

THE GROUNDS OF KNOWLEDGE: A COMPARISON BETWEEN KUHN'S PARADIGMS AND FOUCAULT'S EPISTEMES*

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ABSTRACT *Thomas Kuhn's "paradigms" and Michel Foucault's "epistemes" are often seen as similar concepts, in that both would establish necessary conditions of knowledge. However, how close are they to each other? The aim of this article is to compare these two concepts in detail. Firstly, I discuss the similarities and differences between paradigms and epistemes regarding a number of aspects, as well as their respective functions within Kuhn's and Foucault's approaches. The analysis is organized around a series of topics, such as "definition" and "scope," with the intention of facilitating the comparison. Next, I examine some comments that Foucault and Kuhn made on each other's work, paying particular attention to matters related to the nature and role of paradigms and epistemes.*

Keywords *Thomas Kuhn, Michel Foucault, paradigm, episteme, Philosophy of Science.*

RESUMO *Os "paradigmas" de Thomas Kuhn e as "epistemes" de Michel Foucault são frequentemente apontados como parecidos, estabelecendo ambas condições de possibilidade para o conhecimento. Mas quão similares são eles realmente? O objetivo deste artigo é investigar as semelhanças e diferenças*

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entre esses conceitos, bem como suas funções na filosofia de Kuhn e de Foucault. Para facilitar a discussão, a análise foi dividida em uma série de tópicos, como “definição” e “escopo”. Por fim, examino alguns breves comentários que Foucault e Kuhn fizeram um sobre o outro, prestando especial atenção a questões relacionadas à natureza e ao papel dos paradigmas e das epistemes.

Palavras-chave Thomas Kuhn, Michel Foucault, paradigma, episteme, Filosofia da ciência.

Introduction

The 1960s saw the appearance of two of the most influential books in the field of social sciences in the twentieth century (Garfield, 1987; Green, 2016). The first, published in 1962, was *The Structure of Scientific Revolutions* (SSR), written by the American philosopher of science Thomas Kuhn. The other, published three years later, was *The Order of Things* (OT), by the French epistemologist Michel Foucault.

Some similarities between these works can be noticed even under a superficial reading. Both books, for example, belong to what can be considered, in a broad sense, the same field — philosophy of science.¹ Furthermore, both attach a primary role to the history of science, making abundant use of fine-grained case studies.

Another point, quickly noticed by many readers, is the apparent similarity between the central concepts developed in both works — “paradigm” and “episteme” (e.g., Dreyfus & Rabinow, 1983; Agamben, 2009, ch. 1). Thus, as early as 1968, Piaget was writing that “it is hard, reading Foucault’s analysis on the epistemes [...] not to think about the ‘paradigms’ described by Th. S. Kuhn in his famous work on scientific revolutions” (1968, p. 112).

Despite often compared, though, the exact relation between paradigms and epistemes has not yet been extensively investigated. Are epistemes and

1 Why “philosophy of science” and not “epistemology?” The choice, undeniably having a certain amount of arbitrariness, is based on the meaning that such expressions have in current analytic philosophy. Although the terms overlap considerably, philosophy of science is seen as more concerned with the foundations, methods, and implications of science, while epistemology devotes itself to matters more directly related to the theory of knowledge, such as perception, truth, and justification. In any case, this is only an initial presentation of the theme, and it is precisely the purpose of this article to clarify the differences between the authors’ approaches. For a different, but quite interesting, distinction between “philosophy of science” and “epistemology,” see Laudan, 2004.

paradigms really similar, performing analogous functions in their author's respective projects or is their resemblance only superficial?

My goal in this paper is to explore the parallels and differences between Kuhn's concept of "paradigm" and Foucault's concept of "episteme." The first part involves an examination regarding their nature and methodological role. For the sake of clarity, the discussion is organized around a number of arbitrary topics. I also address some issues that do not refer directly to paradigms and epistemes, but which are intimately connected to them. In the second part of the article, I present and discuss some comments Foucault and Kuhn made on each other's works. By seeing what they saw and questioned in each other's views, we will be in a better position to understand the differences between paradigms and epistemes.

The analysis conducted here focuses primarily on *SSR* and *OT*. The reason for this is a curious similarity between Kuhn's and Foucault's paths. After the success of their books, in which paradigms and epistemes appeared in the foreground, the two philosophers progressively abandoned their well-known concepts. Indeed, in *The Archaeology of Knowledge (AK)*, Foucault avoided talking in terms of epistemes, preferring to conduct an analysis around "discursive formations." Kuhn was a little more reluctant than Foucault in abandoning the notion of "paradigm. Despite severe criticism of his broad and sometimes loose use of the term in *SSR*, Kuhn still tried to rehabilitate the concept later, giving it a more restricted definition (1970b, 1974). Before long, though, he recognized that paradigms had gained a life of their own and stopped using that notion almost completely.

For this reason, it is almost exclusively in *SSR* and *OT* that we can find the best indications of what paradigms and epistemes are. This does not mean, of course, that other texts will not be mentioned. Although the investigation concentrates on these two books, other materials—books, articles, and interviews—have also been used to clarify obscurities and indicate some main changes in later developments in their author's thought.

Paradigms and epistemes

Definitions

One of the major problems in comparing the notions of episteme and paradigm is the difficulty in finding precise definitions of these concepts. Foucault tends to avoid more detailed methodological discussions about "episteme" in *OT*—the notion ends up being understood almost exclusively

by its use throughout the texts. In Kuhn's case, the difficulty is related to the polysemic nature of the term "paradigm" in *SSR*.

Still, we can try to understand what these concepts mean. Let us begin by considering "episteme." This is understood by Foucault as a mode of organization of the objects of experience. It is a "general system of thought" (1966, p. 83) that establishes the boundaries for the discursive practices of an epoch—which includes the numerous branches of science as well as the metaphysical and epistemological theories that reflect upon the episteme itself. More directly, episteme is defined in *AK* as "the total set of relations that unite, at a given period, the discursive practices that give rise to epistemological figures, sciences, and possibly formalized systems" (1969a, p. 191).

According to Foucault, European culture has been structured by a series of different epistemes since at least the sixteenth century. The episteme of Renaissance, for example, was characterized by the notion of similitude. The regime of similarity was the key to think about the most diverse subjects: plants, the heavens, or human health. It was also through the notion of similitude that philosophers reflected on the nature of similarity itself—an object consisting of meaning, signifier and conjuncture (the relation of similarity that linked the first two elements).

Let us now turn to paradigms. *SSR* presents a considerable variety of uses of this term. In an already classic article, Masterman (1970) lists no less than 21 different senses. Kuhn further circumscribes this multiplicity of meanings to two main ideas: those of "disciplinary matrix" and those of "shared example." It is this second sense that Kuhn considers the most fundamental one, and for this reason, I will focus on it.

A paradigm is a universally recognized scientific achievement seen as exemplary by a community of scientists—it is a solution to a concrete problem that serves as a standard for solving new problems. A paradigm has two defining characteristics. First, it delimits the problems that "can be assumed to have solutions" (1962, p. 37). Secondly, it restricts how these problems may be answered by establishing "rules that limit both the nature of acceptable solutions and the steps by which they are to be obtained" (1962, p. 38).² A paradigm, in other words, defines what problems are legitimate and what solutions are acceptable. Newton's laws would be the most perfect example of a paradigm, having structured a three-century tradition of scientific research.

2 These "rules" must be understood in a broad sense, as encompassing all kind of shared commitments: symbolic generalizations, natural laws, epistemic values, types of instrumentation, etc. (1962, ch. 4).

Conditions of Possibility

In the *Critique of Pure Reason*, Kant argues that empirical knowledge depends on certain *a priori* conditions of possibility. He identifies these as the forms of sensibility and the categories of understanding (Kant, 1781). As the Kantian *a prioris*, epistemes and paradigms establish conditions of possibility—of knowledge, for Foucault, and of science, for Kuhn.³

According to Foucault, epistemes provide a set of “rules of formation” (1969a, p. 38) that organize “the production, regulation, distribution, circulation and operation of statements” (1980a, p. 133).⁴ These procedures settle the boundaries of valid, meaningful knowledge (1966, p. xxiii; 1969a, p. 38; 1980a, pp. 112-13),⁵ creating with this an “epistemological field” (1966, p. xxiii) or “space of knowledge” (1966, p. 83).

Paradigms play a similar role in establishing the conditions of possibility of science. They provide a scientific community with both the problems that can be considered genuine and the valid procedures for solving them (1962, pp. 109-10). Consequently, they define the frontiers of admissible practice within a certain tradition of normal science.⁶

Within their fields, paradigms impose themselves in a necessary way. After the community gathers around a first paradigm, scientific practice becomes invariably dependent on paradigms. It is no longer possible, from then on, to practice science without their aid (1962, p. 77; also 1962, pp. 34, 79). Foucault does not explicitly assert that any knowledge is impossible without an episteme sustaining it. But as *OT* makes it clear, at least since the Renaissance all knowledge is effectively based on a sequence of epistemes.

Paradigms and epistemes also demand exclusivity. According to Kuhn, only one paradigm guides the research of the practitioners of a given specialty. “Incompatible rules for doing science,” he claims, “cannot coexist except during revolutions” (1962, p. 169; 1963, p. 352).⁷ The same would be true for

3 In *The Birth of the Clinic* (1963), Foucault explicitly planned to determine “the conditions of possibility of medical experience in modern times” (pp. xxi-xxii). And Kuhn, in one of his last writings, claimed that, in a manner similar to Kant’s *a priori*, his structured lexicon was “constitutive of *possible experience* of the world” (1993, p. 245).

4 The Foucaultian notion of “rules of formation” resembles the Kuhnian concept of “taxonomy” or “lexicon.” The only difference is that taxonomies depend also on “minimal laws of logic” (1991, p. 99) to produce meaningful statements.

5 Although not for discourse, as will be discussed in the section “Scope.”

6 Kuhn defined “normal science” as the “research firmly based upon one or more past achievements, achievements that some particular scientific community acknowledges for a time as supplying the foundation for its further practice” (1962, p. 10).

7 Later, Kuhn admits the existence of rival schools within the same scientific field (1970a, p. 147). Even in the Preface to *SSR*, he already notes that “there are circumstances, though I think them rare, under which two paradigms can coexist peacefully in the later period” (1962, p. xlv).

epistemes. “In any given culture and at any given moment,” Foucault explains, “there is always only one episteme that defines the conditions of possibility of all knowledge” (1966, p. 183).⁸

Truth

Paradigms and epistemes do not determine what is true or false. After all, they are only conditions of *possibility* of knowledge, and not of its *actual* realization. What paradigms and epistemes do is settle the frontiers of meaningfulness. The attribution of truth to statements occurs in a second moment and depends on the contrast with the natural world that is established through accepted methodological procedures (Kuhn, 1991, pp. 99-100).

Foucault’s and Kuhn’s notion of “truth” is essentially intra-theoretical (that is Kuhn’s expression, 1970a, p. 162). Paradigms and epistemes are not true or false themselves, but only the statements they convey. According to Kuhn, there is no immutable basis for assessing beliefs outside a given theoretical body (1991, p. 95), and, therefore, there is no sense in speaking of paradigms as being true or false in themselves (1962, pp. 169-70; 1991, p. 104; 1993, p. 244). Similarly, Foucault explains that he is interested in considering the epistemological field “apart from all criteria having reference to its rational value or to its objective form” (Foucault, 1966, p. xxiii; see Dreyfus & Rabinow, 1983, p. 31).⁹

Normativity and description

The relationship between description and normativity is not problematic in Kuhn’s approach, because both aspects are present in his analysis of paradigms. On the one hand, paradigms are what historians or sociologists identify as giving coherence to a specific tradition of science. At the same time, paradigms are what scientists in a research tradition base their problem-solving activity on. Paradigms, therefore, are what one discovers when studying the history of science, and also what scientists use in their daily practice. Paradigms have simultaneously a descriptive and normative character (1970a, p. 128ff.).

8 Things change when Foucault starts to analyze a smaller, located region of discourse in *AK*. He admits then a plurality of different circumscriptions of the archive. More importantly, since the normative character of epistemes is abandoned, there is no problem in thinking of multiple and incompatible ways of describing the discursive phenomena. See the subsection “Normativity and Description,” and note 15 above.

9 The idea that the objects in science are somehow created by subjects, a position known as anti-realism, is a complicated topic in Kuhn and Foucault. Throughout their works, they present different views on that thesis (sometimes understanding it literally, sometimes metaphorically) and offer different arguments for that. See (Gordon, 2012) for a more extended discussion.

Foucault's position, however, is not as clear as Kuhn's. In *OT*, he does not explicitly discuss the relation between normativity and description, but it is possible to assume that a position similar to Kuhn's is presented there. After all, defining epistemes as the conditions of possibility of the sciences is to characterize them as having an essentially normative nature, and not merely as displaying certain empirical regularities among the sciences.

Things are more complicated in *AK*. On the one hand, Foucault now seems inclined to adopt a descriptive understanding of the archaeological enterprise, considering discourse formations as possible "relations that can be discovered, for a given period, between the sciences" (1969a, p. 191). In other moments, though, he says these formations work as rules for meaningful discourse (1969a, p. 74).¹⁰ Ultimately, the reason for this instability is the fact that epistemes (or, in *AK*'s context, discursive formations) are unknown to the agents who employ them. That makes it complicated to explain how they could possibly have a normative function in directing scientists' discourses.

Scope

Paradigms and epistemes have differing scopes, which results in marked differences when these concepts are applied to the history of science (Piaget, 1971, p. 132). Epistemes are much broader, encompassing most of the knowledge of an era (Foucault, 1969a, pp. 218-19).¹¹ That includes not only the sciences, but also philosophical reflections and the multiple positivities that do not respond to scientific criteria. On the other hand, epistemes leave out "themes with scientific pretensions that one may encounter at the level of opinion and that are not (or are no longer) part of a culture's epistemological network" (1966, p. 398).¹²

10 Dreyfus & Rabinow (1983, ch. 4) discuss the internal tension between prescription and description in *AK*, and its consequences for the failure of the archaeological method.

11 It is not completely clear which fields Foucault considers as "sciences" and which he considers as "knowledge" or "positivity." For instance, he claims that the humanities, by "the position they occupy and the function they perform within the general space of the episteme" (1966, p. 408), do not themselves constitute real sciences, but only positivities. Likewise, general grammar and the classical theory of value "were not sciences, at least for the majority of those who were their contemporaries," as opposed to Cartesian mathematics (1966, p. 506). Biology, economics and philology, on the other hand, are called sciences (1966, p. 378). For a more extended definition of "science," "knowledge," and "positivity," see *AK*, Part 1, ch. 6.

12 Subsequently, Foucault rejects this holistic approach to epistemes (although his claim that he never nurtured such a view sounds unconvincing). One of the problems of *OT*, he says in the *AK*, was that "the absence of methodological signposting may have given the impression that my analyses were being conducted in terms of cultural totality" (1969a, p. 16). Foucault affirms that his intention was, from the outset, to circumscribe a more localized "region of interpositivity" rather than to characterize "the spirit or science of a period—the very thing to which my whole enterprise is opposed" (1969a, p. 179). Instead of a *Weltanschauung*, he was doing only a "regional" study, presenting "a network of analogies" and "isomorphisms" between certain disciplines (1970, pp. x-xi). The concept of "discourse," used in *AK*, aims precisely to replace the unrestricted application

Paradigms, on the contrary, are much more restricted and limited to certain traditions of scientific research. They tend to be relatively independent, and the various sciences are usually governed by distinct paradigms (although they may maintain relations of similarity as a result of transference and appropriation of paradigms). There is, for example, a Cartesian, Newtonian, and Darwinian paradigm, but not something like a paradigm of the natural sciences, as a whole.

Since they differ in scope, epistemes and paradigms do not necessarily exclude each other. An episteme, in that sense, could encompass one or more paradigms. In theory, this situation could make a direct comparison between Kuhn's and Foucault's analysis possible. For example, what are the elements that lead to scientific revolutions—the anomalies faced by paradigms in periods normal science or the changes in epistemes? Unfortunately, however, the sciences analyzed by Foucault and Kuhn are completely different, making a direct contrast between their ideas extremely difficult. Foucault concentrates on the knowledges or positivities of life, work and language, as well as the human sciences,¹³ whereas Kuhn focuses on the natural sciences, especially physics and chemistry.¹⁴

Discontinuity

Both Kuhn and Foucault reject continuist approaches to the history of science. For them, linear schemes of progress cannot accommodate the historical registers (Foucault, 1980a, pp. 111-12; Kuhn, 1962, ch. 1). Instead, they propose a discontinuist approach, in which the history of science is permeated by periods of non-cumulative ruptures — “radical events beneath the apparent continuity of a discourse” (Canguilhem, 1967, 78). These breakdowns occur in the changes from one paradigm (or episteme) to another, when there is “a modification in the rules of formation of statements which are accepted as scientifically true” (Kuhn, 1980, p. 112). As a result of these breaks, Foucault explains, a culture “ceases to think as it had been thinking up till then and

of epistemes for a more localized approach. Foucault speaks then of things like “clinical discourse, economic discourse, the discourse of natural history, psychiatric discourse” (1969a, p. 108). On the relation between “discursive formations” and “disciplines,” see *AK*, Part 1, ch. 1.

13 In *Madness and Civilization* (1961), Foucault studies the birth of psychiatry, and in *The Birth of the Clinic* (1963), that of medicine.

14 For Hacking (1979, p. 39), Foucault would be worried with the “immature sciences,” while Kuhn would be concerned with the mature sciences (the expression “mature science” is from *SSR*). But Foucault himself does not really seem to believe in such a distinction (see his 1980a, p. 110). Moreover, he claims that his interest in science is only secondary, to the extent that it is symptomatic of a larger transformation in Western culture, that of epistemologization (1969a, p. 195). The reason behind his preference for sciences such as psychiatry, medicine, and political economy, on the other hand, would be only that they display the relations between power and knowledge more clearly than fields as physics and chemistry (1980a).

begins to think other things in a new way” (1966, p. 56; 1969a, Introduction). Or, as Kuhn prefers to say, scientists start working “in a different world” (1962, p. 118).

It is hard to say precisely how radical these ruptures would be for each of them. Often, Kuhn and Foucault give the impression of assuming an absolute discontinuity in history, with abrupt and general changes. It is not easy to find in *OT* texts or authors that would be settled in between epistemes, or of any kind of bridge connecting the different modes of deep knowledge. In commenting on the passage from the Renaissance episteme to the classical episteme, for instance, Foucault simply states that “at the beginning of the seventeenth century, [...] thought ceases to move in the element of resemblance” (1966, p. 56).

SSR may also lead to a similar reading. Kuhn’s focus on major scientific revolutions; his analogy of changes of theories with changes in the world; and the holistic conception of paradigms — “in learning a paradigm the scientist acquires a theory, methods, and standards together, usually in an inextricable mixture” (1962, p. 109)—provide arguments for the idea that paradigm shifts involve radical changes in scientific practice.

In other moments, though, it is possible to find statements that offer milder views, suggesting that discontinuities may be more gradual and less abrupt. In the case of Foucault, this appears most clearly in his description of the rise of the modern episteme, which seems to point to a piecemeal transition. He first describes the change occurring in culture as having two successive steps, and not just one big break. Furthermore, he explains that the general grammar, being more deeply attached to the previous episteme (1966, pp. 252-53), ended up subsisting for longer than other kinds of knowledge, which indicates that transitions from one episteme to another could happen gradually.¹⁵

Similarly, one can also read *SSR* as maintaining a more lenient position on the radicalness of scientific revolutions. Kuhn’s objective in *SSR* was never that of studying the macro-revolutions that seldom occur in history, but simply to understand the nature of non-cumulative change in general (1970a, p. 143).¹⁶ Those changes can (and usually) have a small scope, affecting just a particular professional subspecialty (1962, pp. 49-51). However, for Kuhn, contrary to what Foucault’s view may perhaps suggest, non-cumulative changes can never “be made piecemeal, one step at a time” (1981, p. 28).

15 His statements in *AK*, in particular, go in the direction of considering small revolutions. But here Foucault no longer supposes an episteme of universal character, dealing instead with particular discursive formations.

16 Kuhn claims that this was always his original intention, confused only by his own rhetoric (1999, p. 34).

In any case, discontinuity poses a serious problem for the intuitive belief in a historical unit of scientific disciplines. If there are breaks in the sciences over time, would it still be possible to speak of something like economics, biology, or physics? Foucault's analysis, for instance, tends to disregard the unity of scientific disciplines. For him, "all this quasi-continuity on the level of ideas and themes is doubtless only a surface appearance" (1966, p. xxiv). There would be more similarity between the different sciences of an era than between them and their successors (1966, pp. xxiv-xxv).

Although his historical analyses are usually not restricted to disciplines, Kuhn tends to see greater identity in them over time. Even when paradigms change, most of the common terms between successive theories keep the same meaning, permitting a partial overlap (1983). It is this relative continuity of concepts, problems, and solutions that guarantees the unity of a research field.

Principles of Change

What is the cause of history's discontinuous pattern? For Kuhn, paradigm shifts begin with the emergence of anomalies—i.e., "the recognition that nature has somehow violated the paradigm-induced expectations that govern normal science" (1962, p. 53). If enduring, these difficulties may lead to an increasing disbelief in the paradigm and hence to a growing sense of mistrust in its capacity to deal with problems. The extension and intensity of this anomaly may then provoke a crisis, marked by the inability to provide solutions within the normal guidelines. Finally, scientists may decide to experiment new approaches, leading to the emergence of competitors that may take the place of the older paradigm.

Foucault does not provide any kind of explanation for the discontinuities that mark the passage from one system of thought to another (1966, pp. 239-40). He justifies that by claiming that one should wait until the "archaeology of thought has been established more firmly" (1966, p. 56) before explanations of this type are advanced. The abrupt changes described in *OT* thus remain inexplicable, giving the impression, as Foucault himself admits, of being a "somewhat enigmatic event" (1966, p. 258). This is what led many scholars to criticize Foucault's historical reconstruction, claiming that his "epistemic mutations" were presented as "fundamentally arbitrary" (Merquior, 1985, p. 42).¹⁷

17 The concern with indicating the causes of changes in discourses had been worked out by Foucault in his previous books. And a similar attempt to circumvent this difficulty occupies a central space in his later genealogical phase.

Nonetheless, Foucault considers that empirical phenomena have no power to provoke a change of epistemes (1966, p. 274; see 1966, p. 252, for a possible statement to the contrary). Although placing little emphasis on experimentation and observation in *SSR*, Kuhn differs from Foucault in attributing a role to empirical anomalies for producing paradigmatic changes (1962, p. 77). For him, this was the case in the discovery of X-rays resulting from Roentgen's experiments with cathode rays: the new phenomenon required a complete review of numerous well-established instrumental procedures (1962, ch. 6). Kuhn also stresses the existence of constraints imposed by nature on scientific theories. For him, "observation and experience can and must drastically restrict the range of admissible scientific belief, else there would be no science" (1962, p. 4).¹⁸

Incommensurability

The idea that paradigms and epistemes establish the conditions of possibility of scientific knowledge, along with the discontinuous view of the history of science, leads to a phenomenon Kuhn calls "incommensurability." Briefly, incommensurability is the thesis that practitioners of different paradigms (or epistemes) "must fail to make complete contact with each other's viewpoints" (Kuhn, 1962, p. 147).

Incommensurability can manifest itself in several ways: as incompatibility of concepts, instruments, values, problems, and methods (Kuhn, 1962, ch. 12). We can find illustrations of these diverse modalities of incommensurability both in *SSR* and *OT*. A first, and more obvious, type of incommensurability lays on the different concepts used. For example, what the Aristotelian tradition saw as a body falling with difficulty, Galileo saw as a pendulum, a body that repeated the same movement *ad infinitum* (Kuhn, 1962, pp. 118-20); likewise, currency—understood by the Renaissance as a commodity—was considered by classic thinkers as a pure sign (Foucault, 1966, ch. 6).

A second example shows how changes in theories alter the very nature of "methods, problem-field, and standards of solution" (1962, p. 103). The similarity of functions between organs, for instance, which played a secondary role in natural history and were limited to supporting taxonomic classifications, suddenly acquire a central place in the biological analysis conducted in the modern episteme (Foucault, 1966, ch. 8, sec. 3). The "principles" of chemistry,

18 At the same time, Kuhn does insist that such restrictions do not determine the final outcome of paradigmatic disputes, there being always "an apparently arbitrary element, compounded of personal and historical accident" (1962, p. 4) in scientific beliefs.

which were fundamental “to account for the qualities of chemical substances and for the changes these qualities underwent during chemical reactions” (Kuhn, 1962, pp. 106-07) in the phlogiston theory, disappeared from Lavoisier’s oxygen theory.

Incommensurability makes adherents of different theories “inevitably talk through each other when debating the relative merits of their respective paradigms” (1962, p. 109). Supporters of different paradigms are, as Kuhn says, “always slightly at cross-purposes” (1962, p. 112), and communication between them is “inevitably partial” (1962, p. 148). Consequently, incommensurability prevents a point-by-point comparison between paradigms, “by some process like counting the number of problems solved by each” (1962, p. 147).

These communicational issues can be seen in Kuhn’s description of the chemical revolution. Priestley and Lavoisier disagreed about the results of the same experiments: while the former saw bottled air as dephlogisticated air, the latter saw it as oxygen. But similar difficulties of understanding occur equally between scientists of different epistemes, who live under “fundamental modes of knowledge” (Foucault, 1966, p. 275). The naturalist Buffon, for instance, “was to express astonishment” in trying to comprehend the mixture of accurate descriptions and mythology, anatomy, and magic, in Aldrovandi’s writings (1966, p. 43). The effect of strangeness caused by radical changes in scientific patterns can also make old problems look like “mere tautological word-play” (Kuhn, 1962, p. 104), and even generate laughter (Foucault, 1966, p. 56).

Overall, incommensurability poses a serious problem for the possibility of understanding alternative scientific theories. How could an episteme or paradigm be approached from a distinct and incommensurable referential? How could scientists debate the merits of different theories and even adopt a new one?

It is hard to see how scientists would be able to comprehend a different episteme, since, for Foucault, the thoughts elaborated in a different episteme are not “directly accessible” (1966, p. 331). Kuhn, in turn, offers two solutions to that problem in his later work. First, he emphasizes that the incommensurability thesis implies only “partial communication,” not complete mutual incomprehension (1970a, pp. 144-45). Secondly, he distinguishes between the process of translation and the process of interpretation: it is possible to understand a different language in its own vocabulary, without being able to translate it into a different language (1983, 1991). Those two elements explain why, for Kuhn, contrary to Foucault, incommensurability does not exclude communication and comparability (Kuhn, 1970b, sec. 5; and especially, 1983).

Whig Historiography

The discontinuous view of scientific development has important consequences for historiography. If paradigms and epistemes change over time, one must avoid reading the historiographical material with eyes in the present—what is popularly known as “Whig historiography.” Otherwise, we would make the mistake of attributing to past scientists claims that they never sustained.

Kuhn is a fierce critic of presentist historiographies. For him, history of science can only produce a better understanding of its object if it avoids the temptation of answering “questions posed by the unhistorical stereotype drawn from science texts” (1962, p. 1). Instead, Kuhn proposes following the steps of the then new historiography of science. Contrary to the Whig historiography, the new historiography aims at understanding science within its own context, seeking “to display the historical integrity of that science in its own time,” giving scientists’ opinions “the maximum internal coherence and the closest possible fit to nature” (1962, p. 3).¹⁹

Foucault defends a similar approach. Commenting on Canguilhem’s method, in his foreword to the English language edition of *The Normal and the Pathological*, he states that

one does not make history of science either by refiltering the past through the set of statements or theories valid now, thus disclosing in what was “false” the true to come, and in what was true, the error made manifest later on (Foucault, 1989, p. 16).

In Foucault’s view, the task of historiography is to understand the norms that guide the “processes of elimination and selection of statements, theories, objects” (1991, p. 16) at certain moments. And this cannot be performed from our current or any other point of view, since this is just a specific episode in history.²⁰

Progress

Kuhn and Foucault reject the idea that theories in the history of science show a progress towards a true representation of the world—the so-called convergence theory of truth. For Foucault, scientific development is not directed

19 In *AK*, Foucault also talks about the “new history” (1969a, Introduction).

20 In what is one of his rare references to Kuhn, Foucault explains that “it is not by depending on a ‘normal science’ in T.S. Kuhn’s sense that one can return to the past and validly trace its [of the norms] history: it is in rediscovering the ‘norm’ process, the actual knowledge of which is only one moment of it” (Foucault, 1991, p. 16). What he means by that is that historians should not employ the current state of science (the normal science) to examine an older piece of knowledge. Instead, they should analyze it through its own structure. That is exactly what Kuhn defends, although Foucault’s reference to “normal science” may sound as though they are on opposite sides.

at “an objectivity in which today’s science can finally be recognized” (1966, p. xxiii). Likewise, for Kuhn, it is not valid to suppose that the transition from one set of problems and patterns of solutions to another represents “a process of evolution toward anything” (1962, p. 170).²¹

Foucault and Kuhn further agree that changes in theories are not caused by the use of more sophisticated methodologies or a growth in rationality. In Foucault’s words, it is “not that reason made any progress” (1966, p. xxiv; see also p. 346, 55). Similarly, for Kuhn, the transition from one set of questions to another represents “neither a decline nor a raising of standards, but simply a change demanded by the adoption of a new paradigm” (1962, p. 108).

Historical a priori

Unlike Kant, for whom there was just a single set of *a priori* categories imposed on the phenomena of experience, originating in a transcendental subject, epistemes and paradigms change over time. Foucault uses the expression “historical *a priori*” (1966, p. xxiii) to refer to the fact that the epistemes, the conditions of possibilities of the sciences, are not always the same. The expression serves to emphasize the two aspects of the nature of epistemes: they are *a priori* because they are constitutive of experience; and they are historical, insofar as the conditions of possibility change from time to time.

The “historical *a priori*” can also serve to characterize paradigms. In *SSR*, Kuhn explains that paradigms delineate the types of problems and solutions that can be proposed (the *a priori* side). At the same time, he emphasizes the occurrence and necessity of scientific revolutions—that is, alterations of paradigms over time (the historical part). In the 1990s, the notion of “historical *a priori*” becomes even more explicit in his writings. Kuhn then describes himself as a “Kantian with moveable categories” (1997, p. 264), saying that his structured lexicon resembles the Kantian *a priori* when relativizing “the categories (and the experienced world with them) to time, place, and culture” (1993, p. 245; see also 1991, p. 104; 1997, p. 264).

Discursivity

Another important difference between paradigms and epistemes is related to the nature of these elements. The episteme is understood by Foucault as a “specifically discursive apparatus” (1980b, p. 197), which determines what is

21 Foucault does not explain why he rejects the “convergence theory of truth,” but Kuhn has a number of papers in which this position is developed (1962, 1970a, 1970b, 1989, 1991, 1992, 1993).

available or not to be spoken or thought. In *OT*, virtually no attention is paid to non-discursive practices. Epistemes are considered autonomous objects which can be isolated and understood without reference to concrete contexts.

This idea is refined in *AK*, although the position defended there is not absolutely clear. In any case, most scholars believe that Foucault sees discourses as responsible for unifying “the whole system of practices” (Dreyfus & Rabinow, 1983, p. 65, 77). Non-discursive practices, then, would be subordinated to discursive systems (1969a, p. 162ff.; Habermas, 1987, pp. 267-68). Foucault, however, does not seem anymore to presuppose that discourses have a “pure ideality and total historical independence” (1969a, pp. 164-65). The aim of archaeology is not that of establishing a causal relation between discourses and practices, but only that of understanding how they are articulated in a certain domain.

The exclusive focus on discursive elements in *OT* and *AK* contrasts with Foucault’s other works. In his first books, the object of study were the relations between scientific discourses—psychiatric and medical, respectively—and the concomitant social factors and institutions in which they were embedded (although the interactions between both spheres were not always fully explained). Further on, Foucault sets aside again the exclusive fixation on the discursive sphere. He then goes on to investigate the relationship between power and knowledge—between modalities of power and systems of truth—, subordinating “the archaeology of knowledge to the genealogy that explains the emergence of knowledge from practices of power” (Habermas, 1987, p. 268).²²

It is curious to note how Foucault saw his momentary preoccupation with the exclusive discursive aspects of the sciences as bringing together—in an involuntary and negative way—epistemes and paradigms (1980, p. 112). But a close look at *SSR* demonstrates that paradigms are, in fact, quite the opposite. According to Kuhn, paradigms are “examples which include law, theory, application, and instrumentation together” (1962, p. 11). From the outset, they involve a whole constellation of group commitments that goes far beyond the linguistic sphere. Paradigms also have an institutional basis, since their existence is directly linked to the existence of the groups that share them. Contrary to the epistemes, which are autonomous objects and can be understood without reference to concrete contexts and practices, paradigms are necessarily linked to the practices of a community, as are theories, methods, values, and instruments.

22 On the different phases of Foucault’s thought, as well as on its real or retrospective coherence, see Flinn, 2005; Davidson, 1986; Dreyfus & Rabinow, 1983.

Location

Differences between epistemes and paradigms also emerge when we consider where they are located. Paradigms are the propriety of “practitioners of a scientific specialty” (1970b, p. 176).²³ The Foucaultian alternative, on the other hand, is undoubtedly wider and more nebulous. Epistemes occupy something like the entirety of Western culture, serving as the ground of knowledge for different sciences and philosophical reflections in periods of considerable duration.

Anonymity

Epistemes are anonymous objects (Hacking, 1979, p. 42; Foucault, 1969a, p. 117), meaning that those who use them need not be (and usually are not) aware of their existence, nor of the conditions of possibility they establish. For Foucault, individuals have at most a “superficial, limited, and almost fanciful” (1970, p. xii) perception of the episteme they live in, and their discourses, he writes in *AK*, “are governed by rules that are not all given to their consciousness” (1969a, p. 211). The epistemes, in sum, are a “*positive unconscious* of knowledge”—an unconscious that does not act as a negative obstacle to knowledge, but as “a level that eludes the consciousness of the scientist and yet is part of scientific discourse” (1970, pp. xi-xii).²⁴

Paradigms, on the contrary, are not anonymous objects. Naturally, scientists and historians face an unavoidable difficulty when trying to put into words the essential commitments shared by a community (Kuhn, 1974). This problem derives from the non-propositional nature of paradigms, since they are a type of knowledge “embedded in shared examples” (Kuhn, 1970b, p. 191).²⁵ But none of this implies that they are inaccessible to the subjects who use them. Paradigms are essentially public and shareable objects. With the exception, perhaps, of the most random periods of research characteristic of

23 These communities can be considered at their various levels, ranging from the global community of natural scientists to more specialized research groups, with maybe a hundred or fewer members (1970b, p. 224). A much more complicated question in Kuhn’s work is on the proper agent of scientific knowledge. Kuhn never fully explains the relations between his methodological individualism and his sociological approach.

24 At some moments, however, the postulates of the episteme seem to coincide fully with some philosophical reflections. Merquior gives the example of Port Royal: “The Port-Royal *Logic* (1662) enjoys a special status in Foucault’s analysis, for it features as a curious instance of cognitive awareness among the normally unconscious epistemic rules. Thus the classical semiotic regime, which Foucault deems to be unconsciously at work in all other fields of classical knowledge, was actually stated by the Port-Royal logicians Arnauld and Nicole, not—as the other main coordinates of the classical episteme—inferred from classical discourse by Foucault” (Merquior, 1985, p. 64).

25 On Kuhn’s view of “tacit knowledge,” see 1997, p. 296; 1970b, pp. 239-40.

extraordinary science, scientists know what paradigms they employ, and agree on their particular applications.

Internalism

Both Foucault and Kuhn practice what, roughly speaking, can be classified as an internalist historiography of science. Foucaultian epistemes are autonomous and can be understood without appeal to social practices. Therefore, it is possible to describe them by paying attention exclusively to the discursive level.

SSR also incorporates a largely internalist approach. As a general rule, crises and revolutions are almost always explained by the “breakdown of the normal technical puzzle-solving activity” (1962, p. 69).²⁶ However, contrary to Foucault’s approach, Kuhn does not derive his internalism from methodological presuppositions, but from a practical concern with highlighting the disruptive potential inherent to normal science. In fact, *SSR* violates a strict orthodox internalist view in a number of ways, when using, for example, sociological and psychological categories or appealing to non-epistemic elements in explaining the outbreak of crises (see, for example, 1962, pp. 151-52). In practice, though, these externalist incursions occupy a secondary place in *SSR*.

It is only in the article “Objectivity, Value Judgment, and Theory Choice” (1977a) that Kuhn provides precise indications of how to balance internalism and externalism. The connection between social factors and cognitive assessments of theories occurs through the epistemic values. These criteria are used when scientists have to decide which of the available theories to adopt (internalism). At the same time, however, epistemic values are transmitted by the community, and the way they are understood by each person depends on individual elements such as the professional and personal history of the scientist (externalism).

Methodology

Disagreements regarding the nature and location of epistemes and paradigms help to explain the distinct methodologies adopted by Kuhn and Foucault. Paradigms are shared by communities. Their identification, therefore,

26 Later, Kuhn explains the intuitive appeal of internalist approaches as a by-product of the increasing specialization in science. Specialization creates a misleading impression of autonomy of knowledge, since “the problems on which such specialists work are no longer presented by the external society but by an internal challenge to increase the scope and precision of the fit between existing theory and nature.” According to him, “that quite special, though still incomplete, insulation is the presumptive reason why the internal approach to the history of science, conceived as autonomous and self-constrained, has seemed so nearly successful. To an extent unparalleled in other fields, the development of an individual technical specialty can be understood without going beyond the literature of that specialty and a few of its near neighbors” (1968, p. 119).

demands a sociological approach (Kuhn, 1962, p. xli; 1970b, sec. 1; 1970a, p. 131, 134-35).²⁷

Epistemes, in contrast—since they are not possessed by specific individuals or groups—, are objects hidden from a psychological or sociological perspective. Neither are they found in particular discourses (the theories and hypotheses of the sciences), in what would turn the quest for them into a typical venture in the history of scientific ideas—Foucault insists that the latter displays no more than a “surface effect” (1966, p. 226) of deeper knowledge. Instead of a sociology and history of ideas, Foucault proposes an “archaeology” as a way to recover these structures.²⁸

Foucaultian archaeology has as its object the archive — “the set of discourses effectively uttered” (1969b, p. 772) — and aims to find “systems of simultaneity” (1966, p. xxv). For this reason, it treats “the language and practices of a discipline from another age as mere meaningless objects” (Dreyfus & Rabinow, 1983, p. 13), in order to identify forms of organization of knowledge that, from a contemporary perspective, could seem incomprehensible.²⁹ But in what place should archaeology search when trying to recover the epistemes of other epochs? The examples found in *OT* are taken from science and philosophy, but its object is, in fact, much broader — archaeology focuses on all the knowledge of a time. This is where it finds the fundamental relations that constitute the limits of the discourse itself.

It must be acknowledged though, that Foucault does not provide a precise method for identifying epistemes, nor indicates the exact procedures to be adopted by the archaeologist (Piaget, 1971, p. 132). All we can deduce from his works is that the archaeological enterprise involves: i) detecting the fundamental elements of a set of discourses; ii) inferring its logical consequences, iii) and consequently establishing the possible limits of the thought of an epoch. Additionally, there is the complicating factor that the human subjects who think within the scope of an episteme are unconscious of doing so.

The manifest goal of *AK* is precisely to solve this failure by presenting a method. But as Foucault himself acknowledges, the book “was neither

27 Kuhn does not discuss the specific techniques to be used in the study of communities and paradigms, limiting himself to citing some empirical studies in the field (1970b, sec. 1).

28 About the origin of the term, Merquior says that “since epistemes are conceptual strata underpinning various fields of knowledge and corresponding to different epochs in Western thought, historical analysis must ‘unearth’ them—hence the archaeological” (1985, p. 36). Foucault, however, shows some discomfort in relation to the idea of archaeology as excavation: “What I seek is not the relationships that would be secret, hidden, more silent or deeper than the consciousness of men. On the contrary, I try to define relationships that are on the surface of discourses; I try to make visible what is invisible only because it is very much on the surface of things” (1969b, p. 772). Instead, he claims to have taken this notion from Kant (see Foucault, 1971a, p. 60).

29 On the relationship between “archaeology” and “structural analysis,” see Foucault, 1969a, pp. 15-16.

completely a theory nor completely a methodology” (1971c, p. 157).³⁰ Ultimately, what the book did was simply to circumscribe an object distinct from that approached in the traditional history of science.

A final aspect we can note in relation to this topic is the contrast between Foucault’s and Kuhn’s conceptions of “science,” caused by their divergent methodological assumptions. Foucault understands that sciences are a type of knowledge, based on an episteme, presenting “characteristics of objectivity and systematicity” (1966, p. 398). Kuhn, on the other hand, considers science a puzzle-solving activity practiced by a community of highly trained specialists. Thus, Foucault offers a logical definition of “science”—depending on the way sentences are organized—, whereas Kuhn gives a sociological one—a specific pattern of social organization and research.

Commentaries and criticisms

Despite the relative similarities between their projects, Kuhn and Foucault never entered in any fruitful dialogue. That is why a conceptual analysis is indispensable. Nonetheless, it is possible to find some illuminating (although brief) commentaries in some of their texts and interviews. These sources are: on Kuhn’s side, an interview;³¹ and on Foucault’s side, two responses to a review of *OT*, an interview, and his introduction to the English translation of Canguilhem’s *The Normal and the Pathological* (1989). Such material will help us to identify some fundamental disagreements between these authors and further explore the topics discussed above, in a way that would hardly be possible from a mere comparison of the ideas exposed in their books alone.

Let us start by Foucault. In 1971, the critic George Steiner published a review of *OT*. Although praising Foucault for his talents as a writer and historian, the text was generally quite critical. Steiner condemned what he saw as a verbiage typical of the French intelligentsia; an arbitrary selection

30 “It is not a theory since, for example, I did not systematize the relations between discursive formations and social and economic formations, whose importance was established by Marxism in an undeniable way. [...] In addition, I left aside, in *AK*, purely methodological problems. That is: How to work with these instruments? Is it possible to analyze these discursive formations? Does semantics have any use? Quantitative analysis, as those practiced by historians, do they serve for anything?” (Foucault, 1971c, p. 157).

31 Kuhn mentions Foucault only once in a written text. The reference appears in a note to “What are Scientific Revolutions?” (1981), in which he explains his recent adoption of the expression “previously available,” rather than “observational.” The reference to Foucault is very vague, though. Kuhn does not make it clear how Foucault’s strata relate to the notion of “previously understood” that he mentions, nor how they relate to “taxonomies,” which he discusses throughout the article (the fact that the note is found early in the text makes it even more difficult to understand the parallel). And for our purposes of understanding the similarities between “paradigms” and “epistemes,” Kuhn’s reference is doubly opaque: *AK* marks exactly the retreat from the notion of “episteme” to that of “discourse.”

of material; and the fact that Foucault did not give any credit to scholars who had developed ideas similar to his, and of which he would certainly be aware. Foucault's reply was harsh, and the exchange, which continued in two further letters, became increasingly aggressive.

What is of interest here is the last of Steiner's criticisms—that Foucault would not have given due recognition to the ideas he supposedly took from other authors. Among those mentioned by Steiner (1971a, 1971b) was Kuhn and his notion of "paradigm." Foucault responds to this accusation in his second and last reply. He writes then:

Mr. Steiner believes that I should have cited Kuhn. It is true that I hold Kuhn's work to be admirable and definitive. But bad luck again (for me as well as for Mr. Steiner). When I read Kuhn's book during the winter of 1963-64 (I believe it was a year after its publication), I had just finished writing *The Order of Things*. I thus did not cite Kuhn, but quoted instead from the historian of science who shaped and inspired his thoughts: G. Canguilhem (Foucault, 1971b, p. 60).

Hence, Foucault justifies in two ways the lack of references to Kuhn and to "paradigms" in *OT*. First, because he had not read *SSR* at the time—which is absolutely plausible, since Kuhn's book had only been published in the summer of 1962. Furthermore, he claims that lack of reference to Kuhn was not a problem, since he, Foucault, had made reference to a more fundamental author, Canguilhem, who, according to him, had "shaped and inspired" Kuhn's thoughts. For Foucault, if there was any similarity between paradigms and epistemes, it was by virtue of its common source: Canguilhem's ideas.

This last statement is hard to sustain, though. Like Foucault, Kuhn was sometimes accused of not properly crediting other philosophers, such as Toulmin, Wittgenstein, or Polanyi (see Hacking, 2012; for a reply by Kuhn, see 1997, especially, pp. 296-97). His admiration and indebtedness to the historians of science, on the other hand, tended to be more straightforward and generous (for example, 1962, ch. 1; 1997). In spite of that, nowhere in Kuhn's writings is the work of Canguilhem mentioned, despite Kuhn's deep familiarity with French epistemology and history of science.

The difference between Canguilhem's and Kuhn's approaches is also considerable.³² Take, for example, Canguilhem's *The Normal and the Pathological* (1989), arguably his most famous work. The aim of the book is to understand current scientific knowledge through an analysis of its history, and ultimately "to integrate some of the methods and attainments of medicine into

32 For a criticism of Canguilhem to Kuhn, see Canguilhem, 1990, Introduction.

philosophical speculation” (1989, p. 34). *SSR* could not be further from this. Its goals is to comprehend the patterns of research that explain the development of science through time, and not in any way to contribute to scientific practice or methodology.

Canguilhem also departs considerably from Kuhn in the way he employs history. History is used by him for philosophical purposes, as a way of criticizing the 19th century thesis that “pathological phenomena are identical to corresponding normal phenomena save for quantitative variations” (Canguilhem, 1989, p. 35). This “philosophical history rather than historical philosophizing,” in the words of Gutting (2003, p. 52), leads to a methodological approach diametrically opposed to the new historiography of science adopted by Kuhn. Canguilhem sees no problem, for example, in pointing out unrecognized or unexplored contradictions in the works of the authors he discusses. He also makes use of current scientific knowledge, to which scientists in the past did not have access, in order to demonstrate the limits and errors of their theses (e.g., 1989, pp. 79-80). His objective of employing historical reconstruction is, after all, merely expositive. But these practices violate, in a straightforward way, the eminently anti-presentist attitude that underlies Kuhn’s historiography.³³

“Paradigms” are directly mentioned by Foucault in (1980a). There, he defines an episteme transition as “a modification in the rules of formation of statements which are accepted as scientifically true.” He then proceeds to differentiate these changes from others that could be confused with it. According to him,

It is not a change of content (refutation of old errors, recovery of old truths), nor is it a change of theoretical form (renewal of a paradigm, modification of systematic ensembles). It is a question of what *governs* statements, and the way in which they *govern* each other so as to constitute a set of propositions which are scientifically acceptable, and hence capable of being verified or falsified by scientific procedures (1980a, p. 112).

Foucault contrasts changes of discourse regimes to changes of content and theoretical form. The former would be a change in the rules of production of

33 At this point, Foucault’s approach in *OT* seems to equally depart from Canguilhem’s. What must have motivated Foucault to see Canguilhem in such a positive way was his discontinuous conception of the history of concepts. Foucault writes in *AK*: “*Displacements and transformations of concepts: the analyses of G. Canguilhem may serve as models; they show that the history of a concept is not wholly and entirely that of its progressive refinement, its continuously increasing rationality, its abstraction gradient, but that of its successive rules of use, that of the many theoretical contexts in which it developed and matured*” (1969a, p. 4). Canguilhem, however, seems to endorse a sort of scientific realism, contrary to what Foucault’s analysis, expressed in the above passage, suggests (Canguilhem, 1990).

meaningful scientific statements—those that can be accepted or rejected, as opposed to illegitimate or functionless statements; the latter, the change of content and form of statements, would be merely a change in what is actually said—what is considered true or false—or in how statements are organized. For Foucault, Kuhn’s paradigm shift would be of the second type—not a change in the set of meaningful statements, but simply a modification of which of them are accepted as true and how they are related.

If this is indeed Foucault’s interpretation of the Kuhnian notion of paradigm, as Agamben (2009, p. 14) also seems to understand, this is a profound misunderstanding of the nature of this concept. In effect, a paradigm shift is more than a redistribution in the way statements are organized (the “theoretical form”), or what is accepted or not as true (a “change of content”). It is fundamentally a change in the possibilities of meaningful enunciation.

In this sense, paradigms would be exactly like epistemes, in dictating the rules of what can and cannot be formulated. The substitution of one paradigm by another provokes the restructuring of the conditions of possibility of discourse itself, and not simply a restructuring of its modes of organization. Kuhn leaves no doubt about this in *SSR*. He claims that “the reception of a new paradigm often necessitates a redefinition of the corresponding science” (1962, p. 138).³⁴ Moreover, a number of examples in *SSR*, like the Aristotle-Descartes-Newton transition in mechanics (1962, pp. 104-06), demonstrates how paradigm shifts lead to relevant transformations in patterns of scientific explanation; that is, in the kinds of discourses considered acceptable at different times. The dynamics described by Kuhn is, actually, quite similar to that found in *OT* (see, for example, 1966, p. 56, 83).

Let us now look at what Kuhn has to say about Foucault. His commentaries appear in an interview given to Giovanna Borradori (1991), in which he talks about some of the central themes of his work and about his intellectual trajectory. Asked about the influences received from the French epistemologists Gaston Bachelard and Michel Foucault, Kuhn explains that his link with French thought came through the history of science, rather than philosophy (Borradori, 1991, p. 158).³⁵ Kuhn also claims not to know much about Foucault’s work, and that *OT* was among the few things he had read (Borradori, 1991, p. 160).

34 This is even clearer in Kuhn’s later articles, in which he focuses almost exclusively on the semantic aspects of scientific theories (in what comes closer to the Foucaultian approaches found in *OT* and *AK*). A change in taxonomy causes a change in the set of statements that can be candidates for truth or falsity. See Kuhn’s 1989, 1991, 1993.

35 For a comparison between Kuhn’s ideas with those of other French philosophers of science, such as Brunschwig, Bachelard, and Canguilhem, see Gutting, 2003.

But when inquired again about the relations between his ideas and those of Foucault, Kuhn advances a comparison between their perspectives on scientific development and change of theories (Borradori, 1991, p. 161).

First, Kuhn seems skeptical about the amplitude of the epistemes, which do not fit well with the descriptions outlined in *SSR*. Indeed, it is hard to conceive how the history of the natural sciences described by Kuhn would be compatible with Foucault's episteme (see Piaget, 1971, pp. 133-34; Canguilhem, 1967, p. 88). The natural sciences, at least according to Kuhn's historical reconstruction, do not seem to have experienced changes that coincide with Foucault's epistemic breaks. Also, Kuhn would probably find it difficult to fit the natural sciences into the Foucaultian epistemes. The classical episteme, for instance, is said to be based on representation, mathesis, and taxonomy. It is hard to see, though, in what sense Newtonian physics would be marked by these elements more than, for example, the physics of Copernicus or Maxwell. And a similar argument could be formulated as regards the transition from the episteme of analysis to the episteme of history.

Despite that, Kuhn sees certain similarities between his approach and Foucault's regarding the idea that "words are used differently, and that you misread them simply going back in time" (Borradori, 1991, p. 161). This is no other than the phenomenon of "incommensurability." If different paradigms (or epistemes) involve distinct languages, their succession in time implies a rupture of the underlying practices or discourses. Those are Kuhn's "revolutions" and Foucault's "ruptures" [*coupures*].

Nonetheless, while sharing Foucault's belief in ruptures throughout history, Kuhn considers that their views on the trajectory of scientific development are quite different. He agrees with Foucault that the succession of theories does not imply approaching a fixed goal—whatever that goal is (truth, the correct representation of things, etc.). But though science is not developing toward any predetermined goal, it is certainly improving from primitive beginnings (1962, ch. 12; 1970b, sec. 6). According to Wray (2011, p. 114), "changes in science are best understood as responses to existing problems, not as attempts to get at a description of the world as it *really* is." "Scientific development," Kuhn claims, "must be seen as a process driven from behind, not pulled from ahead—as evolution from, rather than evolution toward" (1991, p. 96).

Kuhn also criticizes Foucault for not presenting a mechanism to account for the shift from one episteme to another—a limitation that, as we have seen, Foucault himself acknowledges. This attitude is explained by Kuhn in two ways, without clarifying how they are exactly connected. One is Foucault's interest in understanding where present historical moment is headed, and not so

much in understanding the path that led to the current epistemic configurations (Borradori, 1991, p. 161). The second reason is linked to his “destructive tendency.” Foucault would assume a discontinuity of science so radical that it turned almost impossible to explain the passages between epistemes.

Conclusion

Foucault’s epistemes and Kuhn’s paradigms are frequently compared. To many people, they seemed to possess a strong similarity. Throughout this article I tried to present, in a detailed way, what I considered the main similarities and differences between these ideas. Paradigms and epistemes provide the conditions of possibility of knowledge and are both part of an approach to the history of science that emphasizes discontinuity over continuity. Despite that, they have different explanatory functions and diverge in important methodological aspects.

Fundamentally, the differences in between “paradigms” and “epistemes” are due to their being part of very distinct projects. Kuhn’s primary goal in *SSR* is to find out how science develops over time. The historical descriptions he uses for that enterprise are, in their general outlines, almost unanimously accepted by historians of science. In this sense, his main contributions are twofold. He attributes a prominent place to the historical material for philosophical discussions; and gives an original answer to a number of traditional problems in the philosophy of science, as what gives unity to a research tradition, how scientific revolutions are produced, and what changes in these transitions. Paradigms then come as part of a solution to all of these questions.

Foucault, on the other hand, had a distinct goal. He rejected traditional analyses in the history of science. In its place, he intended to draw new borders in historiography, uncovering synchronic relations between the sciences of a single period. More than explaining transformations in the previously accepted history of ideas, Foucault sought to present an alternative view of it.

This is perhaps the main difference between Kuhn and Foucault. Kuhn is intensively dialoguing with historians and philosophers of science. By attentively examining the history of science, he seeks to uncover a general pattern of development in the natural sciences. And within the philosophical tradition, he gives his own answer to why science progresses, and what kind of progress that is.

Foucault’s project, on the other hand, is much more personal. It involves, first, a singular reappraisal of the history of science. Thus, he sets aside the classifications usually recognized in the history of science and offers instead

an alternative reading of it. Furthermore, Foucault is more worried with the results of this reassessment, than with the philosophical grounds of his theory.

Another relevant difference stems from the methodologies employed by the two authors. Kuhn uses well-established approaches and techniques, without departing much from what was then being produced by historians and sociologists. In fact, by that time, even the so-called “new historiography of science” was not that new. His intent was not inaugurating a new tradition in the historiography of science, but producing a theory in order to explain and organize this historical material (1962, ch. 1).

What we see in the case of Foucault is, in a sense, a more radical project. He proposes a new way of seeing the history of science and knowledge. At the same time—and this is perhaps the main weakness of his project—, Foucault does not state how one should conduct an investigation in order to find the episteme of a culture. Even his supposedly methodological work, *AK*, carries very few practical orientations. He is more categorical about what kind of research he rejects than what he really endorses. Most of what we can understand about the nature of epistemes and their application to history comes not from his scarce theoretical remarks in *OT* and *AK*, but from the empirical studies presented in these works.

These two factors, I believe, explain why paradigms became more popular in the history and philosophy of science. With standard perioditizations and employing traditional techniques, it is easier to evaluate his ideas, apply them to other approaches, and apply them to the history of science. This is likely the reason why so many people sought to identify paradigms in their own fields or to produce historical and sociological analyses inspired in *SSR*. Not many works, however, have tried to use the notion of episteme, and Foucault’s influence on the social sciences derives mainly from his other works, in which he explores the relations between knowledge and power.

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