

# The World of Science

Peter Lipton

Nobody thinks current science is the complete truth; nobody thinks current science is just a story unconstrained by evidence. But almost every intermediate position has its supporters.

Many philosophers of science think that although the whole truth and nothing but the truth is an asymptote, science is producing objective and increasingly comprehensive descriptions of a largely invisible world. Other philosophers would not go this far. Some would insist that even our best scientific theories are only models, whose job it is to generate accurate predictions, not to reveal a hidden reality. Some are depressed by the graveyard of discarded theories that litter the history of science, theories that were predictively successful for a time but that we now know to be fundamentally mistaken. The claim that today's science has finally gotten on the right track may sound like whistling in the dark.

Most philosophical retreats from the full-blooded truth view take one of two forms: partial truth or constructivism. On partial truth approaches, we should believe only certain aspects of our best theories. Perhaps we should only believe what those theories say about observables, or about abstract structures, or about concrete entities. Constructivism is more subtle. Here what is to be adjusted is not how much truth we claim, but our conception of what it means to be true. Perhaps what theories in the natural sciences describe is not a world entirely independent of us, but rather a world that is partially structured by our own conception of it.

The most famous version of constructivism comes from the great 19th-century philosopher Immanuel Kant. He held that there is indeed a world of "things in themselves," but because of its radical independence from human thought, that is a world we can know nothing about. By contrast, the "phenomenal" world that science describes is a world partially constituted by us. The phenomenal world is a joint product of the things

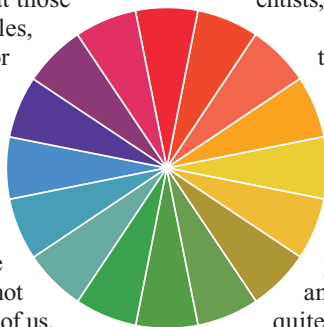
in themselves and the structuring activity of the mind. And according to Kant we bring a lot to the party. The human contribution to the phenomenal world includes space, time, and causation.

A more recent proponent of a version of constructivism is Thomas Kuhn. Like Kant, Kuhn held that the world described by science is a world partially constituted by cognition. But whereas Kant held that there is only one form the human contribution could take, Kuhn argued that the contribution changes as science changes. Kuhn is Kant on wheels.

Constructivism is not easy to understand. In what sense do scientists constitute the world they study? What is the human element in, say, baryons? Kuhn attempted to clarify his constructivism in terms of taxonomies. According to him, the things in themselves do not come predivided into natural kinds. It is the scientists who have to divide things up. Thus while talk of baryons is talk of something in the world, the category is given by scientists, not by the joints of nature.

Kant explained his constructivism differently, appealing to

**Hue circle.** There is no simple linear relationship between wavelength and color.



properties such as colors, properties that already seem anthropocentric. Colors are not quite identified with human color experiences, but they are taken to be defined in terms of those experiences. To say that the ball is red is to say that it is disposed to cause us to have red experiences. Thus colors are not in our heads (and the ball is colored even in the dark), but they are defined in terms of what goes on in our heads. Kant's claim was that all the properties that science deploys are like that.

Ronald Giere's clear and engaging book *Scientific Perspectivism* develops a version of constructivism. Like Kant, Giere (an emeritus professor of philosophy at the University of Minnesota) explains his position with colors. He points out that they cannot easily be identified with objective properties such as surface spectral reflectances because of the existence

## Scientific Perspectivism

by Ronald N. Giere

University of Chicago Press, Chicago, 2006.  
168 pp. \$30, £19.  
ISBN 9780226292120.

of metamers. Different reflectances may correspond to the same color. Color must rather be seen as the product of an interaction between surface and perceiver, and this makes colors irreducibly perspectival. Like Kant,

Giere wants to extend his picture of colors to all of science. Scientific descriptions capture only selected aspects of reality, and those aspects are not bits of the world seen as they are in themselves, but bits of the world seen from a distinctive human perspective.

In addition to the color example, Giere articulates his perspectivism by appeal to maps and to his own earlier and influential work on scientific models. Maps represent the world, but the representations they provide are conventional, affected by interest, and never fully accurate or complete. Similarly, scientific models are idealized structures that represent the world from particular and limited points of view. According to Giere, what goes for colors, maps, and models goes generally: science is perspectival through and through.

Constructivists deny the "view from nowhere." Science can only describe the world from a human perspective. Objectivists claim that, on the contrary, there is such a view. You can't think without thinking, but it does not follow that what you are thinking about—baryons, say—must somehow include the thinker. Objectivists hold on to the idea that the world has its own structure, which science reveals.

Giere's book makes a serious case for constructivism, but those with strong objectivist inclinations will not be moved. For one thing, in spite of his best efforts and the excellent philosophical company he keeps, the constructivist position remains somewhat obscure. The notion of a physical world that emerges from the interaction of the objective and the subjective is difficult to grasp, even if you are a philosopher. And although Giere's arguments for constructivism are serious and provocative, they have uncertain force. Scientific descriptions surely are incomplete and affected by interest, but these are features the objectivist can take on board. Completeness and objectivity are orthogonal. Maybe in the end constructivism is true, or as true as a constructivist can consistently allow. Nevertheless, the thought that the world has determinate objective structures is almost irresistible, and Giere has not ruled out the optimistic view that science is telling us something about them.

The reviewer is in the Department of History and Philosophy of Science, Cambridge University, Free School Lane, Cambridge CB2 3RH, UK. E-mail: Peter.Lipton@kings.cam.ac.uk