analogy a little too much, for she never says with any precision just what it might mean to offer an explanatory integration. What she does say is that 'explanatory integration is a pretty concept, but not easy to spell out' (p. 66). She denies that explanatory integration can be a 'narrowly logical concept,' but she offers no positive account. At one point she alludes to Paul Thagard's work on a computational approach to explanatory coherence (see especially *Coherence in Thought and Actio*n, Cambridge, MA, MIT Press, 2000). But since she never discusses the details of this work, or of the relevant work by Friedman and Philip Kitcher, she leaves us guessing as to what exactly she means by 'explanatory integration.' (Kitcher has addressed this issue in several papers, including 'Explanatory Unification', *Philosophy of Science* 48, 1981, pp. 507-537).

Haack combines the critical common-sensist view of the epistemology and methodology of science with a metaphysical view that she terms 'innocent realism.' This is the second backbone of her model. Haack, it turns out, defends realism along several dimensions: (1) she is a realist about truth; (2) she is a realist about natural kinds and laws of nature, where a real kind is taken to be a 'cluster of properties' that are 'lawfully connected independently of our classifications' (p. 132); and (3) she rejects idealist and constructivist claims to the effect that non-artifactual parts of the physical world are mind-dependent. This sounds about as realist as one can get, so why does she consider her view to be an *innocent* form of scientific realism? The answer is that she claims to be a realist about a lot of things, but not *too* realist about any of them.

> But though my realism is extensive, it is not extreme; in fact, it is very modest. Our sensory organs put us in touch with things and events in the world, but our senses are limited, imperfect, and sometimes distorted by our expectations; and there is no cleanly identifiable class of purely observational statements, or of observable things. There are real kinds; but this is only to say that some knots of properties are held together by laws. There are objective truths, and the sciences sometimes succeed in discovering some of them; but truth is not transparent, and progress is not guaranteed (p. 124).

This makes me wonder who Haack thinks the guilty realists are. She says that the problem with other forms of scientific realism is that they are guilty of 'indefensible ambition' (p. 124). But I cannot think of any leading scientific realists—Richard Boyd, Michael Devitt, Jarrett Leplin, or Stathis Psillos—who would go so far as to claim that progress in discovering objective truths is guaranteed, and those philosophers, I imagine, would look favorably on Haack's description of modest realism in the passage just quoted. Since she never says explicitly how her view differs from the views of the philosophers I just mentioned, it seems a little unfair of her to imply that they are guilty of some philosophical offense that her view does not commit. If anything, Haack seems guilty of helping herself at times to the notion of approximate truth as if such a notion were unproblematic. Other proponents of scientific realism have gone to great lengths to try to spell out that notion.

Hilary Putnam famously claimed that if realism were false, the empirical success of science would be a miracle. Haack indicates on p. 145 that the argument for realism needs to be less ambitious than this; however, the more modest argument she develops there looks a lot like the abductive arguments already spelled out in great detail by Boyd, Leplin, and Psillos. Moreover, it is difficult to tell how much stock she places in the inference to the best explanation of the success of science because she elsewhere (in Chapter 4) proposes a 'multidimensional' explanation of scientific success, not in terms of truth, but rather in terms of the helps to inquiry mentioned earlier. And interestingly, she deploys the following, apparently transcendental argument for the existence of real kinds: Scientists could neither predict nor explain particular things and events unless there were real kinds; but of course they can predict and explain, so there must be real kinds (p. 129). This argument deserves more scrutiny than I can give it here.

I mention it only to show that Haack seems to use different styles of argument to support the different theses of innocent realism.

On issue after issue in the philosophy of science, Haack attempts to defend the modest, the moderate, and the middle-of-the road view, and she almost always succeeds in showing that the moderate view is the most plausible. However, *Defending Science—Within Reason* is less modest in scope. Like her realism, perhaps, the book itself is extensive, but nowhere extreme. She covers a wide variety of topics including (in Chapter 6) the relationship between the natural and the social sciences, (in Chapter 9) questions about the role of scientific testimony in courts of law, and (in Chapter 12), the history of claims, both optimistic and pessimistic, about the end of science. This comprehensiveness, as well as the accessibility and clarity of Haack's style, make *Defending Science—Within Reason* an excellent book to use as the backbone of a philosophy of science course. Since several chapters contain thoughtful discussions of the discovery of the double-helical structure of DNA, as recounted by James Watson, *Defending Science—Within Reason* would work exceptionally well when paired with *The Double Helix* (New York: W.W. Norton, 1980).

The title of Haack's book naturally provokes one to think about who the enemies of science might be. Defending science—against whom? Haack handily defends science against a variety of people, from Bruno Latour and Steve Woolgar, to Michael Behe, a leading proponent of intelligent design theory. For the most part, she seems to want to defend science against the new cynics. Yet to my mind, one of the most important sections of the book is the one entitled 'Costs of Science, Risks of Technology' (pp. 317-324). Haack there discusses, among other things, the history of fears about recombinant DNA research (as an example of the perceived risks of technology), as well as the large amount of money spent on failed attempts to explore Mars (as an example of the costs of scientific research). Some environmentalists argue that the best way to address the risks associated with new technology is to adhere to the so-called precautionary principle, according to which it is better to take precautionary measures now, even if they are expensive, than to deal with serious harms to the environment or public health later on. The idea is that it is better to be safe than sorry. Some proponents of the precautionary principle also defend the related idea that new technologies (for example, new genetically engineered crop varieties) should be considered guilty (i.e. unsafe) until proven innocent. Critics have com-

plained that the precautionary principle is anti-scientific, and that adherence to it would stifle scientific research. Haack does not discuss the precautionary principle, and I wonder if she would agree with this criticism of it.

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