



# The End of Philosophy of Science and the Idea of Open Epistemologies

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## Abstract

The author seeks to clarify the concept of epistemology, which can involve either a theory of knowledge *per se* or, additionally, also a philosophy of science as such. The fundamental thesis is that both problems have been inextricably linked since Descartes and Kant even when it may appear, in this or that author, that it is simply about only one of them. In any case, it is essential to explain how and why this happens in order to understand the concept of epistemology at a time when that of “philosophy of science” seems to have reached its final stage, as happened in the philosophies of several prominent authors in the second half of the 20th century: Kuhn, Quine, Feyerabend, Rorty, and others. The idea of “open epistemologies” is here addressed from this broad point of view.

**Keywords:** Epistemology; Feyerabend; Kuhn; Quine; Science; Theory of Knowledge

## Introduction

I must start with a few words regarding the subject of my paper. Any of the three concepts in question (“philosophy of science”, “epistemology”, “open epistemologies”) can cause confusion and misunderstandings, philosophically speaking. With regard to the concept of epistemology, it can be understood in two different ways, which are nonetheless complementary or mutually related. Epistemology means, first of all, theory of knowledge, and *not necessarily* philosophy of science. This means that, regardless of an approach to the philosophy of science as such, any theory of knowledge can be presented as “epistemology”. In such a theory, it is assumed that the problem of knowledge is addressed generally and independently (though not by default) of its application to science (mathematics, physics and physical-natural sciences generally). Such an approach has been adopted since the beginning of modernity in philosophy, for example, by the so-called tradition of “British empiricism in philosophy” (Locke, Berkeley, Hume, Russell), and continues to be so by

contemporary philosophy itself, as an ample historiography in the Anglo-Saxon sphere attests. This understanding of the concept of epistemology does indeed begin to emerge with Descartes [1] (*Discours de la Méthode* and *Meditationes de Prima Philosophia*): basically, what we are dealing with here is, apparently, theory of knowledge and not necessarily philosophy of science, however important this philosophy may be in defining the status of said theory. And, as we now know, this importance is decisive or fundamental. In any case, and without fallaciously offending the exclusive disjunction in logic, the issue is: is Descartes’ subject in such books as *Meditationes* the theory of knowledge or is it rather the philosophy of science? The same question could be posed regarding Kant and his *Kritik der reinen Vernunft* in particular [2]. The answer is: “both, knowing that the theory of knowledge is inferred from, or is founded on, a (given) philosophy of science; in both cases, and particularly in the latter, the aim is to justify or substantiate a given question (“What can I know?”) based on a conception of science (namely, of mathematics and physics).” However, as will be

shown, the question/answer is not as simple as it may seem at first sight if the (more recent) context is what I shall be calling “the end of the philosophy of science”, in the modern sense of these concepts – an end that was trumpeted by such reputable philosophers as Thomas Kuhn or Willard van O. Quine in the second half of the 20<sup>th</sup> century.

A second meaning of the concept is the one according to which epistemology basically means “philosophy of science”, that is, the idea according to which philosophy provides the metaphysical foundations of science, which is a typically modern idea, like the first meaning of the concept of epistemology (theory of knowledge). Both have their origins, as has been suggested, in Descartes and Kant, in the 17th and 18th centuries. It is obvious that, although separate, the two conceptions of epistemology that I have just succinctly described are closely related to each other. As stated above, from a philosophy of science one may deduce or infer a theory of knowledge, or even an “open epistemology” (in my view, this is most prominently the case of K. Popper in the 20<sup>th</sup> century), but the reverse (from a theory of knowledge one may infer a philosophy of science) is not necessarily true, at least explicitly or expressly, despite the close connections between the two problems under discussion [3]. The early Bertrand Russell, from *The Principles of Mathematics* [4] to *The Analysis of Matter* [5], is an excellent example of what I just said. For a time, Russell – the founder of mathematical logic in the early 20th century – believed that it was possible to infer a theory of knowledge from his conceptions on the foundations of mathematics, although (until he wrote *The Analysis of Matter*) he seemed to entertain some doubts regarding the question of knowing how that theory could be applied to physics and the physical-natural sciences generally. As to whether it could, or should, in principle be applied, there is no doubt at all, as Russell himself abundantly suggests in such texts as *Our Knowledge of the External World* [6]. But on what terms? Under what conditions? Russell’s answers to these questions are not clear, at least not before *The Analysis of Matter*. They have to do with the confusing state of mathematics and physics in the first quarter of the 20<sup>th</sup> century (namely, with the emergence of non-Euclidian geometries, of quantic mechanics and the theory of relativity, and of conventionalism in philosophy of science). And that is the reason that explains why only with the abovementioned book can we talk about a “philosophy of science” as such in Russell. However, if we consider the context (to which I alluded above) of the end of the philosophy of science, which, for all intents and purposes, came to occur as late as the second half of the 20<sup>th</sup> century, something similar (or analogous) could be said – for different reasons, as will be seen below – of postmodern philosophers in general, such as Quine, Kuhn, Feyerabend or Rorty: for them, there is no “philosophy of science” in the true sense of the words, that is, a philosophy that would provide the metaphysical foundations of science,

because it is assumed that this philosophy has ended or terminated in the history of philosophy; there is only, and fundamentally, “epistemology”, whichever it may be. As I hope I have made clear, this point – the end of the philosophy of science in the modern sense of the concept – is absolutely fundamental to understand what I shall be arguing next.

### Open and Closed Epistemologies

Having said that, it is now important to clarify to what extent can a given epistemology be more “open” or more “closed” than any other epistemology. As was suggested above, an answer to this question will only make sense after the previous, preliminary issue of the relationship between the concepts of “epistemology” and “philosophy of science” has been clarified. The reason is that, as happened with the context of the end of the philosophy of science in the second half of the 20<sup>th</sup> century, the idea that such a philosophy exists can be rejected while maintaining that it is possible to do “epistemology” in new terms (a naturalised epistemology, as Quine [7-9] later argues for). In any case, we find ourselves outside the scope of philosophical modernity as such. How and in what sense can a given epistemology be more “open” or more “closed” than any other epistemology, depending on, or irrespective of, its relationship with scientific knowledge? Which authors or philosophers are we discussing and to which periods (and contexts) do they belong? An example, which has been mentioned above: it seems to me to be undeniable that Karl Popper’s philosophy of science can be described as an “open epistemology”, rather than simply an “open philosophy of science”, insofar as it was based on the latter that the author aimed to advance such values as criticism, dialectics between alternative theories concerning the same set of phenomena, refutation, and others that underpin what we now call “critical thinking” [3,10]. But is the fact that such values are upheld enough to enable us to define and characterise the concept of “open epistemology” in general? Can this concept be founded at present upon different premises from Poppers’ (science as the basis of human knowledge)? The concept of “open epistemology” is, therefore, a confusing and problematic concept, especially when everything is lumped together as if it all followed the same common pattern, which, with all due respect, seems to me to often be the case these days. I suggest, therefore, that we speak, above all, of “philosophy of science” instead of “epistemology”, which, for all intents and purposes, is a substitute concept for the former. The thesis is: when we are speaking of “theory of knowledge” or “epistemology” in domains apparently remote from philosophy of science, for example, the legitimacy of scepticism, what one is talking about, at least indirectly, is a given conception of human knowledge which is based on a philosophy of science, whatever it may be, even if this philosophy of science it is not perfectly or immediately clear or evident; or, as I

have been suggesting, even if such a philosophy of science does not exist, because the concept (as happened with a number of postmodern philosophers from the second half of the 20<sup>th</sup> century onwards) has ceased to make sense. This understanding of theory of knowledge and/or epistemology and their relationship with the concept of philosophy of science covers virtually all that has been written on it from Descartes and Locke to this day [11]. However, this again does not mean that we can confuse the two problems under discussion. In his time, E. Mach, for example, continued to believe in the modern idea of a “philosophy of science” [12], but the same can no longer be said of P. Feyerabend, a postmodern philosopher for all intents and purposes, for whom the philosophy of science died or came to an end, giving way to something completely different [13-15]. Feyerabend’s philosophy invites us to discuss what a “closed” epistemology as opposed to an “open” one would be. If the doctrine is, according to this philosopher (and, as will be seen below, also partly according to Quine himself), that an open epistemology is one where different philosophical approaches to science are entirely legitimate and possible, that is, if the doctrine is that an open epistemology is inextricably linked to relativism, I would say that this understanding of the concept is rather restricted and debatable. As I have suggested, I do not see why the critical rationalism of Popper, who, for all intents and purposes, is a modern philosopher (i.e., basically Kantian in books such as *The Logic of Scientific Discovery*), despite the criticism levelled against him by the author of *Against the Method* [13], is not to be considered an “open epistemology” in view of the social, cultural and political impact of such rationalism, in particular on what we nowadays call “critical thinking”. But Popper was surely a champion neither of relativism, as is clear from his important article “The Myth of the Framework”, nor of such theses on the subject as those put forward by Quine in “Ontological Relativism” [16].

What I have been saying so far is that several important distinctions can be made within what “open epistemologies” are supposed to be.

- 1) First, “epistemology” can be a confusing, ambiguous concept if its relationship with the concept of “philosophy of science” fails to be considered.
- 2) In order to avoid confusing the two concepts, particularly from the modern age onwards (Descartes and Kant), it must be methodologically assumed that from those days, in order to be philosophically relevant, any theory of knowledge has to be founded on a given philosophy of science.
- 3) An “open epistemology” is one that, in principle, accepts that a given set of problems or phenomena to be studied can be interpreted in different, conflicting ways, which are most welcome; this is, of course, not the case with a “closed epistemology”. It is possible to illustrate this

understanding of the concept in the early stages of the philosophy of science in the 20<sup>th</sup> century, namely, by invoking Duhem [17], at its very dawn.

- 4) Historico-philosophically speaking, the concept seems to fully make sense only when what I call “the end of the philosophy of science” and the questionings concerning this purported end occur, particularly with Kuhn [18] and Quine [7] though also with such philosophers as Popper [3].
- 5) This means that, for the first time in the history of philosophy since the modern era (Descartes and Kant), it is possible to speak of “epistemology” without the concept necessarily having a given “philosophy of science” as a basis, since this philosophy will no longer make sense.

### Modernity and Philosophy of Science

Perhaps all these problems may be seen in a clearer and more intelligible light, dissipating confusion, if we confine ourselves to discussing the concept of epistemology as philosophy of science. When I speak of “philosophy of science”, what I have in mind is the idea that philosophy will provide the metaphysical foundations of science. This idea dates back to Descartes and Kant, fundamentally, and it continued to guide the future of modern-day philosophy until the second half of the 20<sup>th</sup> century and the beginning of postmodernity. The idea of such foundations is presented by Descartes in *Principia philosophiae*, through the analogy whereby philosophy is to the different sciences what the trunk of a tree is to its branches [19]. Therefore all sciences find their foundations in philosophy. Science, or the sciences (namely physics and mathematics), are an object external to philosophy, which is philosophy’s responsibility to establish. Kant takes up this idea in *Kritik der reinen Vernunft*, no longer simply presupposing the mechanics of Galileo Galilei but also Newton’s laws of motion [2]. Now, my point is: with the exception of a brief interlude or interval in which science is identified with philosophy itself (as happened with German absolute idealism, notably with Schelling and Hegel), it is the Cartesian and Kantian concept of “philosophy of science” that will be taken up by contemporary philosophy in the first half of the 20<sup>th</sup> century (and in much of the second half), as Michael Friedman and Richard Rorty showed, albeit from different but converging perspectives [11,20]. This return to Kant and Kantianism occurred in such diverse approaches to philosophy as the foundations of mathematical logic (namely, Russell and Wittgenstein, logical positivism, and analytic philosophy generally). One is, after all, a Kantian even when one openly rejects Kant. The postmodernity of philosophy fittingly begins when the Cartesian-Kantian concept of philosophy of science dies or ceases to make sense. Descartes’s famous “tree of knowledge”, in the abovementioned book, can no longer provide the framework

for the new philosophical problems. The theory comes into being that the metaphysical foundations, to which I alluded previously, are a harmful and pernicious illusion [21]. This theory led to different perspectives on the end of the philosophy of science in the modern, classical or traditional sense, which I will briefly address in a moment. Kuhn, Quine, Feyerabend, Rorty, and others did subscribe to it, as I said, from different perspectives. In my view, it is here that the idea of open epistemologies finds its roots. It is a historico-philosophically situated idea, according to the context that I have described, which means that, although it may have a background (as I have suggested above), only from the second half of the 20<sup>th</sup> century on (mainly after Kuhn and Quine) has it come to make perfect sense.

However, an unusual paradox of this situation should now be noted. The issue here is not that the philosophers concerned with science in their philosophies generally have no specialised scientific training. Such a situation is grotesque, especially in our days, but given the extent of the applications of the Cartesian “tree of knowledge” paradigm, it should not really surprise us. Poincaré criticised Russell, who had no specialised training in mathematics, exactly from this angle, provocatively calling Russell’s philosophy of mathematics a “philosophy without wings” [22]. Indeed, from the first decade of the 20<sup>th</sup> century, and mainly in German universities, philosophers were forbidden to teach the sciences, namely physics, or coordinate and plan the teaching of such sciences [23]. However, this institutional or academic divorce had no consequences as to the status of philosophy. In principle, it would lead to the end of the philosophy of science, in the first quarter of the twentieth century. But the belief persisted that the abovementioned training was not necessary and that, according to the traditional status of philosophy, the fact of being a philosopher was enough to approach science. Paradoxically, this continues to happen today with most of us who teach “epistemology” or “philosophy of science” in western universities. This is what happens, namely, when philosophers – and analytical philosophers in particular – speak about the so-called “cognitive sciences”. If the philosophy of science is to make any sense, philosophers should start by teaching it in science departments, that is, in Faculties of Science in general. But this problem, important as it certainly is, is not at issue in this essay; to question it would imply questioning the fragmentation of knowledge in postmodernity in general [24].

Let us go back to the idea of the end of the philosophy of science. For Quine, in *Ontological Relativity and Other Essays* [7], this idea follows from his famous argument about ontological relativity, presented in the third chapter of the book. To the extent that any ontology is relative to the theory or theories through which we interpret it, and these theories may be contradictory or incompatible, as

follows from Duhem’s philosophy of science in the early 20<sup>th</sup> century [17], no ontology, including Quine’s own ontology of “naturalised epistemology”, can claim the status of universality, necessity and timelessness that was traditionally attributed to the philosophy of science. This is what follows from this argument and, in particular, from the idea of the inscrutability of reference. I write “including Quine’s own ontology of “naturalised epistemology”, because it seems to me that there a “contradiction in terms” in Quine’s argument. If all ontologies are “relative” and (as it seems to me to be the case, despite Quine’s assertions), this philosopher’s “naturalised epistemology” is itself an ontology, then this same ontology is as “relative” as any other. Two things remain from Quine’s argument, after being duly cleansed of its possible inconsistencies: a) the inscrutability of reference; b) the relativity of ontologies that follows from such inscrutability. Considering what I have said about the inconsistency of the concept of “naturalised epistemology”, a) and b) entail the end of the “philosophy of science” as it was understood after Descartes and Kant. Said “inconsistencies” are important because they led many good people to believe – quite wrongly – that if, for Quine, what he called “naturalised epistemology” (which is, again, just another ontology) was still possible, then other similar or analogous epistemologies were still permissible (namely, in the so called “cognitive sciences”). This or that travestied form of “philosophy of science” was still possible. But no: if rigorously interpreted, the premises behind Quine’s argument lead to the following, much peculiar situation, which had been partly anticipated by Duhem [17]: philosophy cannot found science; when that happens what follows is the “relativity of ontologies”; the relativity of interpretations or conceptions of the world that are divergent and conflicting; insofar as there may be multiple, different conceptions of this kind, possibly contrasting or even mutually contradictory, there is, in principle, no common ontological basis in the world itself, including that whose reference would be Quine’s “naturalised epistemology” itself.

Before we proceed, it is important to establish the following: several implications (or interpretations) can be drawn from Quine’s argument as it was reformulated. Two of them at least are fundamental for the purposes of this essay: one, which may be defined as “pessimistic”, consists in saying: “nothing we can do; ‘philosophy of science’ is dead or has reached an end, leaving no legacy and no heirs; everything else is the work of professional philosophers that will have no consequences”. The second, which I have been seeking to develop so far, includes arguing that the plurality, multiplicity and diversity of interpretations within the ambit of the (deceased) “philosophy of science” is welcome and that, for all purposes, it is insurmountable and unavoidable. Any epistemology is open insofar as it basically accepts this plurality, multiplicity, and diversity. This seems to me to

be what Feyerabend argues for, following Quine, at least in part (and also, partially, Popper), with his “methodological anarchism”, subscribing to the thesis of “referential inscrutability” [13-15]. But that is also what Popper [10] himself claimed since the 1960s, although he basically disputed that such inscrutability could be philosophically sustainable [16].

For Kuhn also, partly following Quine (in the “Afterword” to *The Structure of Scientific Revolutions*), philosophy of science, in the modern sense of the concept, is dead [18]. What remains, as he argues in the first chapter of *The Essential Tension*, is sociology (not philosophy) of science, that is, a predominantly descriptive, non-normative approach to science which scientific communities are adopting or practicing in their respective contexts and according to their respective paradigms [25]. As for himself, as he confesses in the “Afterword” (more than ten years after the book to which it refers had been published), he reaches that conclusion by applying the thesis put forward by his fellow countryman in “Ontological Relativity” concerning the incommensurability between different (mutually conflicting) conceptual schemes about logic, mathematics, and physics. “Philosophies of science” are always possible for philosophers or scientific communities working under this or that specific paradigm; but they are ultimately unproductive or inconsequential, because they work according to their contextual – ultimately, ideological – assumptions; the matters that they deal with are matters pertaining to the history and the sociology of science, context by context (or paradigm by paradigm), not to some metanarrative. However, admitting that the terms of a given conceptual scheme (or paradigm) can always be translated into the terms of any other conceptual scheme which apparently conflicts with the former, and regardless of the inscrutability of reference thesis (which, according to him, and controversially, followed from Quine’s abovementioned article), Kuhn leaves the door open for the idea of “philosophy of science”: in sum, this type of philosophies may be “locally” or “contextually relevant” (depending on the paradigm that they aim to uphold), but they are ultimately *globally irrelevant*. The historical and sociological approach to the paradigms at issue is what finally matters.

For Rorty, who has in view the end of the philosophy of science in the traditional sense, as announced by Kuhn and Quine, science is no longer a privileged area that allows us to demarcate or delimit the other domains of knowledge and human action, as would happen with logical positivism or a philosophy of science such as Popper’s [26]. This means that science (mathematics and physics) has no privileged status over any other fields of knowledge, whatever they may be. Contrary to what has been thought since modernity, it does not provide a framework for the – Cartesian and Kantian – question of knowing “What can I know?”. No philosophy

of science is more appropriate or more legitimate than any other, because philosophy cannot and should not found science, much less can it or should it aim to provide an answer to the question above, i.e., it cannot and should not show how, based on the Cartesian and the Kantian framework, there can be “knowledge” of anything [11]. The consequence of all of this, as far as the concept of “open epistemology” is concerned, is relativism [26,27].

1. Given the proclaimed end of philosophy of science in the traditional sense of the concept, what remains, for all intents and purposes but certainly without any systematic consequences for philosophy, is the very discussion of the concept and its vocabulary within what the philosopher calls “conversation”.
2. Only in this context will it be possible to continue to speak of “philosophies of science” while knowing that none of those which do not embrace the antifoundationalist assumptions mentioned will finally be appropriate and legitimate for the objectives of that “conversation”.
3. Consequently, as followed from Kuhn [18] and Quine [7], several mutually conflicting epistemologies (or “philosophies of science”) can exist, but (and this is the key point in Rorty’s conceptions) none of them will have primacy over the others; none of them can claim to decisively found the “knowledge” of anything at all. From this broad perspective, a conception of “naturalised epistemology” such as Quine’s [7,8] is a “contradiction in terms”, as I myself have suggested. All this ultimately implies abandoning the concepts and vocabularies of traditional philosophy, including the ones that we have been using until now: “knowledge”, “epistemology”, “philosophy of science”, etc [28].

As Feyerabend showed more or less around the same time, after Rorty we have reached not only the end of the philosophy of science but, as he argues in *Farewell to Reason* (and in line with Rorty), also the end of philosophy as systematic research and the end of our own traditional concept of rationality [14]. This is a highly disturbing consequence, which Quine would not subscribe to, fatal as it is to the modern idea of philosophy as systematic research. With Rorty and Feyerabend, what we are talking about is not just the end of the philosophy of science, but rather the end of philosophy itself in the traditional sense of the concepts (philosophy, and philosophy of science, in particular). Does this mean that we must fully renounce their ambitions? An alternative to this seeming tragedy, which I cannot explore here but which I have elaborated on extensively in several books [29,30], is rhetoric and argumentation, as presented to us by Perelman & Olbrechts-Tyteca [31] and Toulmin [32] in the second half of the 20th century: if I cannot speak of what will exist in the world, as follows from Quine’s argument, I can in any case speak of *the ways in which I speak of the world*, that is, I can speak of the rhetoric involved in any type

of discourse (including my own discourse), with rhetoric here meaning not only the form of that discourse but also, and fundamentally, its content.

In lieu of philosophy or metaphysics, rhetoric can be the trunk of the tree of knowledge mentioned by Descartes in *Principia philosophiae* [19]. In my interpretation, it is within this broad context that it will be possible to decisively overcome the relativism which conceptions such as Rorty's and Feyerabend's lead to and whose ground was first laid by Quine's philosophy in the 1950s and the 1960s.

### Conclusions: Open Epistemologies and the Threat of Relativism

Relativism, and along with it, the idea of open epistemologies, leads to three fundamental and dramatic consequences:

- a) There are no universal paradigms of rationality, and all knowledge, as well as all forms of social, cultural and political organisation, be them western or eastern, are contextual and, if compared and evaluated, they share the same level or exist on the same plane;
- b) No particular application of what we understand by "knowledge", just as none of those forms of organisation, are in principle superior to the others or have a privileged status that can be used as a template;
- c) As a result of all this, we lack true patterns or models to definitively resolve arguments or disputes regarding the legitimacy of that template. As the postmodern authors of the so-called "narrative turning point" argue, no metanarrative (as is the case of the philosophy of science) is legitimate and acceptable, including the very idea that there are no metanarratives [33].

All of these assertions follow from Quine's argument concerning ontological relativity, even though this American philosopher did not subscribe to them, as is demonstrated by his assessment of Rorty's philosophy, and, by extension and comprehension, Feyerabend's [34]. He would agree that philosophy in the modern and traditional sense, which comes from Descartes and Kant, has come to an end or died, but he would nonetheless argue that once epistemology has been naturalised and interpreted in naturalist and physicalist terms, interdisciplinary work between philosophers and scientists is always possible within the framework of their own philosophical investigations regarding science – and it is precisely this work that he calls "naturalised" [8]. Quine's concept of naturalised epistemology opens the door to research, which is at present highly reputable, on the so-called "cognitive sciences".

Now, from my point of view, if we wish to avoid confusion and misunderstandings, it is within this broad framework,

that is, within the frameworks of

1. the end of the philosophy of science as systematic research,
2. the end of our traditional conception of rationality,
3. the beginning or emergence of relativism, that the idea of open epistemologies must be understood.

I would certainly not include E. Mach in this context, and most probably I would also not include G. Bachelard, but I would have no doubts as to including Kuhn, Quine, Feyerabend, Rorty, and others. Some perplexities nonetheless persist: is Quine's naturalised epistemology an open or a closed epistemology? In principle, considering the broad context of the ontological relativity argument, it would be an open one, but the same cannot be said, as I have argued, of the concept of naturalised epistemology in itself (which, to a certain extent and as I said, is a kind of *contradictio in adjecto* of the ontological relativity argument). Can a philosophy of science that is a continuation or a development of modernity in new terms, such as Popper's, be considered an "open epistemology"? I have already suggested that it can when I observed, with regard to the status of epistemology, that the philosophy of science did not die for all philosophers with the emergence of postmodernism. Indeed, if we do not accept relativism, we will have to somehow recover the modern idea of a philosophy of science.

The big problem ahead of us is knowing whether relativism is ultimately acceptable, as well as, as I have suggested, to what extent must a compromise between our traditional conception of rationality and philosophy of science and postmodern conceptions themselves be sought. It should again be noted that, as argued above, this is not just about the end of the philosophy of science, but fundamentally, the end of philosophy as systematic research and also the end of our traditional conception of rationality.

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