

K. Brad Wray, ed. *Interpreting Kuhn: Critical Essays*. Cambridge: Cambridge University Press, 2021. Pp. xv+267. US\$99.99 (hardback). ISBN 978-1-108-49829-6.

Thomas S. Kuhn is best-known for *The Structure of Scientific Revolutions*, originally published in 1962, in which he proposed his influential model of scientific change. However, contemporary Kuhn scholarship no longer focuses exclusively on *Structure*. Kuhn continued to develop the details of his approach to science for more than thirty years following its original publication. It is now widely recognized that Kuhn's later work contains significant refinements of the ideas initially proposed in *Structure*. But it is not just that contemporary Kuhn scholarship is informed by the later development of Kuhn's ideas. It is also increasingly informed by an awareness of the earlier development of Kuhn's thought prior to the original publication of *Structure*. This is not just a matter of considering Kuhn's publications prior to *Structure*. It is also a matter of access to significant archival materials, including Kuhn's course notes, unpublished lectures, and correspondence.

The present volume is a contribution to contemporary Kuhn scholarship in the sense just described. The editor, Brad Wray, has assembled a dozen papers which represent various aspects of contemporary scholarly approaches to Kuhn. The volume opens with an introductory essay by Wray, which offers general remarks about the state of Kuhn scholarship and introduces the subject matter of the papers contained in the volume. The volume is divided into three parts. I follow this organizational structure in summarizing the contents of the volume before offering critical commentary.

The first part of the volume is entitled 'Foundational Issues'. It opens with a paper by Paul Hoyningen-Huene, which presents a genealogical analysis of Kuhn's metaphysics. Hoyningen-Huene traces Kuhn's idealist-tending metaphysics back, by way of twentieth century physics, Kant, primary and secondary qualities to "the fundamentally disruptive insight of Copernicanism ... that real, objective, causally efficacious phenomena that *appear* to be purely object-sided *are not* necessarily purely object-sided, because they may contain genetically subject-sided components" (p. 14). A somewhat different genealogy emerges in the next chapter by Lydia Patton. Patton points to the influence of philosophers who were on the scene at Harvard during Kuhn's student years, such as C. I. Lewis and Raphael Demos, among others. She also emphasizes Kuhn's reading of the psychologist Jean Piaget on concept acquisition in children. In his contribution, George Reisch contrasts Kuhn's apolitical conception of science with the engaged approach of James Bryant Conant, who gave Kuhn's career its start by inviting him to teach in the Harvard general education program. Where Conant advocated a positive role for science in a democratic society, Kuhn understood normal science to operate in isolation from external influences. In the final piece in the section, J. C. Pinto de Oliveira considers the traditional "image of science" against which Kuhn opposed the approach presented in *Structure*. Pinto de Oliveira articulates assumptions made by logical positivism relating to cumulative progress in science, which suggest that the traditional image was shared by the positivists. He draws on early manuscripts of *Structure* to show that Kuhn had in mind a contrast with an image of art as non-cumulative, a contrast which Kuhn sought to dispel with the alternative image of science that he presented.

The second part of the volume is 'Three Core Concepts'. William Goodwin provides a detailed analysis of normal science and puzzle-solving, taking off from Kuhn's claim that normal science consists in large part of "mop-up work". Kuhn's idea of extraordinary or revolutionary science has often captured attention. Goodwin argues that for Kuhn science must be understood in "two-point perspective", which involves both extraordinary and normal phases of scientific research (p. 103). William J. Devlin makes standard distinctions between forms of Kuhnian incommensurability and develops interesting implications of incommensurability with respect to the correspondence theory of truth. He brings Kuhn's later

thinking about lexicons and local incommensurability into fruitful contact with a distinction made by Merrill and Jaakko Hintikka between language as universal medium and language as calculus. In his contribution, Eric Scerri focuses on a suggestion by Brad Wray that the shift from identifying chemical elements by atomic weight to identifying them by atomic number constituted a classic Kuhnian revolution. Scerri casts doubt on whether this shift conforms to Kuhn's characterization of a revolution either as originally presented in *Structure* or as Kuhn later presented it in terms of change in lexical structure and the no-overlap principle.

The third part is 'Kuhnian Themes'. In a fascinating historical study, Peter Barker shows how more recent scholarship, especially on Islamic astronomy, reveals a very different picture from Kuhn's view of the Copernican revolution. Barker ultimately concludes that, Copernicus's work was not in fact revolutionary, though it did inaugurate a crisis which, only after Newton, gave rise to a new paradigm. For her part, Vasso Kindi addresses Kuhn's use of Wittgenstein's duck-rabbit image. On the one hand, Kuhn uses the image to characterize the way in which scientists perceive the world through the lens of the paradigm within which they operate. On the other hand, he used the image to get across the way in which a scientist's shift between paradigms involves a holistic alteration of their entire theoretical outlook. In his contribution, Thomas Nickles turns to Kuhn's treatment of scientific discovery. Kuhn proposed an "endogenous" account of discovery as stemming from the processes of normal scientific puzzle-solving activity. But, Nickles argues, Kuhn fails to fully "endogenize" discovery, since he is unable to provide an account of the origin of the "founding exemplars" (p. 191) that form the basis of the new normal science that emerges after a revolution. Jouni-Matti Kuukkanen considers Kuhn's evolutionary conception of scientific development. Kuhn rejects the idea that the progress of science consists in convergence on the one true theory of the world in favour of an evolutionary conception of progress as movement away from a primitive starting-point. Because of the way in which Kuhn sees science and the world as co-evolving, Kuukkanen argues, a standard realist conception of truth as correspondence to a fixed reality must be rejected within a Kuhnian framework. Finally, in the last chapter of the volume, the editor himself, Brad Wray explores the opposition between monism and pluralism in relation to Kuhn's view of science. Kuhn emphasized the role of basic consensus on paradigm for the proper functioning of normal science. Such a monistic view of normal science is in tension with a recent tendency in the history and philosophy of science to emphasize the plurality of scientific practices. Wray seeks to reconcile monistic elements of Kuhn's view with the idea that science is characterized by a plurality of "systems of practices" (p. 227).

I turn now from summary to appraisal. There is much that is good about this volume, as well as a worry. To accentuate the positive, I begin with the good. The essays in this volume are a clear demonstration of the maturity of the scholarship that is now characteristic of what might be called "Kuhn studies". The essays are grounded in a thorough and sophisticated understanding of Kuhn. Considerable care has been invested in detailed articulation and analysis of a range of themes that emerge in Kuhn's work. The level at which the volume is pitched makes it unsuited for a reader with no prior knowledge of Kuhn. But the essays are so well-written and presented that the generalist reader with basic familiarity with Kuhn may benefit from study of the volume. The specialist reader will find much that is of interest, though perhaps little that breaks genuinely new ground.

As for the worry, I note that the sub-title of the volume is "Critical Essays". But criticism of Kuhn is just what is lacking. There is, of course, passing reference to early critics, such as Popper, Scheffler and Shapere. There is, as well, detailed discussion that might be described as "internal critique". An example is Nickles' point that Kuhn's account of discovery fails to be fully endogenous due to the origin of exemplars. Another example is Scerri's objection to Wray's Kuhnian treatment of the shift from atomic weight to number. But there is a sense that the contributors to the present volume, for the most part, take the critics of Kuhn

to have been satisfactorily answered in previous literature. They may now be set aside and safely ignored. Incommensurability is real. Correspondence truth is not. Idealism is post-Copernican. Realism is pre-Copernican. To put a positive spin on this, one might say that the area of Kuhn studies has matured into normal science that concentrates on puzzles without the distraction of debate over fundamentals. The worry is that it is more akin to a cult. Kuhn-devotees ignore past criticism and press ahead with the study of their founding figure. Charity suggests we adopt the positive spin. In less charitable moments, the worry remains. As with Wittgenstein's duck-rabbit, the book may be seen in two opposing ways – but not at the same time.