

Vasso Kindi and Theodore Arabatzis, eds.

Kuhn's The Structure of Scientific Revolutions Revisited.

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The book is a collection of eleven essays. Apart from the introduction, the essays come from a conference on Kuhn. I take the essays to fall into two main categories, the orthodox and the revisionist. The orthodox category breaks into three sub-categories: 1) the historical, describing how Kuhn adapted his original ideas to the variety of responses they invoked; 2) the scholastic, which is involved in making fine distinctions not made by Kuhn in his own writings; and 3) the pragmatic, which seeks to find an application not made by Kuhn in his own writings. The second main category, the revisionist, also breaks into three sub-categories: these essays seek to recast 1) Kuhn as a Wittgensteinian; 2) Kuhn as an evolutionary epistemologist; and 3) Kuhn as a combination of social historian and developmental psychologist.

I cannot go over all eleven essays in the space of a short review. But the essays I do review are paradigmatic of the categories and sub-categories outlined above.

The historical approach has the advantage of hindsight – something that Kuhn, as everyone, lacks while the work is in production. The release of Kuhn's *Structure of Scientific Revolutions* (*SSR*) was the object of exhaustive criticism. The introductory essay by the editors notes this but tends to dismiss the criticism: "the book's philosophical reception was shaped, for the most part, by the debates and climate in philosophy of science in the 1960s and 1970s. It was heavily criticized for not meeting the standards of the then-dominant view: it was found to be rather vague, inconsistent, not technical enough, philosophically naïve, and open to charges of promoting relativism and irrationalism, always by the yardstick of a philosophy which was itself one of the targets of the book's author." (3)

A paradigmatic essay in the historical sub-category of what I call the orthodox approach is by James A. Marcum and carries the title "From Paradigm to Disciplinary and Exemplar." Marcum declares that "Kuhn took his critics seriously, realizing the importance of defending the demarcation between normal and revolutionary science... Without an adequate defense of normal science, particularly in terms of a robust notion of paradigm, revolutionary or Popperian critical science becomes the standard for developing normative notions of science." (42) Marcum talks at length about the attempted hatchet job of Kuhn at a 1965 London conference, only three years after the release of *SSR*, whose results were published by Lakatos and Musgrave in 1970. Marcum fails to mention Feyerabend's tongue-in-cheek caricature of Kuhn's normal scientist as a safe-cracker. But, according to Marcum, Kuhn was most impressed with Masterman's famous analysis of "paradigm" as having a constellation of meanings, a "paradigm taxonomy" (46). Kuhn responded to Masterman in a 1967 lecture. This lecture focused on scientific communities as the locus of paradigms, and the exemplar and the disciplinary matrix as the core meaning of paradigm. In a conference in 1969, Kuhn again tackled the Masterman criticism by looking at paradigms as exemplars and disciplinary matrices in terms of symbolic structures.

Kuhn bases his appendix for the second 1970 edition of *SSR* on those earlier responses. According to Marcum, “Kuhn believes he is on the right road not only to clarifying more precisely the notion of paradigm but also to defending the notion of normal science and the demarcation between normal and revolutionary science; however, he is not there yet. He spends the rest of his professional career trying to complete the project, especially as it relates to the notion of incommensurability, but death cuts him off before he succeeds.” (59)

For the orthodox Kuhnian, Marcum’s approach raises two questions. The first orthodox question is scholastic: what does Kuhn really mean by his key terms, such as ‘the incommensurable’ and ‘paradigm’? The second orthodox question is pragmatic: how can the Kuhnian intellectual outlook apply to fields outside the philosophy and history of science?

Hasok Chang’s essay, “Incommensurability: Revisiting the Chemical Revolution” attempts to rescue incommensurability by making fine distinctions. The point of Chang’s scholastic distinctions is to show that certain common criticisms may apply to the “semantic” version of incommensurability, but not the “methodological” version. The methodological version is the one more important to Kuhn’s programme in *SSR*. Chang uses the chemical revolution as a test case for which version works best. Chang’s argument is that those proposing the “phlogiston” paradigm and those proposing the “oxygen” paradigm actually understood one another. Their paradigms were not “semantically incommensurable”. However, their paradigms were “methodologically incommensurable”. In a sense, Chang is saying – using a strategy that parallels Kindi’s take on Kuhn’s notion of paradigm – that Kuhn himself didn’t quite grasp what Kuhn should have meant by the notion of incommensurability. “Perhaps it is understandable that Kuhn himself maintained a focus on semantic incommensurability... But I would argue that semantic incommensurability is generally more of a problem for the historians looking back than it is for the scientific actors at the time of theory change... The vexation of undetermined theory choice came not from shifts in meaning and reference, but from a lack of agreement on how to evaluate the merits of the competing paradigms due to the lack of shared standards of judgment – that is to say, due to methodological incommensurability” (171). Kuhn’s theoretical edifice is saved by attributing a meaning to the cornerstone concept of incommensurability that Kuhn’s critics (and Kuhn himself in his later works) may not have fully appreciated, but which is nonetheless thought to be in the *Urtext* that *SSR* has become for Kuhnians. “[M]y closing call is ‘back to *Structure*’”, Chang concludes, “back to the engagement with methodological incommensurability, which Kuhn started so startlingly and productively in *SSR*.” (171)

The pragmatic approach of the essay by Alan Richardson, “The Structure of Philosophical History: Thoughts after Kuhn”, is more subtle in its orthodoxy than what I have termed the historical and scholastic approaches. The historical approach amounts to saying that Kuhn’s approach won the day, regardless of criticisms and Kuhn’s own failings, and that winning in history is what counts. The scholastic approach amounts to saying that Kuhn’s critics misunderstand what Kuhn really meant to say (or what he should have meant) and that because of this the criticisms can be disregarded. What makes the pragmatic approach subtler is that it chooses to sidestep completely the criticisms by applying Kuhn’s outlook to a set of problems outside Kuhn’s own focus.

According to Richardson, Kuhn teaches the historian of philosophy to focus more on context and communities and less on individuals. When looking at individuals, we should focus not merely on those issues discussed by them that are similar to issues currently discussed by philosophers, but aspects of their work that might no longer be included in the current definition of philosophy as a discipline. Moreover, when looking at individual historical philosophers, historians of philosophy need to look at their biographies in terms of the cultural, social, and political influences on their lives and intellectual outlooks. According to Richardson, Kuhn teaches philosophers that, by taking the history of their discipline as seriously as Kuhn took the history of science for the philosophy of science, philosophers might change their understanding of philosophy: “How would our understanding of philosophy change if we treated philosophy as a cultural project, undertaken by actual human beings living actual human lives in cultural, political, and intellectual circumstances, circumstances that have varied greatly across the two and a half millennia of Western philosophical history?” (243) Given how Richardson argues for a Kuhnian historiography of the history of philosophy, one can ask this question: how about a Kuhnian historiography of western intellectual history? How has Kuhn influenced recent intellectual history? For instance, let intellectual historians look at Kuhn as a public intellectual, as opposed to seeing him merely as an academic historian and philosopher of science. I think, using Richardson's Kuhnian historiography, one could well examine how Kuhn's intellectual outlook has become part of the culture of business, the culture of technology, and the culture of public intellectuals and politicians.

I turn next to the anti- or at least unorthodox essays in this collection. Rather than defend Kuhn's ideas, the question here becomes how they could and perhaps should be revised.

The revisionist essay by Rupert Read and Wes Sharrock, “Kuhn's Fundamental Insight – Reflections on the ‘Social Sciences’ as a Pedagogical and Philosophical Tool for Thinking Adequately about the Natural Sciences” advocates for a total assimilation of Kuhn to Wittgenstein. More precisely, the version of Wittgenstein is the version developed by Peter Winch. Read and Sharrock's main point is that critics of Kuhn as well as of Winch distort them both by presupposing that standards of rationality somehow transcend scientific paradigms and cultures. According to Read and Sharrock, both Kuhn and Winch came to understand that standards of rationality can only occur within paradigms and cultures: both in their examination of alien communities “wanted to make the *first* question not: does what they do seem rational to us? but, instead: in what way is it rational *to them*?” (70) Read and Sharrock take this view of rationality to be derivative of the trivial idea that humans (including scientists) are primarily socially and historically situated beings whose standards of rationality only occur within paradigms and cultures. Moreover, Read and Sharrock interpret Kuhn in a Winchian way, as saying that changes in paradigms and standards of rationality are due not to the “the scientific consensus” but to the “transformation of loyalties”. (76). Read and Sharrock see the Kuhn/Wittgenstein/Winch view of social and cultural life as constitutive of standards of rationality as a truism: how we do things, how we carry out our practices – whether scientific or otherwise – is not only culturally defined and determined, but self-evidently so. Hence, Read and Sharrock have a problem trying to grasp why Kuhn's critics are so harsh with him. According to Read and Sharrock, Kuhn is merely enunciating a trivial truism. The question for Read and Sharrock is why Kuhn's critics cannot absorb this trivial truism or why they expect the ideas of science, unlike the rest of the ideas of humanity, to conform to self-standing and culturally

independent standards of rationality. Read and Sharrock propose a quasi-existentialist answer: in their eyes, Kuhn's critics suffer angst over the cultural boundedness of all humanity, including scientists. "Fear and denial of the plainest truism – that science itself is a social process, an activity undertaken by a community – lies at the root of much of the overdetermined antagonism toward Kuhn..." (81)

Revisionist approaches to Kuhn redirect criticism from Kuhn to Kuhn as Wittgensteinian in the case of Read and Sharrock, or Kuhn as an evolutionary epistemologist in the case of the essay by Thomas Nickles with the title "Some Puzzles about Kuhn's Exemplars". Nickles sets the stage for his proposal to reduce Kuhn's view to a variant of evolutionary epistemology by critiquing Kuhn's view of normal science. Nickles discusses how Kuhn's view of normal science is too static and narrow, or else uncreative. Kuhn's view of normal scientists as plodding along and limiting themselves to solving small-scale puzzles misses much of normal science. Normal scientists do make discoveries and can come up with big ideas. If so, the distinction between the stages of science in terms of "paradigm" and "normal science" is fuzzier than Kuhn thought. "At the very least he [Kuhn] has to acknowledge that major new exemplars originate within normal science as he here characterizes it." (118) Notice here that Nickles does not propose to reject Kuhn's terminology, in particular not the term "normal science": he merely wants to shift its application. Nickles reduces the concept of normal science to evolutionary epistemology: "variation, selection, and retention or transmission within a relatively steady social and intellectual environment with selection pressures." (119) Moreover, the ultimate model of Kuhn's view of science that Nickles proposes (after examining other likely candidates) similarly shifts, rather than displaces, the concept of "revolution". Here, the end result is an evolutionary approach in which "the paradigm-changing revolutions [are] within an already mature science." (126) Thus a mature science according to Nickles contains "revolutions", but the revolutions do not involve radical disruptions but incremental modifications instead: "Kuhn himself clearly remains in the Enlightenment-Modern tradition of regarding mature science as a very special and important social enterprise, one that progresses in more evident ways than any other human endeavor – including progress through revolutions." (127)

There is space to review one essay in the sub-category that combines social history and cognitive science: I have chosen the essay by Alexander Bird, "Kuhn, Naturalism, and the Social Study of Science". Bird's essay reduces Kuhn to both a cognitive scientist and a social historian. However, his essay has the broader purpose of placing Kuhn in the naturalist category. To understand science, so Bird intimates, we need to see what scientists do. Similarly, what is ultimately rational in science is also what scientists do. Though Kuhn uses a social historical account of science to describe what scientists do, Kuhn does not agree, according to Bird, with the Strong Programme in science studies. (208) According to Bird, Kuhn can consequently use the social history of science to provide an internal account of science: "even in Kuhn's account of scientific revolutions the factors that influence decisions are predominantly internal to science." (215–216) Furthermore, the supposed irrationalism in Kuhn's view of scientific change is based on taking Kuhn's social history of science as an externalist account of scientific change. Rather, Kuhn's internalist account of scientific change involves "Kuhn's innovative naturalism" (220). By "innovative naturalism" Bird refers not only to Kuhn's use of an internalist social history of science but also to his use of cognitive psychology: "science is driven by judgments of similarity to exemplary scientific solutions – paradigms-as-exemplars; an ability

to make such judgments may be learned by practice with the paradigmatic exemplars and related kinds of example... Such acquired dispositions have significant effects; they can affect one's perceptual judgments and more generally they channel one's thinking so that only puzzle solutions akin to the exemplars are likely to be spotted." (220)

Though Bird aims to provide an overall naturalist reinterpretation of Kuhn, he is careful to avoid reducing Kuhn to the externalist science studies approach to science. However, this reduction of Kuhn to "an historical-sociological element and a cognitive-psychological element" amounts to sidestepping the charge of irrationality made against the standard interpretation of Kuhn's original account (with stages of paradigm-bound science, fast paradigm shifts, and plodding normalcy). For naturalism, science as a rational endeavour is what scientists do: the rational and the actual are always identical, in science at least.

The totality of the 11 essays in this book provide a gestalt-shift in the interpretation of Kuhn. I chose to discuss a selection of those essays to stand as exemplars for the shift within the Kuhnian paradigm. The image of Kuhn is no longer one of a radical, open, intellectually honest and self-critical philosopher and historian of science. The new image of Kuhn is that of an orthodox and derivative thinker.

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