



REVIEW: Bas van Fraassen, *Scientific Representation: Paradoxes of Perspective*

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BOOK REVIEWS

Bas van Fraassen. *Scientific Representation: Paradoxes of Perspective*. 408 pp. Oxford: Oxford University Press, 2008.*

Curtis Forbes[†]

Readers of Bas van Fraassen's previous work will find his newest book, *Scientific Representation: Paradoxes of Perspective* (2008), packed with many familiar theses, albeit defended in interesting new ways. They will also find many new themes and theses discussed in this book, outlined with clarity and defended with philosophical insight. Those interested in the debate between scientific realists and anti-realists, in particular, will find this a more satisfying sequel to his first book, *The Scientific Image* (1980), than any of his subsequent work.

To defend his anti-realist philosophy of science, van Fraassen invents and employs several new terms, concepts, paradoxes, problems, and distinctions; I have no doubt that their names will soon find a permanent place in the common technical parlance of professional philosophers of science. One such contribution is the development of two complementary yet incompatible views of measurement and theory. The view "from within" looks at measurement procedures in the historical process of development, as they co-evolve with the theory that describes them. Looking at measurement from within allows us to understand how abstract pieces of mathematics (i.e., scientific models) gain empirical significance, by becoming coordinated with concrete physical objects. In contrast, the view "from above" looks at measurement procedures as they are portrayed in an accepted scientific theory—as physical processes. Looking at measurement from above allows us to understand measurements as at once physical processes and representations. This, in turn, helps us understand how, relative to a given theory, certain sorts of scientific instruments can gather information about their target systems through the right sorts of physical processes.

There is also an interesting anti-realist account of scientific experiments as "engines of creation" given in this book, which contrasts with the realist account of experiments as "windows into another world." Whereas realists

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often portray scientific experiments as allowing us to discover things about an unobservable world that was previously hidden from our eyes, van Fraassen, inspired by some work by Nancy Cartwright (1999) and Ian Hacking (1983), gives an equally adequate but metaphysically minimalistic account of scientific experiments as simply creating new phenomena that our scientific theories must then be held accountable to.

This anti-realist account of experiments will no doubt revitalize the realism debate on its own, but for those interested in *Scientific Representation* from a realist perspective, there is nothing more important than van Fraassen's new tripartite distinction between "appearances," "phenomena," and "theory/reality." The main anti-realist claim of this book is drawn directly from *The Scientific Image*. Here, as before, van Fraassen defends the claim that the aim of science is the production of *empirically adequate* theories or models, where a model is empirically adequate just when it accurately represents the observable phenomena. Scientific realists, by contrast, claim that science aims for something more than mere empirical adequacy, such as the accurate representation of unobservable reality. It is by distinguishing appearances from phenomena, as he previously did not do, that van Fraassen is able to clarify previous ambiguities in his all-important notion of empirical adequacy. Many readers will remember how fundamental this concept is in van Fraassen's previous work, and will be happy to see that it is outlined here in greater detail.

With a more precise notion of empirical adequacy in hand, van Fraassen is able to specify his anti-realist philosophy of science in new and elaborate ways, which is surely the main purpose of this book. This specification is only possible once he has spent the bulk of the book developing a variety of new conceptual tools for thinking about representation, measurement, perspective, structure, and a variety of other hot topics in the philosophy of science. Despite the important connections that *Scientific Representation* has with his previous work, the discussion of these new subjects could easily lead one to become intellectually engrossed in this book without first reading any of van Fraassen's previous writing.

Having some new tools and terminology goes a long way for van Fraassen, and after 250 pages of set-up, he does not disappoint his main philosophical opponent, the metaphysical scientific realist, when he presents an interesting new argument against scientific realism. What is most reinvigorating about this new argument, and the rest of the book, is that it promises to disturb the apparent stalemate that had developed between van Fraassen and some scientific realists (e.g., Chakravartty 2007): here van Fraassen argues that the realist's beliefs about the aim of science are actually *untenable*, given the scientific adequacy of an

empiricist version of quantum mechanics. Simply put, since quantum mechanics is an acceptable scientific theory, realism is an unacceptable philosophy of science. This is quite a challenge, one that scientific realists will no doubt enjoy facing head on in the inevitable commentary that will soon follow this book.

Van Fraassen has recanted some of his claims from *The Scientific Image*, and deemphasized some of the themes found in his most recent book, *The Empirical Stance* (2002), but this represents maturation in his thought, rather than any substantial concession to his many philosophical opponents. Many of his previous books, upon publication, changed the tenor of the realism debate almost immediately, and *Scientific Representation* will surely do the same. It is obviously of interest to scientific realists who wish to engage in continued debate with van Fraassen, but it will also prove interesting and useful to philosophers of science working in other areas, especially those interested in structuralism, perspectivism, measurement, and representation. I have no doubt that, over the next thirty years, philosophers of science will commonly be distinguishing “appearances” from “phenomena,” and speaking “from above” and “from within”; many of them will probably be treasuring well-worn copies of this book, as well. *Scientific Representation: Paradoxes of Perspective* promises to be required reading for the next generation of philosophers of science.

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REFERENCES

- Cartwright, Nancy. 1999. *The Dappled World: A Study of the Boundaries of Science*. Cambridge: Cambridge University Press.
- Chakravartty, Anjan. 2007. *A Metaphysics for Scientific Realism: Knowing the Unobservable*. Cambridge: Cambridge University Press.
- Hacking, Ian. 1983. *Representing and Intervening: Introductory Topics in the Philosophy of Natural Science*. Cambridge: Cambridge University Press.
- van Fraassen, Bas C. 1980. *The Scientific Image*. Oxford: Clarendon Press.
- van Fraassen, Bas C. 2002. *The Empirical Stance*. New Haven: Yale University Press.
- van Fraassen, Bas. 2008. *Scientific Representation: Paradoxes of Perspective*. Oxford: Oxford University Press.