

What's forgotten about *The Structure of Scientific Revolutions*?

Jouni-Matti Kuukkanen
Professor in Philosophy, History of Sciences and Ideas
University of Oulu, Finland
jouni-matti.kuukkanen@oulu.fi

Thomas Kuhn's *The Structure of Scientific Revolutions* is a classic, and it is certainly not forgotten. However, an essential aspect about it has been neglected. That is, Kuhn's *Structure* is a book in philosophy of history in the sense that *Structure* attempts gives an account of historical events, focuses on the whole of the history of science and stipulates a structure of the history of science to explain historical events. Kuhn's book and its contribution to the debates about the progress of science and the contingency and inevitability of the history of science shows why and how philosophy of history is relevant for the history and philosophy of science. Its successful integration of historical and philosophical aspects in one account makes it worthwhile reading also for philosophers of history in the twentieth-first century. In particular, it raises the question whether the historical record can justify philosophical views and comprehensive syntheses of the past.

Key words: Thomas Kuhn, *The Structure of Scientific Revolutions*, philosophy of history, speculative philosophy of history, history and philosophy of science, global history

It would border on insensibility to suggest that Thomas Kuhn's *The Structure of Scientific Revolutions* is a *forgotten* classic. Having sold about 600 000 English-language copies, and perhaps well over a million in total,¹ Kuhn's ideas have been extremely influential cross-disciplinarily in the sciences and beyond, also societally; this text is one of the success stories of how a philosophy book can be transformative. Kuhn helped to forge philosophy of science into a new form and gave birth to the history and philosophy of science as an academic discipline. And it is *Structure* that has made 'paradigm,' 'incommensurability' and 'scientific revolution' almost household names.² Kuhn's influence is felt in that one can come across this type of Kuhnian discourse in radio programmes, on the pages of newspapers and in various other venues.

Naturally, I am not claiming that Kuhn's *Structure* is forgotten. But given that it is a classic, my point is that some significant aspects of the work have not been properly recognised. All books can be (and are) read in a new light over time, but I am talking about a very significant aspect of the book that has the potential to redefine the character of this book. In brief, I am reading *Structure* as a philosophy of history text. My claim is not that it could be but that it should be read as a formulation of a philosophy of history. To put it bluntly, Kuhn's *Structure* is first and foremost a text in philosophy of history. There are, of course, other reasons for a contemporary reader to read the opus, but in this essay text I focus on those overlooked aspects that make it relevant in theory and philosophy of history.

1. What is speculative philosophy of history?

I am primarily concerned with what used to be called speculative or substantive philosophy of history as opposed to analytical or critical philosophy of history. However, my intention is not to delve into speculative philosophy of history via speculative philosophers of history (whoever they are then) but to come up with a

¹ The sales figure of the English language copies was given by The University of Chicago Press by email. It has also been claimed that Kuhn's *Structure* had sold 1.4 million copies already by the beginning of the 2010s. Assuming that this estimate is correct, it must include copies in various languages. See [The Structure of Scientific Revolutions by Thomas S Kuhn – review | Science and nature books | The Guardian](#)

² This is not to claim that he coined these terms, as they all had been used in some subfield well before Kuhn.

plausible definition of what it is. And once that's done, I will explain how *Structure* fits it, or better, in what sense it fits it.

The terms 'critical philosophy' and 'speculative philosophy' derive from C. D. Broad.³ While the former refers to conceptual analysis and criticism of our assumed conceptions, the latter intends to provide a synthesis of the whole range of human phenomena: scientific, social, ethical, aesthetic and religious. The aim is to build on the "strong and persistent desire to see how things hang together [which] is perhaps the one characteristic common and peculiar to philosophy."⁴ The synthesis supplies concepts and principles that cover the phenomena being viewed synoptically.

The expressions 'critical philosophy of history' and 'speculative philosophy of history' were constructed on the basis of Broad's conceptions by the analytical philosophers of history in the 1950s, 1960s and 1970s but were later developed in new directions, providing them additional content.⁵ It is ironical that even when one attempts to go beyond the concept of the 'speculative philosophy of history' to the great speculative philosophers themselves, such as Kant, Herder, Hegel, Toynbee and Niebuhr, one is bound to operate with the conception of analytical philosophers. It is the analytical philosophers of history who are responsible for lumping these 'speculative philosophers' together.

While it would be fascinating to delve into the views of the analytical philosophers of history, the benefit would be limited for a number of reasons. First, there is no consensus on how speculative or substantial philosophy of history should be understood. Second, some features put forward by the analytical philosophers of history seem to be in tension. For example, Dray writes about metaphysical, empirical and religious approaches under the category of speculative philosophy of history despite their significant differences.⁶ Sometimes the 'meaning' of history refers to an attempt to find a temporal or other embedding structure for events, as in Danto's analogy between the attempts by speculative philosophy of history to explain historical phenomena and Newton's laws to explain Tycho Brahe's celestial observations and Kepler's descriptive theory.⁷ Other times it denotes something like intentionality or purposefulness of the historical process.⁸ Third, for analytical philosophers 'speculative philosophy of history' was a term of abuse, as Tucker has emphasised.⁹ This raises a possibility that the name was coined more for sociological reasons, to establish a demarcation line between one's own group and the rest, than to provide an accurate and reliable characterisation of different styles of doing philosophy of history.

To simplify a little, it can be said that the speculative philosophy of history is either large-scale empirical writing of history that goes beyond ordinary history or revelation of the teleological and purposeful plot of historical development that undergirds historical events. It is the former that I focus on here and explicitly

³ C. D. Broad, "Critical and Speculative Philosophy" in J. H. Muirhead, ed., *Contemporary Philosophy* (London: Allen & Unwin, 1924), 17–99 and C. D. Broad, "Philosophy I & II," *Inquiry* 1, no. 2.

⁴ Broad, "Philosophy I & II," 116.

⁵ E.g. W. H. Walsh, *An Introduction to Philosophy of History* (London: Hutchinson University Library, 1958), 14–15. For other accounts of the speculative philosophy of history, see William Dray, *Philosophy of History* (Englewood Cliffs, NJ: Prentice-Hall, 1964); Patrick Gardiner, "Introduction" in Gardiner, *The Philosophy of History* (Oxford: Oxford University Press, 1982); Arthur Danto, *Narration and Knowledge* (New York: Columbia University Press); Fain, Haskell, *Between Philosophy and History: The Resurrection of Speculative Philosophy of History Within the Analytic Tradition* (Princeton, N. J.: Princeton University Press, 1970).

⁶ Dray, *Philosophy of History*.

⁷ Danto, *Narration and Knowledge*, 3–4.

⁸ W. H. Walsh, for example, highlights both these aspects. See his *An Introduction to Philosophy of History*, 25–26.

⁹ Aviezer Tucker, Introduction to *A Companion to the Philosophy of History and Historiography*, edited by A. Tucker (Chichester: Wiley-Blackwell), 4; See also Fain Haskell, *Between Philosophy and History*, 231.

disregard the idea of purposefulness, plan or intentional meaning in history. This is to say that a respectable philosophy of history, even a speculative kind, exists without intentional and teleological elements. Perhaps the most useful attempt to characterise speculative philosophy of history by the writers of previous generations is Fain Haskell's. He suggested that there is no clear-cut distinction between "ordinary and philosophical history." Instead of any substantial cleavage between the two, the difference between them is a difference of form.¹⁰ All in all, I suggest that the following features create a useful actionable understanding of the speculative philosophy of history:

- (i) The speculative philosophy of history is not philosophical, in essence, but provides an account of historical phenomena;
- (ii) the scope of the speculative philosophy of history is the whole past;
- (iii) the speculative philosophy of history aims to find a pattern, coherence or a structure amongst historical events and facts.¹¹

A few explanatory notes are still in order. The first step regarding historical phenomena is to know what happened (i), after which the phenomena can be attempted to be explained. The locution 'the whole past' in (ii) should be understood in the synoptic sense as an attempt to decipher how "things hang together." It is an important specification here that 'the whole historical process' refers not to temporality, to the whole history, suggesting necessarily that future events are also covered by it, as Danto thought,¹² but to the large scope of phenomena. A totally different and oppositional approach to this is to study a very narrowly focused part of the past without any concern for its connections to other parts of the past or other historical phenomena. In the past fifty years, this kind of micro-perspective or localism has been very common.¹³ Further, it is worth emphasising that the focus on the whole of history does not, in particular, entail invariability or ahistoricism either with regard to the explanatory structures identified. If we were to discover that cultures have followed a specific pattern, say, in a Spenglerian fashion, it does not automatically mean that they will do so also in the future.

An attempt to go beyond "ordinary historical events", as in (iii), should be understood exactly as an effort to find a larger pattern or structure, and thus connections between various historical phenomena, under which perhaps seemingly unrelated historical phenomena can be embedded. The condition (iii) may both provide an explanation and entail an account of explanation itself. It is my suggestion that embedding an event under this pattern is to explain it. For example, if one were to detect that an underlying economic structure determines the course of events or that truth "pulls" science towards a preordained picture of the world, both these structural patterns would provide an explanatory framework for the events subsumed under them. In brief, the structures would explain the historical phenomena.

Next I shall discuss Kuhn's *Structure* in light of these features and argue that it is a book in the speculative philosophy of history in the sense just specified above.

2. Why *Structure* is philosophy of history

¹⁰ Haskell writes: "if Namier, for example, had opened *England in the Age of the American Revolution* by setting down some of his thoughts about history and had then written that book keeping such thoughts explicitly in mind, endeavouring whenever possible to work them into the narrative, then we would have been justified in calling the result 'The Speculative Philosophy of England in the Age of the American Revolution.'" Haskell, *Between Philosophy and History*, 231.

¹¹ While this stipulation is a "rational reconstruction" of speculative philosophy of history, it is also a learnt reconstruction on the basis of previous discussions where all these features appears. See Walsh, *An Introduction to Philosophy of History*, 26–28; Danto, *Narration and Knowledge*, 1, 3–4, 8; Dray, *Philosophy of History*, 1–3.

¹² Danto, *Narration and Knowledge*, 15–16.

¹³ See Jouni-Matti Kuukkanen, "Senses of Localism," *History of Science* 50 (2012), 477–500.

The first thing to notice is that *Structure* is a remarkably descriptive text. It is very clear that Kuhn *describes* the various stages of the scientific development of various sciences in history. For example, when he characterises the nature and function of paradigms, he writes that “similar reformulations of a paradigm have occurred in all of the sciences.”¹⁴ Or to take another case in point, Kuhn observes that “there were a number of competing schools”¹⁵ about the nature of light such as Epicurean, Aristotelian and Platonic and “that similar fundamental disagreements characterized, for example, the study of motion before Aristotle and of statics before Archimedes, the study of heat before Black, of chemistry before Boyle and Boerhaave, and of historical geology before Hutton.”¹⁶ These are overall conclusions and observations of what has happened in the past and of what any science is expected to go through (in a preparadigmatic phase in this case). *Structure* is full of similar descriptive phrases and characterisations whose function is to give an account of what happened.

Another notable point is that Kuhn often refers to historical evidence to support his views. One of the main rationales of *Structure* is to correct the old skewed (linear) image of science and its history that derives from textbooks, popularisations of science and from the philosophy of science (of logical positivism). Kuhn writes that the concept of science emerges from “*the historical record of the research activity itself*”¹⁷ and that “[f]ar more *historical evidence* is available than I have had space to exploit here.”¹⁸ For example, the notion of paradigm is formulated, perhaps discovered, through historical research: “Close *historical investigations* of a given specialty at a given time discloses a set of recurrent and quasi-standard illustrations of various theories in their conceptual, observational, and instrumental applications. These are the community’s paradigms.”¹⁹ Further, when describing what discovering is in the sciences is (Ch. VI.), Kuhn illustrates the pattern by using three robust historical cases, explaining how the discovery of oxygen, x-rays and the Leiden Jar occurred.

Kuhn also clearly spells out that he has provided “purely factual” reasons for doubting that scientists reject paradigms because of anomalies and counterinstances. Interestingly, these reasons function themselves as “counterinstances to a prevalent epistemological paradigm”, although Kuhn recognises that it does not necessarily lead to a rejection of this epistemological paradigm.²⁰ Also Kuhn’s arguably most radical statement, namely that paradigm changes are changes of the world, results, for the historian of science, from “examining *the record of past science* from the vantage of contemporary historiography.”²¹ Again, these are illustrated by historical examples, such as Herschel’s discovery of Uranus and other astronomical discoveries, the history of electricity, the case of phlogiston and oxygen in the history of chemistry, and still others. Further, Kuhn is interested in how scientific revolutions “are effected,” and the way to answer this

¹⁴ Thomas Kuhn, *The Structure of Scientific Revolutions*, 2nd enlarged ed (Chicago: The University of Chicago Press, 1970), 33.

¹⁵ Kuhn, *Structure*, 12.

¹⁶ Kuhn, *Structure*, 15.

¹⁷ Kuhn, *Structure*, 1. My emphasis.

¹⁸ Kuhn, *Structure*, ix. My emphasis.

¹⁹ Kuhn, *Structure*, 43. My emphasis.

²⁰ Kuhn, *Structure*, 77–78, similarly 121. Kuhn refers to the “epistemological paradigms” or “dominant paradigms” several times. It is “the view of science-as-cumulation” (96). Kuhn also refers explicitly to the logical positivists’ assumption that a new theory is not permitted to conflict with some of the accepted predictions of an older theory about the same natural phenomena (98). This tenet of logical positivism is based on foundationalism, which entails firm and stable fixations of meaning and knowledge. Once a meaning is safely determined through observation, there is no need to change it, but we can expect accumulation on it (on this, see also 126). Interestingly, Kuhn also writes about the philosophical paradigm “initiated by Descartes and developed at the same time as Newtonian dynamics” (121). Again, he claims that the historical study of the sciences has made it apparent that this paradigm is “askew”.

²¹ Kuhn, *Structure*, 111. My emphasis.

question is to “*examine* not only the impact of nature and logic, but also the techniques of persuasive argumentation effective within ... the community of scientists.”²²

The fact that Kuhn’s *Structure* is descriptive of the past science and that it relies on historical evidence to reach its conclusions establishes that Kuhn’s work is, in essence, historical in the same sense as any historical work that attempts to provide an account of historical phenomena. The conceptual condition (i) as stipulated above is thus satisfied.

Kuhn claims that his model applies to all sciences in their different respective historical stages, as the usage of the phrase “all science” (above) and “any science” (in the following) makes evident: “in the early stages of the development of *any* science....”²³ Kuhn uses similar qualifications to indicate a wide, and even the maximum, scope of application in some cases, such as in the kinds of shifts of “*all* discoveries” at times of scientific crises.²⁴ Further, theories are said to be “*always* based upon more than a comparison of that theory with the world.”²⁵ Sometimes these depictions are more restricted, such as the claim that the “*crisis often* proliferates new discoveries” or “*almost always* men who achieve ... fundamental inventions of a new paradigm have been either very young or very new to the field whose paradigms they change.”²⁶ Occasionally, generality is merely implied like in the blunt statement in the present tense and in the constative mode that “[c]onfronted with anomaly or with crises, scientists take a different attitude toward existing statements,” or like in the conclusion that “the research worker *is* a solver of puzzles, not a tester of paradigms.”²⁷

Perhaps the most explicit illustration of how Kuhn’s views about the sciences apply to all sciences is the concluding chapter of the original edition “Progress through revolutions”. In this chapter, one already finds the rudiments of the evolutionary conception of scientific development that Kuhn kept on honing until the end of his life. It summarises how the history of science in general should be seen, or to put it alternatively, what scientific progress is like. It is “a process of evolution *from* primitive beginnings,” and “the evolution of scientific ideas” consists of increased speciation and specialisation of scientific fields.²⁸ Kuhn’s model applies to all sciences in the history of science, and therefore, it is thus *the whole of the history of science* and the nature of its developmental process that are under consideration. However, the restriction that has to be made here is that the history of science refers to past science and not to all, including future, science. This is important because although Kuhn gives an account of all the sciences in history, he does not rule out that the nature of science and scientific development might change in the future. Naturally, it is possible, too, in principle, that Kuhn in *Structure* discovered the structure of the history of science that remains valid also with respect to the future sciences. But whether this is so or not is an empirical and contingent matter.

There is thus no doubt that Kuhn’s cyclical model, and related notions like incommensurably, apply to all (mature) sciences,²⁹ and therefore to the whole of the history of science as past science. The condition (ii) as stipulated above is therefore satisfied.

Let us reverse here a little and consider what the title of Kuhn’s book, *The Structure of Scientific Revolutions*, connotes. Kuhn promises in the title and subsequently substantiates in the book that he has found an overall structure of scientific development in history. It is curious that this pattern captures also revolutionary transformations in the sciences, as revolutions could be thought to break any patterns and structures. Kuhn also explicitly formulates his intention to state something that holds without exceptions,

²² Kuhn, *Structure*, 94. My emphasis.

²³ Kuhn, *Structure*, 17; similarly 64.

²⁴ Kuhn, *Structure*, 66. My emphasis.

²⁵ Kuhn, *Structure*, 77. My emphasis.

²⁶ Kuhn, *Structure*, 88, 90. My emphasis.

²⁷ Kuhn, *Structure*, 91, 144. My emphases.

²⁸ Kuhn, *Structure*, 170, 172.

²⁹ Kuhn famously excluded the humanities and social sciences.

universally. In the end of the book, Kuhn hopes that his “schematic descriptions of scientific development ... [have] ... caught the *essential structure* of a science’s continuing evolution.”³⁰ And certain effects of crises in science “seem to be universal.”³¹ This attempt to find universal patterns coheres with his statement that there are almost law-like regularities in the history of science: “When paradigms enter, as they *must*, into a debate about paradigm choice, their role is *necessarily* circular.”³² Finally, the view that “after a revolution scientists work in a different world” is stated categorically many times specifically in Chapter X.

The cyclical model of normal science, crisis, revolution and normal science again stipulates a (binding) structure and a pattern that is comprehensive and covers all individual episodes or facts of history. It is therefore clear that Kuhn’s model of *Structure* also satisfies the condition (iii) above. Now, the structure of scientific change in Kuhn’s *Structure* is significant regarding the question of what it means to explain historical phenomena. It is my suggestion that embedding a phenomenon into a structure or pattern provides an explanation to it. In other words, the structure tells why it happened. Let us take an example: why was there a paradigm change from the phlogiston chemistry to Lavoisier’s chemistry? Of course, providing an account of what took place, a ‘story’ of this transformation, answers our curiosity as to what happened. Paul Roth, following Dante, has even turned what seems to be a narrative-descriptive account into an interesting theory of explanation, arguing that showing a (narrative) unfolding of events amounts to an explanation in historiography.³³

However, it is possible to find more general reasons and uniformities for why something happened. In the case of Lavoisier’s chemistry, Kuhn’s idea of normal science as a puzzle-solving activity that does not seek novelties and discoveries (but completion of existing puzzles) is the central explanatory framework. He provides an account for how oxygen was discovered and why it gradually led to an entire scientific revolution in chemistry. Kuhn emphasises that the distinction between invention and discovery is not sharp and that discovery is an extended process that entails time and numerous adjustments of the conceptual scheme and the conceptual machinery. To cut the long story short, the explanation for Lavoisier’s revolution is, first, the emergence of an anomaly that “violates the paradigm-induced expectations that govern normal science.”³⁴ And then “it continues with a more or less extended exploration of the area of anomaly. And it closes only when the paradigm theory has been adjusted so that the anomalous has become the expected.”³⁵ In other words, the discovery of oxygen (which does entail recognising and conceptualising that something has been discovered) and the resultant scientific revolution are not fundamentally explained by reference to a sequence of events but by their participation in a general structure that applies to all mature science. Now, this does not mean that this pattern for modelling scientific change could not be broken at some future date. The universality and ahistoricity of a binding structure of all (past, present, future) science is a different matter from the existence of an explanatory structure of past phenomena. The later Kuhn himself changed his view on this model and began to characterise scientific change through the evolutionary metaphor as a process of speciation and specialisation of science (of course, the history of science studied did not change, but only Kuhn’s perspective on it).³⁶

In conclusion, Kuhn’s history and philosophy of science in *Structure* is also a philosophy of history, or more precisely, it is a speculative philosophy of history, as defined above. Kuhn’s approach is historical in that it attempts to describe the past science and his claims are based on the historical record and evidential. Naturally, this is not surprising from a *historical* philosopher of science. Kuhn’s model applies also to the whole of history, at least when the whole of history is the (whole) past science. Finally, while the structure of

³⁰ Kuhn, *Structure*, 160. My emphasis.

³¹ Kuhn, *Structure*, 85. My emphasis.

³² Kuhn, *Structure*, 94. My emphasis.

³³ Paul Roth, *The Philosophical Structure of Historical Explanation* (Evanston: Northwestern University Press, 2020).

³⁴ Kuhn, *Structure*, 52–53.

³⁵ Kuhn, *Structure*, 53.

³⁶ See my “Truth, Incoherence, and the Evolution of Science,” in Wray, K. Brad (ed.) (2021). *Interpreting Kuhn: Critical Essays*. Cambridge: Cambridge University Press. 202–222.

the history of science in *Structure* does not provide a meaning to history in any providential or intentional sense, it does certainly yield and present the history of science in a coherent, predictable and meaningful form. This form or pattern can be used to explain the manifestations of individual sciences, in somewhat similar fashion to how Danto's Newton provides explanations for astronomical data that others working before Newton had unearthed.

3. Why Kuhn has not been seen as a philosopher of history

What has been said so far entitles us to draw an interesting conclusion. Although Kuhn was a philosopher of history, he was not a marginal figure. This is surprising given the bad reputation of (speculative) philosophy of history.³⁷ As is well known, Kuhn had a major influence in and on the history and philosophy of science, and beyond. Indeed, many debates to which Kuhn's *Structure* contributed and still contributes are absolutely central in the history and philosophy of science. The most obvious is the discussion on scientific progress. The question whether science converges on the truth in history and whether it shows the required continuity in this process is still zealously debated today. Examples are too numerous to list. Another related theme of topical interest is the question whether scientific development is contingent or inevitable. There have been interesting theme issues in recent years on this, for example.³⁸ Kuhn's contribution to these debates is that science progresses (in the sense of increasing problem-solving capacity) but not towards the truth, or any other goal. And because scientific development is evolutionary in nature, it is also contingent and underdetermined as regards any end point. Most importantly, these debates are debates in philosophy of history: what are the moving factors of the history of science, to what direction is history heading, if any, and further, what is the nature of history of science in the first place?

(i) *Bad reputation of the philosophy of history*

Why has it not been understood that Kuhn is (also) a philosopher of history then? At least this is not how Kuhn and the contribution of *Structure* are normally conceived of. A more interesting question is why the kinds of philosophical debates mentioned above, dealing with the nature of scientific progress, are not understood to contribute to philosophy of history. It is impossible to provide any definitive answers, but my view is that the bad reputation of the speculative philosophy of history has obscured the view. Some compared it to the attempts to find explanations of nature above and beyond the natural sciences like in philosophy of nature; as if the speculative philosophy of history had some advanced metaphysical method to study history.³⁹ It is quite like Fain says: the term 'speculative philosophy of history' connotes something disreputable (as opposed to reputable critical or analytical philosophy of history).⁴⁰ No wonder, then, that philosophers and historians of science were not and are not tempted to see themselves as debating issues relevant to the speculative philosophy of history, this despite the facts that they commonly discuss Kuhn and the same topics as Kuhn did in *Structure*. One interesting discussion concerns the general explanatory factors of scientific development, such as social factors, cognitive values and nature, as potential explanatory notions. For example, if it can be established that specific kinds of factors are decisive in the sciences in general and that they nudge science towards some direction, one has managed to find a pattern or structure in the history of science, and perhaps also to determine a law-like regularity of scientific development in history.

³⁷ See Walsh, *An Introduction to Philosophy of History*, 15, 25; Dray, *Philosophy of History*, 2; Patrick Gardiner, "Introduction" in Gardiner, *The Philosophy of History* (Oxford: Oxford University Press, 1982), 2

³⁸ E.g. Soler, Léna, Emiliano Trizio, and Andrew Pickering, eds. *Science as It Could Have Been: Discussing the Contingency/Inevitability Problem* (Pittsburgh, Pa: University of Pittsburgh Press, 2015). Accessed January 25, 2021. <http://www.jstor.org/stable/j.ctt19rmb0p>; see *The Contingency versus Inevitabilism Issue, Studies in History and Philosophy of Science* 39, 221–265; *Focus: Counterfactuals and the Historian of Science, Isis* 99, 547–585.

³⁹ See Walsh, *An Introduction to Philosophy of History*, 15.

⁴⁰ Haskell, *Between Philosophy and History*, 231.

But what about the ‘speculation’ of the speculative philosophy of history? A reader might think that I have forgotten this important aspect about the speculative philosophy of history and provided a weak definition of it: isn’t the ‘speculative’ aspect of the speculative philosophy of history central, too? Was it not this speculative aspect that particularly irritated the analytical philosophers of history when they coined the very term? In their view, the speculative philosopher “seemed prepared to override or disregard facts that conflicted with the tenets of cherished doctrine ... and tended to rely upon unexamined *a priori* assumptions,” as Gardiner put it.⁴¹ The speculative philosophers were accused of “conceptual imprecision and of formulating hypotheses which turned out on inspection to be either hopelessly vague or else to be no more than the tautological consequences of definitions arbitrarily determined in advance.”⁴² Would Kuhn’s *Structure* count as speculative philosophy of history if speculation is taken seriously and in this sense? There are two ways to answer this.

Granted, if the speculative philosophy of history was understood in this way, Kuhn’s structure would not count as an instance of it. However, as we have seen, the ‘speculative philosophers of history’ are a diverse group, and it is difficult to come up with any definition that covers all historical figures of the speculative philosophy of history, from the empirically inclined Toynbee to the philosophical systematiser Hegel and to the theologically orientated Niebuhr.⁴³ Naturally, Gardiner’s characterisation may even apply to some. But even then it is more likely that this characterisation tells more about the definers than the object of definition. A more productive view is to understand ‘speculative’ as C. D. Broad comprehended speculative philosophy: as an attempt to synthesise disparate (historical) phenomena, much of which is premised on empirical research into what there is out there. This is something that Kuhn certainly did, and better than most. The historical philosopher of science Kuhn studied the record of the history of science and synthesised that it is governed by a specific cyclical model.

(ii) *Kuhn as a bad historian or as a philosopher of history?*

Another facet that makes *Structure* interesting to philosophers of history is that it falls between two fields: history and philosophy. In his introduction to the 50th anniversary edition of *Structure*, Ian Hacking asks pointedly: “[I]s the book history or philosophy?” He does not provide a clear answer. And it appears that Kuhn’s influence has been felt throughout the humanities except, ironically, in the history of science, at least when measured by the number of citations. While there were 600 references to *Structure* in the humanities in general in 1995, only seven of those were in the history of science journals. Perhaps this is because Kuhn was thought to be a bad historian or not the right kind of historian.⁴⁴ Part of the reason why Kuhn was not taken seriously by historians of science may also be that *Structure* is, fundamentally, not history or philosophy, but philosophy of history.

Now, the scene in both philosophy of history and historiography has changed in recent decades. On the one hand, there are calls to revive at least a “quasi-substantive philosophy of history.”⁴⁵ This is premised on the idea that the old substantive history assumed that the past, present and future form a unity, “a single ontological subject ... [that] could take place *within* and *as* the whole of history.” In contrast to this, the new quasi-substantive philosophy of history rejects the idea that the developmental stages of a subject retain its self-identity, and instead, conceptualises changes as “*perpetual alteration of ever new ontological*

⁴¹ Gardiner, *The Philosophy of History*, 2.

⁴² Gardiner, *The Philosophy of History*, 2.

⁴³ They all are representative of speculative philosophy of history and a chapter is devoted to each in Dray’s *Philosophy of History*.

⁴⁴ Interestingly, Kuhn’s language, for example in *The Copernican Revolution* and in *Structure*, has been similarly accused of being too vague and metaphorical. Robert S Westman, “Two Cultures or One?: A Second Look at Kuhn’s *The Copernican Revolution*” *Isis* 85(1994). See note 2, page 79.

⁴⁵ Zoltán Boldizsár Simon, “We are history: the outlines of a quasi-substantive philosophy of history,” *Rethinking History* (2016), 259-279.

subjects.”⁴⁶ The proposal that Kuhn’s *Structure* is a work in philosophy of history entails neither the alleged presupposition of the old nor this new sense of quasi-substantive philosophy of history. While the shared idea with this new approach is that the speculative philosophy of history deals with the course of events, the point is not to suggest that the past, present and future do or do not form a unity or anything about their continuity either. Instead, the locution ‘the whole of history’ and the idea of the structure of history refer to attempts to draw (evidence-based) conclusions on the dynamics of historical events *on a higher scale* than localised studies of ordinary history normally do. This is what Kuhn did regarding the dynamics of the history of science.

Currently there are several initiatives of history on a large scale. While Kuhn’s historiography in *Structure* may resemble some of them, it certainly does not others. One attempt to write history as a whole is the so-called Big History Project.⁴⁷ Its initiative is to write the history of the whole universe, human history included. Nothing so grandiose is suggested here by the expression ‘speculative philosophy of history.’ Then, there are the over-arching, *longue durée* histories of various ideas and artefacts of book, health, war, history (itself) and so on that are generated these days. These also are different from what is suggested here. They seem to postulate a continuity on the basis of the trans-temporal identity of one object, without any concerns for structural explanatory patterns of history. Further, global histories tend to cover large geographical and temporal segments without typically referring to any deeper explanatory structures, although there is no *a priori* reason why they could not do the latter too.

The key question is where the border between the smaller-scale ‘ordinary’ history and the larger-scale ‘speculative’ philosophy of history lies. The way I have approached this is that they both deal with historical events and use evidence for their conclusions, but the speculative philosophy of history subsumes a great quantity of historical events under it and explains them by reference to explanatory patterns. Still, it is an open question whether there is a level on which a conclusion based on history becomes philosophical, and even metaphysical, and if this happens, whether it renders historical evidence irrelevant for the view.

An attempt to answer this question can be made via Kuhn’s *Structure*. If Kuhn is not a traditional historian, but a philosopher of history, what is the difference between a historical approach and philosophy of history? I wish to highlight one related aspect that is in need of further reflection. Both *Structure* and the speculative philosophy of history are large-scale histories. For example, the former does not attempt to explain the birth of phlogiston theory, in particular, but the emergence and the development of chemistry, and then even the whole of science or all sciences. But if the scale is the only difference between the ‘ordinary’ writing of history and the historiography of *Structure*, the latter is just a kind of ‘big history’ that applies explanatory principles similar to those used in more localised and smaller-scale studies, only on a wider scale. For example, Kuhn’s suggestion of the cyclical model of scientific development can be seen as justified historically (not taking a stance on whether well or poorly). Yet it seems to have philosophical content in suggesting something about the nature of science and of the epistemological enterprise in general.

The real significance of this analysis is that the difference between large-scale attempts to understand history and more narrowly focused research is a difference in degree. Both are explanatory accounts of historical phenomena but differ in scale regarding historical phenomena. This would mean that also the difference between the speculative philosophy of history and historical research is a difference in degree rather than in kind.

(iii) *Empirical warrant for ‘speculative’ views?*

⁴⁶ Simon, “We are history,” 263, 265 (emphasis in original); see also “History set into motion again,” *Rethinking History* (2015)19, 651–667.

⁴⁷ [International Big History Association – big history](#)

Structure makes empirical claims.⁴⁸ For example, the challenge directed to scientific and convergent realism is in part based on a judgment of what the record of history shows. According to the “most prevalent notion of progress ... a scientific theory is usually felt to be better than its predecessors not only in the sense that it is a better instrument for discovering and solving puzzles but also because it is somehow a better representation of what nature is really like.”⁴⁹ However, Kuhn writes that “I can see in their succession no coherent direction of ontological development.”⁵⁰ In other words, the succession of coherent direction is not supported by historical empirical data (although not detecting does not falsify it either). For example, Kuhn argues that Einstein’s general theory of relativity is “in some important respects” closer to Aristotle’s theory than either of them is to Newton’s theory. Further, while disputing the view that history of science is cumulative, Kuhn directly challenges some historians’ observation, or assumption, “that the history of science *records* a continuing increase in the maturity and refinement of man’s conception of the nature of science.”⁵¹

This kind of thinking may seem to open a testable research programme in the history and philosophy of science, and this is indeed what was attempted in the 1980s. *Structure*, together with other “post-positivist” philosophers of science, provided a prime incentive to an interesting systematic empirical research programme in the history and philosophy of science, the so-called the VPI (Virginia Polytechnic Institute) project.⁵² As Rachel Laudan, Larry Laudan and Arthur Donovan put it in their manifesto-like introduction: “herein lies the rationale for this volume, the members of the historical school insist that their alternative theories evolved from a careful examination of past and present science ... the sad truth is that most theories of scientific change ... have not yet been extensively or systematically tested against the empirical record.”⁵³ The key idea here is that historical case studies perform the role of empirical validation or falsification of the philosophical conceptions of science. In this way, case studies were meant to provide “a reality check for philosophy of science,” as Schickore put it.⁵⁴ For example, one could perhaps verify or falsify that there are such things as paradigms in science. Of course, the thought that philosophical ideas about science are historically testable is controversial. The history of this idea and the VPI programme are complicated.⁵⁵

However, it is necessary to note that the later Kuhn experienced a shift in thinking and began to view this matter differently as a result. This idea takes one to a different notion of philosophy of history entirely. Kuhn said that “many of the most central conclusions we drew from the historical record can be derived instead from *first principles*” and given “what I shall call the historical perspective, one can reach many of the

⁴⁸This status is not affected even if the image of science in *Structure* emerges not from painstaking archival work but as a result of scholarly influences, such as J. B. Conant, Ludwick Fleck, Stephen Toulmin and Michael Polanyi, and of Kuhn’s reading secondary sources dealing with the history of science as well as his experience in teaching. See Brad Wray, “The Influence of James B. Conant on Kuhn’s *Structure of Scientific Revolutions*,” *Hopos: The Journal of the International Society for the History of Philosophy of Science* 6 (2016), 1–23.

⁴⁹ Kuhn, *Structure*, 206.

⁵⁰ Kuhn, *Structure*, 206.

⁵¹ Kuhn, *Structure*, 108.

⁵² Larry Laudan et al, “Scientific Change: Philosophical Models and Historical Research,” *Synthese* 69 (1986), 141–223; Arthur Donovan and Larry Laudan, *Scrutinizing Science. Empirical Studies of Scientific Change* (Dordrecht: Kluwer Academic Publishers, 1988).

⁵³ Laudan, *Scrutinizing Science*, 5.

⁵⁴ J. Schickore, “Explication Work for Science and Philosophy,” *Journal of the Philosophy of History* 12 (2018), 1, 4.

⁵⁵ See Laudan, Larry, “Thoughts on HPS: 20 Years on,” *Studies in History and Philosophy of Science* 20 (1989), 91–13; Joseph Pitt, “The Dilemma of Case Studies: Toward a Heraclitian Philosophy of Science,” *Perspectives on Science* 9 (2001), 373–82; Jutta Schickore, “More Thoughts on HPS: Another 20 Years On,” *Perspectives on Science* 19 (2011), 453–481; See also the special issue *Can History be Used to Test History* in *Journal of the Philosophy of History* 12 (2018).

central conclusions we drew with scarcely a glance at the historical record itself.”⁵⁶ He thought that he and his generation of historical philosophers of science overemphasised the empirical component in their attempts to attain a valid image of science: “the evolutionary epistemology need not be a naturalized one.”⁵⁷

Now one might be tempted to dismiss this kind of “first-principles” approach as an arcane Hegelian kind of *aprioristic* top-bottom approach with a poor warrant. I suppose that the best reply is to say that it is doubtful that explanatory factors, whether they are intentional human actors, intentional non-human actors, non-intentional causal factors and so on, can be determined purely empirically. This is to say that while the Kuhn of *Structure* is a historian-philosopher able to model the past, the view that emerged was and still is in need of historical vindication. And while the writing of history on a smaller scale is often tightly empirically justified, it must rely on unempirical organising and explanatory principles and notions.

4. Conclusion

I have suggested in this text that Kuhn’s *Structure* is a book in philosophy of history in that it empirically focuses on historical phenomena, attempts to provide an account of the whole history understood as past, and identifies a pattern or structure that explains historical phenomena. In my view, it is mainly the bad reputation of the speculative philosophy of history that has barred Kuhn’s *Structure* from being identified as a work in philosophy of history. The association of the speculative philosophy of history with purposefulness and intentionality has been disadvantageous in this sense. Having said this, there are two take-home messages in particular. The one is that it should be possible to write large-scale history in ‘ordinary history’ too as long as the organising principles of this historiography and its empirical warrant are made explicit. The difference between larger-scale or ‘speculative’ histories and small-scale or ‘ordinary’ ones is a matter of degree. The other is that the relation between the historical record and its large-scale conclusions should be a topic of acute interest. If the difference between ‘speculative’ conclusions about the nature, mechanism and direction of history and more localised studies of history is a difference in degree, then their integration under one discipline should be possible. The former attempts to explain a much wider scope but is evidential and employs explanatory tools similarly to the latter. This would seem to open an interesting prospect for philosophical views that are supported by the historical record. Kuhn’s *Structure* can be seen to set an example for history and for the philosophy of history, and not only in the philosophy and history of science: it is an example of how research can fruitfully integrate both historical and philosophical aspects in one account. That alone should be reason enough to read *Structure* in the twenty-first century.

⁵⁶ Thomas Kuhn, *The Road since the Structure* (Chicago: Chicago University Press, 2000), 111, 112.

⁵⁷ Kuhn, *The Road since the Structure*, 95.