Realist and Anti-Realist Approaches in Philosophy of Science: Perspective and Representational Pluralism in Scientific Discovery

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Table of Contents

Abstract

This work traces a thread from what might be called a standard account of scientific realism and anti-realism, through Bas van Fraassen's influential alternative anti-realist accounts of his *constructive empiricism* and later *empiricist structuralism*, expressed in his writings that have stimulated vigorous and extended reactions over many years. Via an examination of *structural realism*, the thread has lead me away from the focus on microphysics, so prevalent in much of the writing in this debate, to a consideration of the problem of complexity in the special sciences, a response from the point of view of biology in particular, where I assert that the complexity of this discipline is incompatible with the idea that biological representation can be usefully mathematized, up to isomorphic description, one of the central tenets of van Fraassen's structuralist thesis. I argue that understanding scientific models only in terms of mathematical structures is too restrictive and is inappropriate for understanding the diverse phenomenal models prevalent in biology. I discuss alternative, less constrained, more pluralistic ways of matching representation to the world, and separately consider the difficulties of dealing with the 'disorder of nature' including the problem of definition of natural kinds, and the associated implications for realism, ending with the question 'realism about what?' I conclude with a tentative advocacy for a moderate, perspectival, epistemic realism, similar to Giere's constructive realism or a species of entity realism, consonant with Paul Churchland's suggestion that our best grasp on the real resides in the representations provided by our best scientific theories.

Thesis Declaration

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