Incommensurability, Metaphors of Science, and the Feyerabend-Kuhn Debate: Does Argument exist in Science?

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After the appearance of Thomas Kuhn's *The Structure of Scientific Revolutions* (1962) and the subsequent popularizing of the concept of the scientific paradigm, rhetoricians of science have sought to investigate the claims of objectivity made by science. Kuhn's compelling account of science as legitimizing particular ways of seeing over others also showed a picture of science as determined by social networks and particular research agendas that may inhibit what claims are made by science, and also affect its status as an objective foundational discipline. In highlighting the subjective side of science, Kuhn claimed that operating within science means existing within the restrictive confines of the dominant paradigm, which attempts to limit the kinds of questions that get asked, how these are asked, and how their answers are formulated into viable scientific facts that are accepted by fellow scientists. This paradigm, in turn, may actually obstruct the progress of science by nature of being untranslatable to other paradigms and preclude rational argument. In a postscript to *The Structure of Scientific Revolutions*, Kuhn remarks that a scientist's switch between one paradigm to the next is akin to a "gestalt switch" in which a "neural reprogramming" of the mind is required rather than any logical persuasion and argument (1969, p.204). Kuhn's book therefore pointed to the construction of disciplinary frameworks that surrounded and structured science and the discovery of new scientific knowledge.

Though Kuhn has often been remarked as being one of the first to question the efficacy of the methodological frameworks of science, Paul Feyerabend had similarly outlined science as a discipline harmed by the dogmatic acceptance of dominant

methodological frameworks. After the publication of Kuhn's book, the ensuing debate amongst philosophers of science pitted Kuhn against critics such as Karl Popper, Paul Feyerabend and Imre Lakatos, who argued that Kuhn's paradigm model had painted too simple a picture of science. In *Against Method* (1975) Feyerabend proposes the radical option of adopting the idea that there is no specific scientific method that ensures the objectivity of science. Instead, Feyerabend proposes that in science no rational progression of ideas exists, and that we need to accept that both logical and illogical arguments should be allowed to advance science. According to Feyerabend, science and scientific progress are better served if we are to accept "epistemological anarchism", and accept that science is an "essentially anarchistic enterprise" in which any methodology is preferable over Kuhn's picture of "law and order science" that attempts to delimit and structure what gets accepted as science and scientific knowledge (1975 pp. 10; 27-28). As a result, Feyerabend claims contra Kuhn that there are no established methods of science and that to impose them would limit the scope and effective potential of science. Hence, instead of science's claims to objectivity, Feyerabend mentions that in science "anything goes" and that scientists should adopt the idea that a pluralistic methodological anarchism is preferable over the immutable scientific methodology displayed in Kuhn's paradigm model (28).

For this essay, I would like to compare and contrast Kuhn and Feyerabend's models as they pertain to the rhetoric of science. In denying rational argument and positing the existence of anarchistic methodology in science, Feyerabend seemingly puts rhetoric in the corner of irrationalism and sophistry. Yet Feyerabend also proposes that rhetoric is a part of science by allowing scientists to freely motivate and adopt their own

methodology in scientific matters. In *Science in a Free Society*, Feyerabend notes "the only way of arriving at a useful judgement of what is supposed to be the truth, or the correct procedure, is to become acquainted with the widest possible range of alternatives" (1978, p.86). In making a claim for methodological freedom, Feyerabend also unknowingly makes the case for rhetoric: accepting the deliberative nature of science in finding "a useful judgement" means also finding the realm of rhetoric and Aristotelian argument. As Aristotle reminds us, rhetoric "may be defined as the faculty of observing in any given case the available means of persuasion" and can be used for any form of critical inquiry by indicating the erroneous avenues of knowledge "in order that we may see clearly what the facts are, and that, if another man argues unfairly, we on our part may be able to confute him" – and thus introduces deliberation and argument in veridical disputes ("From *Rhetoric*" Bk. I, p. 181). Moreover, as Feyerabend (1970) himself has remarked, Kuhn specifically precludes argument from his account of the historical progression of science, and therefore, in presenting a monolithic account of the scientific paradigm does not make the case for multiple competing epistemological frameworks in science. In a letter to Kuhn, Feyerabend (1995) therefore accuses him of "[taking] [his] readers in rather than trying to persuade them" and thus neglect to give his readers a chance to question his logic and have his readers affirm the possibility of argument in science. Therefore, even though Feyerabend's picture of science emphasizes the necessity of adopting a framework that allows freedom over dogmatic adherence, Feyerabend does give rhetoric, and more specifically, argument, a function in the sphere of science. Nowhere is this made clearer than in Kuhn and Feyerabend's respective disagreements on the issue of "incommensurability" – the notion that competing theories cannot be judged

neutrally and irrespective of the way their content deals with matters of truth. By examining the notion of incommensurability, we also examine the issue of translation and metaphoric use in science by virtue of which scientific arguments are constructed and advanced. In so doing, we also uncover the sphere of the rhetoric of science – and the claims made by Kuhn and Feyerabend in allowing rhetoric into science.

As Hoyningen –Huene (2000) and Weber (2002) have noted, Kuhn and Feyerabend were divided about the issue of incommensurability – i.e. whether a new theory can be translated in terms of an older theory. Kuhn's (1962) well-documented case of eighteenth-century chemistry's rejection of the fictional element of phlogiston in favor of oxygen makes it clear that the metaphors that science uses to describe natural phenomena cannot prevent a theory from being a failure. When it comes to approximating natural phenomena - precisely because a metaphor is used to describe a concept that cannot be factually proven – scientists run the risk of constructing theoretical models that are completely erroneous in hindsight. In this sense, both Kuhn and Feyerabend do not ascribe to the idea that the progress of science is inevitable, precisely because there is no way to measure this a priori. However, because competing paradigms function on the basis of different principles that neither adherent can agree on (hence the existence of the competing theories), and because there is no accurate factual way to ascertain the truth-value of either paradigm (hence the use of metaphors), incommensurability makes it obvious that, in order to be accepted by the scientific community, paradigms necessitate further *argumentation* and *justification* for the metaphors they use to describe natural properties. Thus, taking to heart Lakoff and Johnon's (1980) notion that "metaphor is not merely in the words we use – it is in our

very concept of an argument" (p.5), the existence of metaphors in science also indicates to me the possibility of translation of lesser known concepts into more well known aspects, which in turn indicates a scientist's argument for the use of that particular conceptual metaphor for a particular scientific phenomenon. In this way, I am seeing metaphors as argumentative strategies that cannot be explained away by the claim of incommensurability. For this reason, it will be necessary to examine the differences between Kuhn and Feyerabend's positions on incommensurability in order to see the space Feyerabend allows for argument in science.

As Sankey (1994) has remarked, both Kuhn and Feyerabend reacted against the traditional empiricist notion that a window-pane theory of language existed by the denying the existence of a "theory-neutral language in which the content of [any] theory may be compared" (p.3). Instead, Feyerabend and Kuhn proposed that different theoretical vocabularies attached different meanings to basic concepts, which in turn produced an unstable view of language in scientific processes. The notion of incommensurability advocated by Kuhn and Feyerabend therefore posits language as loaded with the presumptions of the scientist. At the same time, this does not mean that it is impossible to reformulate those metaphors in the intellectual climate in which the scientist exists. Thus, the traditional geocentric view of the universe as advocated by the Ptolemaic system was replaced by the heliocentric view of Copernicus, which happened despite the religious fervor of his time, and only later paved the way to the Renaissance's less anthropocentric formulation of the way humans stood in relation to the universe.

Comparing Kuhn and Feyerabend's notion of incommensurable scientific theories, Weber (2000) has noted that the following similarities exist between the two:

1. Incompability that is not transformable into logical contradictions
2. Differing claims about what exists in the world
3. Translation failure
4. Difficulty of direct empirical theory comparison. (Weber, 2000, p.7).

In turn, Kuhn and Feyerabend's notions lead to the following consequences:

(1) Logical contradictions cannot be made because theories are dependent upon different theoretical vocabularies that make argument impossible (as we shall see, Feyerabend disagrees with Kuhn on this respect).

(2) Because theories make different claims about what exists in the world, they do not agree on what does exist, which in turn makes it impossible for them to agree on the prime principles of the natural phenomena, leading to (1) once again.

(3) Theories are difficult to translate to one another, because they cannot be resolved into a logical contradiction due to their different use of metaphors, because one word in a theory's vocabulary may mean a different thing to another.

(4) This, in turn, makes it difficult to compare the relative merit of one theory over the other, precisely because neither one can be shown to be better than the other, often turning arguments into arguments over semantics (i.e. what metaphors to adopt for the natural phenomena) that preclude rational and logical approaches.

As a result, the idea of incommensurability precludes the idea of logical contradiction, and thus, rational argument is dismissed by Kuhn on the basis of all the preceding points. However, as we shall see, Feyerabend does acknowledge the existence of multiple competing theories which in turn signals the argumentative nature of science. However, admitting multiple competing theories into science is a perspective that Kuhn is not willing to admit in his landmark study on scientific revolutions.

In The *Structure of Scientific Revolutions*, Kuhn (1962) distinguishes between two different forms of activity in modern science: "normal science" – which operates within a paradigm and attempts to resolve the questions demanded by the paradigm – and "revolutionary science" – which happens when one paradigm is refuted by the discovery of an element that is inconsistent to the metaphor(s) used by the dominant paradigm and leads to the adoption of another paradigm. In Kuhn's estimation, a paradigm is used as a heuristic: by defining a problem with analogous research questions that hold out the promise of solving the paradigm's initial problem, a paradigm also delimits what is considered to be a problem worthy of research and what questions should be asked in studying the problem. In doing so, other potentially interesting problems in the field are pushed aside by the problems posed by the dominant paradigm, and only an anomaly – an inconsistent element that can no longer be ignored from within the confines of the dominant paradigm - can facilitate the adoption of another paradigm. Kuhn therefore mentions that paradigms should be seen in judicial terms, as adjudicating what research questions get asked and what specific problems are dealt with:

> A paradigm is an accepted model or pattern . . . In a science . . . a paradigm is rarely an object for replication. Instead, like an accepted judicial decision in the common law, it is an object for further articulation and specification under new or more stringent conditions. (1962, p.23)

According to Kuhn, a paradigm therefore posits questions that hold out the promise of resolving the paradigm's function as generative value for further research, but under stricter conditions than before. By mentioning the *de jure* structural nature of a paradigm, in which the acceptance of the paradigm is paramount to the identity of a particular scientific discipline, Kuhn's account of the paradigm is in terms of total conversion: either a scientist accepts the precepts of the paradigm as defined by his discipline, or he

leaves the discipline all together. In a postscript to his critics, Kuhn stands by defining the paradigm as indicative of a group's commitments:

> Though the strength of group commitment varies, with non-trivial consequences, along the spectrum from heuristic to ontological models, all [paradigm] models have similar functions. Among other things they supply the group with preferred or permissible analogies and metaphors. By doing so they help to determine what will be accepted as an explanation and as a puzzle-solution; conversely, they assist in the determination of the roster of unsolved puzzles and in the evaluation of the importance of each. (p. 184)

According to Kuhn, the normal modus operandi of science is to gather facts that are worthy of study as a problem, study the facts as to formulate a theory and articulate and refine the theory. Yet for all the liberty this would seemingly allow, Kuhn also mentions that all of these categories exist within the operating principles of a paradigm, and "work under the paradigm can be conducted in no other way, and to desert the paradigm is to cease practicing the science it defines" (1962, p.34). The nature of science, as Kuhn claims, is therefore to fluctuate between relatively quiets periods of normal science, with scientists trying to complete the pieces of the puzzle that the paradigm has constructed, and the bursts of activity inaugurated by paradigm shifts, after anomalies – inconsistencies not explained by the paradigm's conceptual metaphors - have posited the metaphors of the preceding dominant paradigm to be inaccurate, or simply, inconsistent with its own internal logic.

Kuhn therefore aligns a scientific discipline according to its practice under a dominant paradigm. In giving paramount importance to paradigms in science, Kuhn therefore also encourages the idea that science progresses from one paradigm to the next, and thus makes a case for the incommensurability of scientific theories. In other words, Kuhn's account leaves no trace in science for rhetoric – both in the epistemological sense

and the Aristotelian sense – and the realm of argumentation. Epistemologically, Kuhn's paradigm shifts occur because of anomalous occurrences that cannot be explained given the dominant metaphors employed by the paradigm's dominant epistemological framework. Rhetorically, Kuhn gives no credence to the idea that the adoption of a scientific theory might be informed by suasion and deliberative argument, because Kuhn's approach to paradigms is done through a realistic epistemology in which the proof of a theory is a self-evident demonstration of nature that then causes a disciplinary conversion after which the new metaphors of the paradigm are accepted. It is not because the scientist has changed his mind on what metaphors to adopt in approaching his/her subject, but because an anomaly has accidentally pointed out the inconsistency of the metaphor employed by the dominant paradigm. Hence, Kuhn concludes his account of science by affirming the primacy of realism as an epistemological framework in science: "[F]ew scientists will easily be persuaded to adopt a viewpoint that again opens to question many problems that had previously been solved. Nature itself must first undermine professional security by making prior achievements seem problematic" (1962, p. 169). Yet in giving epistemological primacy to realism, Kuhn leaves out the agency of the scientist to adopt another conceptual framework. There is simply no way of adopting other metaphors to change the scientist's view of the problem. Thus Kuhn remarks that the discoveries of new paradigms are merely external anomalous occurrences that manage to shed new light on a problem and can then only change a paradigm and the way a scientist looks at the problem:

> Rather than being an interpreter, the scientist who embraces a new paradigm is like the man wearing inverting lenses. . . Scientists then often speak of the "scales falling from the eyes" or of the "lightning flash" that "inundates" a previously

> obscure puzzle, enabling its components to be seen in a new way that for the first time permits its solution. (1962, p. 122)

Instead of giving scientists the capacity to translate their experiences into new conceptual metaphors, Kuhn simply gives the attention to "discovery" of a new scientific fact. Yet in doing so Kuhn does away with logical deliberation and makes too strong a case for a paradigm's ability to shape a scientist's thinking and activities, equating the dominant paradigm as the scientist's conformity to disciplinary identity. Thus, the ocular metaphors (of "scales falling from the eyes") used by the scientists for the moment of scientific "discovery" make a case for Kuhn to effectively replace instances of argumentative deliberation that subsequent paradigms necessitate. While it is not denied that such anomalies occur and do cause subsequent shifts in thinking, the pattern introduced by Kuhn emphasizes the process of discovery over shifts in thinking and the argumentation by which that thinking proceeds. While sensory-data are our primary access to making logical inferences about reality, the question of data and its interpretation are left to the external force of the anomaly as opposed to the scientist.

Kuhn's belief in realism and the normal-revolutionary progress of science is therefore too strong to provide him with the notion that argument exists in science and that these arguments are made by adopting certain scientific metaphors over others. It is as if Kuhn wants the scientist to stand from a purely a priori point in which metaphors and language do not decide what is witnessed. Richard Rorty (1979) has made the point that either we assume that we have a relationship that posits knowledge either in terms of a "hermeneutic" conversation with a reality-in-progress or as an epistemological foundation, but that neither position – being based on a belief in respectively the construction of reality by the language we use to describe it and the notion that the

accumulation of knowledge accurately puts us closer to objective reality - can guarantee that we get any closer to any "objective" truth (p. 318). Kuhn here merely seems to adopt the epistemological position of realism while skirting the issue of the representation through the metaphors and language used by scientists.

Kuhn's strict realist notions on science and its progress therefore rely on the definition of a paradigm's inability to change except after an anomaly has appeared and been witnessed, instead prompting epistemological conversions that have the characteristics of a religious reformation within a discipline. Thus, talking about incommensurability, Kuhn mentions the fact that argument has no place in the adoption of a new paradigm, instead, focusing on the inevitable fact of conversion: "Still to say that resistance is inevitable and legitimate, that paradigm change cannot be justified by proof, is not to say that no arguments are relevant or that scientists cannot be persuaded to change their minds" (1962, p. 152). However, the implication is made by Kuhn that instead of the primary argumentative nature of paradigm constructions, they require a conversion first. A bit further, seemingly responding to the idea of conversion making it impossible for scientists to motivate their own choices in adopting certain conceptual schemata, Kuhn asks himself how conversion is "induced and how resisted":

> What sort of answer to that question may we expect? Just because it is asked about techniques of persuasion, or about argument and counterargument in a situation in which there can be no proof, our question is a new one, demanding a sort of study that has not previously been undertaken . . . *when asked about persuasion rather than proof, the question of the nature of scientific argument has no single or uniform answer*. Individual scientists embrace a new paradigm for all sorts of reasons and usually for several at once. Some of these reasons . . . lie outside the apparent sphere of science entirely. [. . .] Ultimately, therefore, we must learn to ask this question differently. Our concern will not then be with arguments that in fact convert one or another individual, but rather with the sort of community that always sooner or later re-forms as a single group. (1962, pp.152-153; emphasis added)

Denying the possibility of persuasion to be proof, Kuhn holds out on defining conversion in terms of persuasion (and thus, argument), instead making it a case of each scientist for himself or herself as part of group. However, Kuhn does mention that paradigms are adopted because they have an innate ability to solve the problems researched by fellow scientists or they are seen as more "appropriate" or "aesthetic" by way of a simpler explanation of complex phenomena than the old paradigm (1962, p. 155). Ockham's razor, though an old principle in science, is self-explanatory to Kuhn, despite the notion that the "aesthetic" quality of simplicity and the self-evident "appropriate" scientific solution accepted by a scientific community is also motivated by the rhetorical qualities of the scientist relating the discovery, and the elegance of the proposed solution (cf. Campbell, 1997; Gross, 1997). However, Kuhn does point out that the pattern of normal science-revolutionary science make him doubt that "changes of paradigm carry scientists and those who learn from them closer and closer to the truth" which he replaces with the deliberative rhetoric of a science that evolves "to-what-we-wish-to-know" but cannot be immediately be said to lead to approximating closer to the truth or any objective reality (1962, pp.170-171).

To recap, Kuhn's position on science is that scientific proofs are determined by the scientist's detection of an anomalous principle which leads to adopted of a new paradigm by a scientific discipline as a whole. Moreover, Kuhn's account of the incommensurability of paradigms relies on Kuhn's notion that new theories can never be translated into newer ones. Though Kuhn does make the point that the existence of paradigms does not guarantee the progress of science in general, he does mention that science might help us in deliberating to what we do want to know. However, the basis for

science remains in the adoption of newer paradigms, which might help us in getting to know what we want to know from nature. In the final analysis, Kuhn precludes argument from the sphere of paradigm debates, remarking that translation and persuasion, though helpful, can "neither . . . constitute conversion" (p.204) of the sort that Kuhn talks about in his landmark study of scientific revolutions. Those conversions are in terms of the disciplinary conventions of a group and would require a "gestalt switch" due to the incommensurability of theories, necessitating a "reprogramming" of the scientist's mind to fit the new disciplinary conventions. However, the rhetorical structure of the explanations offered in new paradigms and the metaphors they employ, or the fact that overlap may exist in subsequent theories that allow for argument and disputation, are not examined by Kuhn, for which we have to turn to Feyerabend.

In "Consolations for the Specialist", Paul Feyerabend responds to Kuhn's pattern of normal-revolutionary science, by examining the claims made by Kuhn on the incommensurability of the metaphors used by scientific disciplines. Though Feyerabend acknowledges the existence of disciplinary conventions, he also allows multiple competing theories to dispute dominant theoretical frameworks in science. Thus, Feyerabend does not deny Kuhn's idea that scientists have a need to commit to a certain theoretical framework, but that such commitments can be changed according to any (logical or illogical) argument at the drop of a hat. For this reason, Feyerabend replaces Kuhn's paradigm with the principles of "proliferation" – the ability to conjure up alternative to existing theories- and "tenacity" – the ability to hold on to a theory despite evidence to the contrary from other theories (1970, p. 205). Thus, Feyerabend asks if the progress of science is not the normal pattern of "puzzle-solving" as dictated by a

paradigm, but the ability of the scientist to conjure up alternate hypotheses during an experiment:

> It seems that it is not the puzzle-solving activity that is responsible for the growth of our knowledge but the active interplay of various tenaciously held views Moreover, it is the invention of new ideas and the attempt to secure for them a worthy place in the competition that leads to the overthrow of old and familiar paradigms. Such inventing goes on all the time. This change of attention does not reflect any profound structural change (such as for example a transition from puzzle solving to philosophical speculation and testing of foundations). It is nothing but a change of interest and of publicity. (1970, p.209)

Feyerabend therefore removes the disciplinary constraints that Kuhn imposes on science by the use of paradigms, and instead mentions that revolutionary science has the potential to happen all the time due to the articulation of new hypotheses about a familiar problem. In so doing, the scientist is given agency in articulating new research question through logic and argument, rather than accidentally discovering an anomalous occurrence that leads him to question the paradigm. According to Feyerabend, it is of paramount importance that scientists develop these alternatives in the name of progress "[which] has always been achieved by probing well-entrenched and well-founded forms of life with unpopular and unfounded values" (1970, p.209). If we adopt Kuhn's model, according to Feyerabend, this amounts to accepting the "anti-humanitarian tendencies" (1970, p. 197) of modern science where argument has no place in the expediency of science and purported objectivity of the scientist. Instead, Feyerabend proposes that we accept a plurality of methodological approaches in science, which leaves science and scientists not as the arbiters of truth, but as a public sphere in which any argument has the potential to overthrow a dominant theory.

However, for our discussion, the most important part of Feyerabend's disagreement with Kuhn is in the issue of incommensurability. Feyerabend similarly

employed the notion of incommensurability in an essay that came out during the same year as Kuhn's seminal book. According to Feyerabend, "the growth of knowledge, or, more specifically, the replacement of one comprehensive theory by another involves losses as well as gains" (1970, p.219). Though Feyerabend agrees with Kuhn that newer theories cannot be compared in terms of one theory being better than the other, Feyerabend does disagree with Kuhn in terms of the issue of translation and potential overlap of theories. Kuhn's idea of incommensurability is, as mentioned, that of a "gestalt switch" in which arguments facilitate the conversion, but ultimately cannot *effect* the conversion required for paradigm shifts. Feyerabend's notion follows that of Popper's falsificationism, in which any theory can be disputed by a competing theory and will thus ensure the (at least temporary) veridical applicability of existing theories by way of the motivation required in falsificationism. However, Feyerabend rightly asks if the picture of science that is painted by Kuhn can be seen as rational or if we have to allow for a certain measure of irrationality in order for science to proceed by proving a theory's worth by disputation through another theory. Feyerabend therefore makes a case for the value of arguments and argumentation in scientific revolution, by giving Karl Popper's falsification method (which allows for irrational and rational arguments to appear in the sphere of science) precedence over Kuhn's paradigms (in which arguments play a secondary role to disciplinary group thinking). Feyerabend effectively thus argues that Kuhn's basis for paradigms, being dependent upon the cognitive behavioral structuring of the scientist's mind by disciplinary conventions, effectively obstructs any progress of science by not allowing any space for rational or irrational argument:

> For if there are events, not necessarily arguments which *cause* us to adopt new standards, will it then not be up to the defenders of the status quo to provide, not

> just arguments, but also *contrary causes*? And if the old forms of argumentation turn out to be too weak a contrary cause, must they then not either give up, or resort to stronger and more 'irrational' means? . . . Even the most puritanical rationalist will then be forced to leave argument and to use, say, *propaganda* not because some of his arguments have ceased to be valid, but because the psychological conditions which enable him to effectively argue in this manner and thereby to influence others have disappeared. And what is the use of an argument that leaves people unmoved? (1970, p.217)

In this sense, Feyerabend argues in favor of the ability of any methodology to be applied to science, saying that argument will prevail over the group thinking implied in Kuhn's "gestalt switch". Though he does not deny that this idea may lead to many "irrational" methods which can lead science on the path of new knowledge, Feyerabend also allows that this is part of the evolution of scientific knowledge: scientists will more than likely accept an argument that explains a natural phenomena in a way that is more convincing than the old way. Scientists will not cling to the older paradigm despite convincing arguments to the contrary. If they would, their efforts would lead them to use motivations for taking in their position that lie outside the sphere of rationality (propaganda), which to Feyerabend is the reductio ad absurdum of Kuhn's paradigm model.

In *Against Method* (1975), Feyerabend argues that science should therefore renounce the claims to absolute truth, objectivity, or progress, and instead embrace a method in which epistemological anarchism has a place. According to Feyerabend, in science it is a prime necessity that a plurality of methods is accepted:

> There is not a single rule that remains valid under all circumstances and not a single agency to which appeal can always be made [. . .] *Given* science, reason cannot be universal and unreason cannot be excluded [. . .] science is not sacrosanct [. . .] Thus anarchism is not only *possible*, it is *necessary* both for the internal progress of science and for the development of our culture as a whole. (1975, p. 180)

Thus, whereas Kuhn's model emphasizes science as evolving according to "what-we-want-to-know", Feyerabend emphasizes that paradigms and "law-and-order

methodologies" (1975, p. 171) should be replaced by methodological pluralism, which benefits humans by de-emphasizing scientific methodology to be an objective arbiter of truth. In doing so, Feyerabend also remarks about Kuhn's incommensurability thesis. Though they both employed this in their thinking about science, there are differences in the way that Feyerabend and Kuhn employ incommensurability. As I noted above, Feyerabend disagrees with Kuhn on the matter of incommensurability, because he does not think that the incommensurability of scientific theories prevents them from being discussed by its subsequent proponents. To Feyerabend, the notion of translatability is not the issue- instead of a one-to-one relationship in which the elements of theory A need to be translated first to the newer theory B – he emphasizes that subsequent overlap can, and often does, exist between subsequent theories, allowing for argument and rhetoric to exist in the scientific framework which Kuhn so vehemently denies.

In response to Feyerabend and other critics, Kuhn (1969) mentions that many of his critics have misread him. Kuhn denies here that he advocated the adoption of a new paradigm as a "mystical aesthetic", but is not willing to go as far as admitting the possibility of reasonable argument either:

> What I am denying then is neither the existence of good reasons nor that these reasons are of the sort usually described. I am, however, insisting that such reasons constitute *values* to be used in making choices rather than *rules* of choice. Scientists who share them may nevertheless make different choices in the same concrete situation. (1969, pp. 261-262; my emphasis)

Rather than embedding science and scientific methodology in the reasoning of the scientist, Kuhn denies the possibility of reason to actually shape the "discovery" of new scientific knowledge. Kuhn therefore also rules out the idea that argument ("good reasons") can be anything but afterthoughts to scientific knowledge. Once again, Kuhn

precludes logical argument from shaping the things that scientists see, instead relying upon a priori knowledge as opposed to a posteriori knowledge, and claiming that rhetoric and argument are not the actual process of science, but instead values that influence, but cannot ultimately, make science.

In contrast, Feyerabend renounces the platform of certainty on which Kuhn puts the scientist:

> Creation of a *thing*, and creation plus full understanding of a *correct idea* of the thing, *are very often parts of one and the same indivisible process* and cannot be separated without bringing the process to a stop. The process itself is not guided by a well-defined programme, and cannot be guided by such a programme, for it contains the condition for the realization of all possible programmes. It is guided rather by a vague urge, by a 'passion' (Kierkegaard). The passion gives rise to specific behaviour which in turn creates the circumstances and the ideas necessary for analyzing and explaining the process, for making it 'rational'. (1975, p. 26; original emphasis).

Feyerabend therefore throws out the possibility of paradigms structuring science, instead remarking that the new knowledge claims are the result of the creation of a concept that is embedded in the familiar trappings of language until it is articulated. In allowing language into the sphere of scientific claims, Feyerabend therefore also denies that incommensurability is predominant in science. Whereas Kuhn's paradigm system allows for revolutionary science only as it is invented by predominantly "new" people to the specific field of science (e.g. Einstein was a postal worker before changing the field of Quantum physics) who have not operated under the dominant paradigm and can therefore change it, Feyerabend makes scientists methodological anarchists, whose knowledge claims are constructed by the interplay of speculation embedded in a familiar language. In making a case for their knowledge claim, the scientist will need to articulate their knowledge in terms of "rational" values that can be adopted by the scientific community.

Rhetoric and argument are therefore allowed a place in the conceptual system presented by Feyerabend.

Therefore, as Sankey (1994) has remarked, the overlap between one theory and the next means that issues of translation are not paramount to paradigm conversions, but instead argument and rhetoric are necessary to come to some form of agreement: “For if there is no radical discontinuity of reference and theories do refer to a common world, then sufficient relations of referential overlap may obtain for the purposes of content comparison” (220). In turn, this might mean that argument is possible in science, because scientists have to motivate their choices and phrase it in terms of the familiar language of their discipline. In so doing, they are not experiencing translation problems, but instead, should make an attempt to motivate knowledge claim by reason. The clean-pattern of incommensurable paradigms and normal- revolutionary science introduced by Kuhn is therefore too simplistic. Staring oneself blind at the incommensurability of scientific paradigms means therefore for us to forego on the ability of metaphors to be communicated and the development of various arguments to motivate the adoption of new metaphors. It is the difference between adopting the distinction made by Clifford Geertz (1973) and Kenneth Pike (1954; 1967) between “thin” (“etic”) descriptions – which emphasize translation as impossible but claim objectivity - over “thick” (“emic”) descriptions – which emphasize that translation is possible but claim subjectivity (Geertz, 1973, p. 7; Pike, 1967 pp. 55-56). The pretense being kept up is that either the scientist can only be an outsider to the natural phenomena (and thus have “thin” description) where translation is impossible save for the idea of a pure tribunal of objectivity, or a scientist can be an insider (“thick” description) to the natural phenomena and is specially

placed to the phenomena to advance knowledge claims in which translation is possible but subjective and temporal. As a result, one-to-one translation is not the issue here, and might be too strict a criterion for science. Rather, the real issue is the belief in either the accuracy of the etic (Kuhn) or emic (Feyerabend) approach to science[1]. Feyerabend makes us see science (and scientists) as dominated by a methodological opportunism in which "anything goes". Instead of the gestalt conversion of Kuhn, Feyerabend gives rationality and irrationalism a place in science. In so doing, Feyerabend makes the point that any idea of "progress" can only be arrived at in hindsight: though we feel we may have arrived at a certain point in science, it cannot always be (and should not be) logically motivated and therefore is never absolute. Feyerabend therefore remarks that while argument can never ensure the veridical nature of a scientist's knowledge claim, they are in need of argument in making a case for their scientific knowledge claim. Asking whether this argument is logical or illogical (or objective versus subjective) makes no sense to Feyerabend. Though this introduces the issue of sophistry and deception, if one abandons the idea of progress (which Kuhn couches in realist terms) one also abandons the idea of a veridical end point by which various knowledge claims can be tested and ruled to be rational or irrational. Paradoxically, to deny the irrational nature of science therefore means to cast out argument and rhetoric as the method of introducing new knowledge claims and instead favoring an approach that ensures notions

[1] Indeed, echoing Feyerabend, Pike notes on the etic-emic distinction that the latter can serve as a dialectical means of adjudicating etic analyses, and gives a means of theory-comparison:
"Practically, the conviction that there is an emic system to be discovered serves as a stimulus to refuse to accept too readily, as definitive description of a particular set of data, any pair of analysis which appear to be equally valid but contradictory. In such a situation the outlook given here would insist that, before accepting such a result, we try to find a third analysis which does violence to neither of the first two, but merges both analyses in a synthesis at a higher level – possibly by bringing in kinds of data or other levels of data which each of the earlier partial analyses rejected as nonrelevant to the immediate problem, but which now appear relevant" (p. 56).

of progress and objectivity. Even if Kuhn admits at the end of *The Structure of Scientific Revolutions* (1962) that we may have to let go of objective notions of "Truth", Feyerabend brings us closer to the truth of science by removing us further from the idea of "Truth". By adopting argument and rhetoric, rationalism and irrationalism, Feyerabend claims, we may achieve progress in the sense of the introduction of new scientific ideas that may take science in the direction of true progress: to ensure that ideas are tested in the human realm of decision making that allow humanist values back into science.

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