Critical Notices

Critical Scientific Realism. ILKKA NIINILUOTO. Oxford: Oxford University Press, 1999. Pp. xiv, 341.

In the wake of proclamations of the death of scientific realism, the past few years have witnessed several book-length resurrections. Like the undead, realism is proving hard to finish off once and for all. In the preface to his book, Ilkka Niiniluoto suggests that the realism debate will never generate a consensus; it is an eternal problem of philosophy. Certainly, since the flourishing of work on the subject two decades ago, it has become clear that some disputes between realists and antirealists are destined to remain unresolved due to a lack of shared assumptions. Nevertheless, there remain problems for realists to tackle if they are to demonstrate that the position is coherent.

Critical Scientific Realism is an attempt to address some of these problems. In particular, Niiniluoto is keen to apply his work of many years on the concept of truthlikeness to various ends. In the process he takes issue with instrumentalists, constructive empiricists, Kantians, pragmatists, internal realists, relativists, and social constructivists. The positive account is developed through a series of commitments: realism in ontology, semantics, epistemology, axiology, and methodology. The breadth of the book is staggering, though this does have consequences for its depth. I will give an indication of the scope of the issues touched on below. First, however, let us consider the heart of Niiniluoto's realism.

Almost all realists believe in the existence of a mind-independent reality, adopt a literal semantics for theoretical claims about this reality, and hold that some such claims constitute knowledge. The novelty of Niiniluoto's proposal resides in a conjunction of three theses. The first is a commitment to a correspondence theory of truth; the second, an account of truthlikeness and approximate truth; and third, an acceptance of ontological relativity. The first two of these theses are often cited as realist desiderata in some form or other. The third is perhaps less common. I will briefly examine Niiniluoto's understanding of these commitments in turn.

Scientific realism, it is proposed, should include the idea that 'truth is a semantical relation between language and reality' (p. 42), where reality is understood as mind-independent. The main task Niiniluoto sets himself regarding truth is to demonstrate that Tarski's account is an adequate explication of the correspondence theory. The burden of proof here falls mainly on his contention that Tarski's theory is not simply equivalent to the disquotational theory; Tarski intended something more. Understanding what Niiniluoto takes this something more to be, however, is not easy. That it is invoked to shed light on the notion of correspondence is clear, but the light it sheds is of debatable brightness. The primary evidence given for interpreting Tarski's theory as a correspondence theory is the fact that Tarski takes the object language to be an *interpreted* language: 'truth is relative to an interpretation function' (p. 61). But assuming that Tarski's theory is applicable to natural languages (or scientific fragments thereof), it is unclear how this evidence helps, for anyone who holds that a language has content can offer interpretations of well-formed sentences, including disquotationalists. Interpretation does not by itself offer an explication of what it means for words to corre-

spond to mind-independent things. One way of doing this would be to furnish a theory of reference, but as Niiniluoto notes, Tarski's theory is compatible with different views on this question.

The second major plank of the proposed realism is a formal account of truthlikeness and approximate truth. The problem with Popper's ill-fated attempts to define verisimilitude, Niiniluoto suggests, is that he lacked the concept of 'similarity'. Introducing this concept, we can think of the requisite notions figuratively in terms of the formula 'truthlikeness = truth + similarity' (p. 68). Similarity is understood as a measure of the "distance" of a hypothesis from the truth; a hypothesis is approximately true if its distance from the truth is sufficiently small. (Truthlikeness is distinguished from approximate truth in that the former but not the latter has an "informational" component, described in terms of maximizing truth and minimizing falsehood. For example, given true hypotheses h_1 and h_2, h_1 has a comparatively higher degree of truthlikeness if it says more than h_2.) A possible criticism here is that the discussion of these concepts is somewhat abstract, and certainly of limited accessibility to the non-technical reader. It would be helpful, for example, to see the concepts illustrated with an actual scientific example in order to demonstrate that the abstract calculus does the work for which it is intended. But the need for a workable notion of approximate truth is so great that such criticism seems churlish. Merely having a substantive account with which to work is a boon for the realist. So let us briefly consider its prospects.

The importance to the realist of notions like truthlikeness and approximate truth is nowhere greater than in the attempt to understand scientific change as progress. It is important to the realist to be able to describe successions of theories in various domains as (generally) getting closer to the truth. Indeed, Niiniluoto characterizes scientific progress in terms of increasing levels of truthlikeness. In order that this characterization succeed, it is essential that we be able to compare the truthlikeness of different theories in the same domain. It is not clear, however, that this sort of comparison is possible on the account proposed. Niiniluoto concedes a criticism of David Miller that on his view, truthlikeness is language relative: 'comparative judgements of verisimilitude are not invariant with respect to one-to-one translations between languages' (p.76). Niiniluoto accepts this; degrees of truthlikeness should be considered, he suggests, only relative to particular languages used in the sciences, which employ languages best suited to the problems they investigate.

One potential difficulty here stems from the fact that truthlikeness is a function of the "distance" between a hypothesis, h, and its 'target hypothesis', h*, which expresses the truth. Niiniluoto maintains that the introduction of new concepts constitutes a change in language, and thus of h* and the very problem under investigation—every change in meaning is a change in language (pp. 48-9). But the whole point of theory change, generally, is to introduce new concepts, and often to reject previous ones. On Niiniluoto's account, this entails that subsequent theories are generally formulated in different languages. How can we analyze scientific *progress* by comparing the truthlikeness of such theories, given that truthlikeness is determined relative to a target hypothesis, and the target hypotheses of these theories (not to mention the problems they investigate, whatever this means) are different? Lacking a fixed h*, comparative truthlikeness tells us little. Niiniluoto suggests that comparisons are helpful so long as there is

continuity of reference across theory change. That is, despite changes in languages, target hypotheses, and problems investigated, useful comparisons of truthlikeness are still possible so long as theoretical terms continue to refer to the same things (p. 124). Niiniluoto does provide a theory of reference, but it is unclear how doing so might help to address the apparent difficulty above.

The final core element of Niiniluoto's realism is, in my estimation, its most compelling feature. It is also a respect in which he is likely to differ from more traditional or conservative realists. *Critical Scientific Realism* promotes a form of ontological relativity: different 'conceptual frameworks' render the mind-independent world into different taxonomies of individuals, kinds, and states of affairs. 'The world does not divide itself uniquely into *natural kinds*' (p. 32); 'objects can be individuated and identified in alternative ways through different conceptual systems' (p. 205). There is only one reality, but we may employ different conceptual frameworks to describe it. This takes Niiniluoto part way along the path of Putnam's internal realism, but only part way, for contra pragmatists and internal realists, he rejects epistemic theories of truth. The invariant bedrock of realism, he suggests, are tropes, out of which we can formulate objects as mereological sums in different ways, thus resulting in different taxonomical systems. Sympathetic as I am to this, one might worry again here about the coherence of the overall package. Successive theories may well employ different conceptual frameworks, and different frameworks will employ, *ex hypothesi*, different languages. A question thus arises once again as to whether the truthlikeness of such theories can be compared in such a way as to yield an account of scientific progress.

Earlier I promised to convey a sense of the vast range of topics considered in the book. Here is a brief overview. Chapter 1 reviews innumerable distinctions concerning the realism debate, and defends Niiniluoto's approach: formal, not historical; normative, not naturalistic; philosophical, not defeatist (contra NOA). Chapter 2 reviews forms of materialism, dualism, idealism, the notion of mind-independence, realism about universals, nominalism, facts, and rejects subjective idealism. Chapter 3 concerns Tarski's model-theoretic definition of truth, the correspondence theory, truthlikeness, and approximate truth. Chapter 4 argues for fallibilistic knowledge of the world, against infallibilism and global skepticism, against Cartesian skepticism, against Kant's distinction between phenomena and noumena, and against epistemic theories of truth. Chapter 5 considers logical positivism and empiricism, instrumentalism, constructive empiricism, the semantic view of theories, theory ladenness of observation, incommensurability, reference, laws, and idealization. Chapter 6 concerns measuring and explaining scientific success, the aim of science, methodological norms, the problem of underdetermination, and scientific progress. Chapter 7 argues for ontological pluralism combined with a correspondence theory of truth. Chapter 8 rejects moral realism and defends a 'moderate cognitive relativism' about justification, but not truth or reality, and considers feminist critiques of science. Chapter 9 argues that moderately construed, sociology of science (Bloor, Barnes, Shapin) is compatible with realism, but more radical accounts (Latour, Woolgar, Knorr-Cetina) are incompatible. Finally, chapter 10 considers, from ancient times to the present, why and how realism and antirealism have been attractive to different constituencies, and ends with reflections on Feyerabend, freedom, and the 'truth-centred' social norms of science.

As one might expect of an effort of this scope, most topics receive a synoptic treatment. Indeed, with notable exceptions, the discussion is not especially detailed. The positions of many dissenting authors are outlined and dismissed summarily, and realist views are often primarily asserted rather than argued for at length. But this is no doubt the intention of the book. It is not generally deep, but systematic, and broad, and thus serves as a realist manifesto: a comprehensive inventory of many of the views that comprise what it is to be a scientific realist. This combined with the impressive extent of Niiniluoto's reading makes *Critical Scientific Realism* a rich resource—a reference textbook of realist commitment. Such a resource may prove unsatisfying to those who seek new arguments with which to advance realism and respond to antirealist skepticism. Others, though, content with the thought that realism is a perennial problem of philosophy, will take pleasure in this attempt to furnish a unified account of scientific achievement.

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How Things Persist. KATHERINE HAWLEY. Oxford: Clarendon Press, 2001. Pp. ix, 221.

There sits my trusty coffee mug. Just like yesterday, only a bit grungier. So how does it persist through time and change? Is it wholly present at every moment during which it exists, as the friends of endurance think? Or is it a four-dimensional space-time worm that has different parts at different times, as the friends of perdurance think? Or is it instead a momentary object related in various to-be-spelled-out ways to other momentary objects existing at other times? In *How Things Persist*, Katherine Hawley follows Theodore Sider (1996, 2001) in defending the third of these three views.

In the first two chapters, Hawley characterizes the three views more precisely than I just did. Consider the following two claims:

i) objects exist at more than one moment,

ii) statements about what parts objects have must be made relative to a time.

Hawley characterizes endurantism as the view that both (i) and (ii) are true (27), perdurantism as the view that (i) is true but (ii) is false (27-30), and stage theory as the view that (i) is false and "something close to" (ii) is true (45-46). One thing to notice right away is that because only stage theorists deny (i), her characterizations appear to entail that all presentists must be stage theorists.[1] Perhaps that is true, but the one paragraph Hawley devotes to presentism isn't enough to convince me of it. Another thing to notice right away is Hawley's (correct) claim that the stage theorist can deny (ii) itself. It is worth emphasizing the reason for this.

The reason is that the stage theorist can believe in and talk atemporally about the very same extended four-dimensional space-time worms that the perdurantist

[1] Of course, both presentists and stage theorists accept tensed claims like 'my coffee mug will exist tomorrow'. Hawley clearly is reading (i) so that its denial is compatible with such claims.