
The work of Thomas S. Kuhn has exerted a profound and enduring influence on historical, philosophical and social studies of science in the latter part of the twentieth century. The nature of this influence was presaged by Kuhn himself in the opening lines of his major work, *The Structure of Scientific Revolutions* (2nd ed., 1970). Kuhn claimed that granting an enhanced role to history in our thinking about science might lead to a 'decisive transformation in the image of science by which we are now possessed' (Kuhn, 1970, p. 1). This prediction has proved correct. Granting such a role to history has led to challenges to traditional philosophical ideas about the nature and methodology of science, stimulated reflection on the historiography of science and promoted sociological analysis of epistemic aspects of science.

There is a massive literature relating to Kuhn. Yet until now no monographic treatment has been devoted solely to the philosophical aspects of Kuhn's account of science. *Reconstructing Scientific Revolutions* remedies this situation by providing an extremely detailed and impressively
documented scholarly examination of Kuhn’s philosophy of science. Since The Structure of Scientific Revolutions contains the fullest development of Kuhn’s views, it tends to be the focal point of Hoyningen-Huene’s discussion. However, Hoyningen-Huene goes to great lengths to document modifications of Kuhn’s position which were introduced prior to Structure as well as in subsequent publications. He covers a wide range of Kuhnian themes, and takes the analysis of several such themes to unprecedented depths. The book, which was originally written in German, contains numerous references to German philosophers of science, and brings a European orientation to bear on Kuhn which makes for novel treatment of a number of key issues.

One of these involves the emphasis which Hoyningen-Huene places on Kuhn’s metaphysical perspective. In describing the nature of scientific revolutions, Kuhn spoke rather extravagantly of the world changing in the transition between paradigms, ‘as if the professional community had been suddenly transported to another planet’ (Kuhn, 1970, p. 111). Such turns of phrase suggested an idealistic rejection of a reality independent of human thought. However, Hoyningen-Huene argues (pp. 32-33) that Kuhn was in fact operating with a distinction between the invariant world-in-itself and the phenomenal world of the scientist, which is subject to variation. This metaphysical divide between appearance and reality corresponds to an epistemological divide between the knowable and the unknowable, which is reminiscent of Kant. Hoyningen-Huene proposes a very plausible interpretation of Kuhn, according to which scientists’ epistemic access is restricted to the phenomenal world and does not extend beyond the phenomena to the world-in-itself (pp. 34-35, 239, 270-271).

There is, however, an air of paradox about the idea that one might know, of whatever lies beyond the appearances, that one can know nothing of it, which Hoyningen-Huene does little to dispel.

In later work, Kuhn’s metaphysical position has continued to develop, and Hoyningen-Huene traces out a number of the changes which Kuhn has made. These range from an attempt to cast the world-change idea in terms of a distinction between objective ‘stimuli’ and subjectively variant ‘sensations’ (pp. 42-60), to Kuhn’s later thoughts of doing without a Kantian noumenal world altogether (p. 60) (an option recently rejected by Kuhn, ‘The Road Since Structure’ PSA 1990, Vol. 2, 1991, p. 12). However, the idea of a historically changing phenomenal world remains crucial to Kuhn’s position throughout his work. Hoyningen-Huene discusses at length (pp. 70-111) the account of empirical concept acquisition by means of ostensibly learned similarity relations, which Kuhn developed in a series of papers in the 1970s. He argues that this account provides an analysis of how the phenomenal worlds inhabited by different scientific communities are constituted. He also shows that Kuhn’s analysis of the constitution of phenomenal worlds faces a fundamental difficulty due to the inability to transcend the phenomenal world of the analyst: owing to our confinement within a particular phenomenal world, it is mysterious how the analyst may step outside that world to develop a general account of the constitution of all such worlds (pp. 66-69, 122-130).

After spending much of the first half of the book on Kuhn’s metaphysical stance, Hoyningen-Huene turns to Kuhn’s model of scientific theory-change. The main outlines of this model are well-known: viz., initial disunified research in a field of science gives way to consensus based on a shared paradigm; research is then characterized by normal scientific puzzle-solving, which is periodically interrupted by revolutionary transitions between paradigms. Hoyningen-Huene devotes the latter half of the book to a detailed elaboration of the model, paying particular attention to changes introduced by Kuhn in work after Structure.

Important examples of such changes discussed by Hoyningen-Huene include Kuhn’s attempt to resolve ambiguity in the concept of paradigm by distinguishing between exemplar and disciplinary matrix (pp. 140-141), and Kuhn’s abandonment of universal acceptance of a single paradigm as necessary for normal science (pp. 143, 169-170). Hoyningen-Huene also provides lucid treatment of the evolution which Kuhn’s concept of incommensurability has undergone since Structure (pp. 206-218): initially, it involved differences of meaning, phenomenal world and problem-field; later, it became a strictly semantic notion related to Quinean indeterminacy; in recent formulations, incommensurability involves differences of lexical structure between theories. There is, as well, extended analysis of the role played by rational factors in Kuhn’s model of revolutionary theory-choice, which includes an interesting discussion of the bearing of Kuhn’s views on the distinction between the contexts of discovery and justification (pp. 236-252).

Hoyningen-Huene’s main aim in this book is to provide an authoritative interpretation of Kuhn, which will serve as a corrective to much of the misunderstanding with which Kuhn has met. Accordingly, Kuhn’s views on controversial topics such as rationality, relativism and incommensurability emerge as less extreme than they initially appeared to many philosophers, reacquainting us with his views in the mid-1960s. Moreover, given the close attention which Hoyningen-Huene pays to modifications which Kuhn has made since Structure, readers whose knowledge of Kuhn is based on
that work will find a significantly revised version of Kuhn's model of science carefully presented by Hoyningen-Huene.

In order to concentrate on the interpretation of Kuhn, Hoyningen-Huene chooses not to discuss the critical literature on Kuhn in any great detail. Reference to the literature is largely confined to footnotes, and to a limited number of points where discussion of other authors is needed to understand Kuhn's views. Given the widespread misunderstanding to which Kuhn's work has been subject, this procedure seems on the whole to be justified. However, the procedure has an inherent weakness which Hoyningen-Huene does not altogether avoid: narrow focus on an author in isolation from the critical literature runs the risk of failing to place due emphasis on views which the author has developed in response to the literature.

A particularly salient case in point involves the issue of meaning variance, which Hoyningen-Huene discusses in connection with Kuhn's account of concept acquisition and incommensurability. Philosophers have treated meaning variance primarily as a problem within the theory of reference, and have placed particular emphasis on application of the causal theory of reference to this problem. The causal theory is a source of serious objections to Kuhn's thesis that both the sense and the reference of scientific terms vary in theoretical change. Kuhn has responded to these objections repeatedly, and at least once has discussed the causal theory in detail, raising cogent objections to it ('Dubbing and Redubbing', in C.W. Savage (ed.) Minnesota Studies in Philosophy of Science XIV: Scientific Theories. 1990). Yet, by concentrating on Kuhn's positive views, Hoyningen-Huene fails either to address the significance of the causal theory for meaning variance or to evaluate Kuhn's response to the causal theory. His interpretation therefore fails to address at least one significant aspect of Kuhn's philosophy of science.

The book has an immense number of footnotes, which provide references to the numerous relevant comments made by Kuhn scattered throughout his writings. There is a complete bibliography of Kuhn's published work, and an extensive list of secondary sources. Kuhn has himself written the Foreword, and says that 'No one, myself included, speaks with as much authority about the nature and development of my ideas' (p. xi). One could hardly ask for a better recommendation than that.

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