

REVIEW

Paul Horwich (ed.)

World Changes: Thomas Kuhn and the Nature of Science

MIT Press, Cambridge, MA, 1993, pp. 356, £40.50

Paul Hoyningen-Huene

Reconstructing Scientific Revolutions:

Thomas S. Kuhn's Philosophy of Science

Chicago University Press, Chicago, 1993, (trans. A. Levin),
pp. xx + 310, £30.50/\$43.75 cloth, £12.75/\$18.25 paper

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Almost three-quarters of a million people all over the world have bought (and probably read) T. S. Kuhn's *The Structure of Scientific Revolutions*. Kuhn's innocent-looking publication in the positivists' *Encyclopedia of Unified Science*, thirty-two years ago, was bound to cause a great stir among the prevalent philosophical views of science and historiographical techniques. Kuhn's account of the dynamic of scientific growth—paradigm → normal science → puzzle-solving → anomaly → crisis → extraordinary science → revolution → normal science—became widely known as the last nail in the coffin of the positivist conception of science and the turning point in the subsequent demise of Popperianism.

Philosophers of the most divergent persuasions have taken pains to spell out the commitments of and eventually repudiate the emergent Kuhnian image of science. The most standard line of philosophical critique involved the charges of irrationalism and relativism. Kuhn's philosophy—generations of students have been told—deprives science of its distinctive rational gown; it renders theory-change a totally irrational act of group-conversion; each paradigm creates its own world; prevailing paradigms are abandoned in favour of other incommensurable ones through gestalt-switch-like transition—pretty much like what happened to Saul when he converted to Christianity (Saint Paul) after a sudden vision.

Not that this is a totally unjustified, mythical, or fictitious, summary of Kuhn's views. In fact, we all know that lots of passages in *The Structure*—

as well as its overall spirit—lend themselves to this interpretation. The oft-quoted ‘The proponents of competing paradigms practice their trades in different worlds . . . Practising in different worlds, the two groups of scientists see different things when they look from the same point of view in the same direction’ is just one among the many relevant testimonies. But Kuhn himself has persistently denied the relativist or irrationalist views that are often attributed to him. Moreover, his own views on scientific development have evolved considerably since he first set off with *The Structure*. Where do things stand now? What are the views that Kuhn really held thirty-two years ago? How have these views evolved and what does he believe now?

These are the questions that the two magnificent books under review set out to explore and answer. Paul Hoyningen-Huene’s *Reconstructing Scientific Revolutions* has performed a rather admirable task, which—as noted in Kuhn’s introduction to the book—has found Kuhn’s own approval. Hoyningen-Huene has investigated all the bits and pieces that Kuhn has published and communicated before and after *The Structure* until the present and has produced a definitive critical exposition of Kuhn’s views. Hoyningen-Huene’s main achievement is an excellent narrative of the evolution of Kuhn’s thought. This book will enable Kuhn’s latest views to become better known and the shifts in his position to be appreciated.

Hoyningen-Huene begins by exploring the philosophical presuppositions of Kuhn’s views on science. This is a task that Kuhn himself has never systematically performed. The point that Hoyningen-Huene presses in the first half of the book is that Kuhn’s underlying philosophy is relativized neo-Kantianism. It is neo-Kantianism because Kuhn sharply distinguishes between the *world-in-itself*, which is epistemically inaccessible to cognizers, and the *phenomenal world*, which is constituted by the cognizers’ paradigm and is within their epistemic reach. But Kuhn’s philosophy is *relativized* neo-Kantianism, because, unlike Kant, Kuhn posits a *plurality of phenomenal worlds* each being dependent on, and in fact constituted by, some community’s conceptual scheme.

Hoyningen-Huene goes on to question the very foundations of Kuhn’s favourite philosophical framework. His major points are two. On the one hand, Kuhn’s recourse to a world-in-itself (even in its post-1969 formulation as a world of purely object-sided stimuli) is rather a *deus ex machina*, its purpose being to ward off a form of idealism, or better a rather repugnant social solipsism that allows no possibility of two different communities sharing the same phenomenal world. On the other hand, any attempt to *characterize* this object-sided world-in-itself—an attempt which, as Hoyningen-Huene ably shows, is indispensable in avoiding

social solipsism—is radically at odds with Kuhn’s central epistemic thesis that no phenomenal world has any sort of privilege over any other (pp. 42–60). To be sure, as Hoyningen-Huene rather nicely points out, the Kuhnian world-in-itself enters the stage as a source of possible resistances (pp. 48 and 269). These resistances appear mostly as persistent *anomalies* which show that, somehow, the prevailing paradigm has had its day. The presence of resistances suggests that nature cannot be forced to fit in any arbitrary conceptual scheme; hence, there is a sense in which nature is independent of conceptual schemes. But, surprisingly enough, Kuhn comes to a point where he wants to dispense with even this anaemic world-in-itself (cf. p. 60). And then even the sympathetic Hoyningen-Huene expresses his anxiety as to whether Kuhn ‘avoids the solipsistic pitfalls of this position ...’ (p. 60).

The other general issue that *Reconstructing Scientific Revolutions* explores is Kuhn’s views on meaning and concept acquisition in science. The prime semantic message of *The Structure* is that scientific concepts are not learned through grasping necessary and sufficient conditions for their application in empirical situations. But, as Hoyningen-Huene makes vivid, *The Structure* has no articulate theory of meaning. In his later research Kuhn advanced a theory of concept acquisition that rests on grasping networks of similarity and dissimilarity relations (pp. 90–110). I personally think that Hoyningen-Huene’s discussion of these issues in Chapter 3 is probably the most valuable portion of *Reconstructing Scientific Revolutions*. Kuhn’s recent views—as explicated further by Hoyningen-Huene—give a far-reaching account of concept formation in science.

Kuhn’s initial vague term ‘paradigm’ has now been replaced by the sharper terms ‘lexicon’ and ‘lexical structure’. A lexicon is ‘the module in which members of a speech community store the community’s kind-terms’ (Kuhn’s ‘Afterwords’ in *World Changes*, p. 315). The lexicon is constitutive of a phenomenal world in the sense that it creates a taxonomy of kinds corresponding to the concepts available to the speech community living in this phenomenal world. Then, Kuhn says, trans-world traffic is often forbidden when the different communities have different lexical structures that cannot be mapped upon one another. This is, currently, the essence of the incommensurability thesis—which is now also milder than it used to be in that it allows *comparison* between theories and it renders untranslatability between different lexical structures *local* rather than *global*. Hoyningen-Huene (pp. 206–22) gives an excellent exposition of Kuhn’s latest views on incommensurability and attempts to spell out what the incommensurability thesis implies and what it does not.

While *Reconstructing Scientific Revolutions* puts an order to Kuhn’s philosophy, *World Changes* sets Kuhn’s philosophy in a broader philoso-

philical perspective and attempts to appraise his views with respect to a broad array of philosophical issues. *World Changes*, based on a conference held at the Massachusetts Institute of Technology in 1990, is a splendid volume with some state-of-the art philosophical and historical pieces.

The issues raised in *World Changes* range from John Earman's systematic comparison between Kuhn and Carnap—pointing to neglected similarities and overstated differences between the two philosophers—to Ernan McMullin's defence of truth and rationality in science and to Micheal Friedman's innovative paper showing how the development of modern philosophical thought has been largely the product of philosophers' sensitive response to advancements in science. In an attempt to take a glance ahead, Ian Hacking defends a nominalist interpretation of Kuhn's plurality-of-worlds thesis and Nancy Cartwright explores Kuhn's views on concept-acquisition, which she embeds in her view of models as concretisations of abstract physical concepts. The collection also includes a keynote introduction by Horwich, and a moving appraisal by Carl Hempel. *World Changes* incorporates four significant historical papers by J. L. Heilborn, Noel Swerdlow, Jed Buchwald, and Norton Wise, all of which hinge on Kuhn's latest views on lexical structures and concept-formation. It concludes with splendid afterwords by Kuhn himself, where, apart from an appraisal of his own philosophical development, it comprises also his latest views on the dynamics of scientific growth.

All in all, we are presented with two excellent books that push ahead the philosophical frontiers and do justice to the complex and evolving thought of one of the most influential and controversial philosophers of science of this century. I highly recommend them both.