KUHN'S *THE STRUCTURE OF SCIENTIFIC REVOLUTIONS* REVISITED

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SUMMARY. The present paper argues that there is an affinity between Kuhn's *The Structure of Scientific Revolutions* and Wittgenstein's philosophy. It is maintained, in particular, that Kuhn's notion of paradigm draws on such Wittgensteinian concepts as language games, family resemblance, rules, forms of life. It is also claimed that Kuhn's incommensurability thesis is a sequel of the theory of meaning supplied by Wittgenstein's later philosophy. As such its assessment is not fallacious, since it is not an empirical hypothesis and it does not have the relativistic implications Kuhn's critics repeatedly indicated. Although concepts are indeed relative to a language game or paradigm, interparadigmatic intelligibility is preserved through the standard techniques of translation or praxis. The impossibility of radical translation which is captured by the claim of incommensurability lies with that which cannot be said but only shown.

Key words: Kuhn, Wittgenstein, paradigm, incommensurability, language games, relativism, rationality.

1. INTRODUCTION

Another paper on T.S. Kuhn's *The Structure of Scientific Revolutions* (1962),[1] more than 30 years after its publication, risks the danger of recapitulating issues that have been exhaustively discussed. This is a pitfall that the present essay will seek to avoid. It will not dwell upon the arguments of the past, those referring strictly to the text, nor will it reconstruct the debate *The Structure* has evoked. Instead, its aim is to attempt a reading of the work of T.S. Kuhn that will bring out some of its philosophical aspects as regards, in particular, the implications of the incommensurability thesis. Certainly, problems of rationality and relativism that accompany this thesis are not confined to the book itself. Nevertheless, its publication in 1962 has been considered to have triggered the still ongoing controversy regarding these issues in the field of philosophy of science.

The assemblage of history, psychology, linguistics, sociology into an account of scientific progress, as well as the concepts of paradigm, normal science, and incommensurability, which Kuhn introduced, were considered by many to deeply undermine the rationalist tradition. Along with the criticism aimed at specific weaknesses and limitations of the book, indiscriminate charges of irrationalism, relativism, sociologism, idealism, and scepticism were leveled against Kuhn.[2] As a result, the philosophical theses, latently or overtly articulated in *The Structure*, were not pinpointed nor discussed further, either in association with other philosophical arguments

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and traditions or for development. From the philosophical point of view, the first period of critical discussion ended in quick critical dismissal. On the other hand, in nearly all other kinds of epistemic inquiry, e.g. sociology, political science, linguistics, economics, literary criticism, education, engineering, and technology, even in theology and metaphysics, the theses of *The Structure* were investigated and their consequences explored.[3]

In this essay I will try to establish that, contrary to appearances and widespread belief, Kuhn was no relativist in a way that does not take refuge in the well-tested doctrines of traditional epistemology.[4] I will do that by trying to substantiate the affinities between *The Structure* and what I consider to be its homeland, the work of the later Wittgenstein. I will not 'prove' a Wittgensteinian influence on Kuhn, nor will I judge whether either one of the philosophers is right on the issues discussed. I will here try to render this comparison legitimate, in view of addressing the problem of relativism.

2. THE STRUCTURE OF SCIENTIFIC REVOLUTIONS

Interest in *The Structure* has been revived in recent years. Its idiomatic 'relativism' has been defended especially within the epistemology-hermeneutics debate. Interestingly enough, Kuhn's work has again been dubbed relativistic and hastily rolled up in the hermeneutical wrapping, leaving unexplored once more the implications of the theses held in the book (Barnes, 1982; Bearn, 1985; Doppelt, 1978; Rorty, 1979; Chapter 7, Section 2). The charge of relativism that has doomed the book philosophically in the '60s and '70s, has boosted it to the forefront of discussion in the '80s. What was then regarded a liability has now been declared an asset. Nevertheless, phrases and remarks that seem to clash with either the critical epistemological or the systematic hermeneutical reading are either ignored and left aside or attributed to an unfortunate or an unhappy use.[5]

Critics and advocates of Kuhn have traced relativism, considering it as either a curse or a blessing, on the notion of incommensurability. Kuhn has borrowed the term from mathematics where it means 'no common measure' as in the case of the hypotenuse and the side of an isosceles right triangle (Kuhn, 1977, p. 301). The incommensurable units in *The Structure of Scientific Revolutions* are the paradigms and the common measure that is lacking points, directly or not, to the much sought – after *neutral common language* to which two theories, two paradigms, either contemporary or successive in history, should be reduced or at least be fully translatable.

Actually Kuhn distinguishes three aspects of incommensurability: (i) the incommensurability of standards; (ii) that of concepts, vocabulary (lexicon), and apparatuses; and (iii) the incommensurability of perceptual skills (pp. 148–150). But as these distinct cases are all comprised under the notion of paradigm they will here be dealt with jointly.[6]

2.1. Paradigms

Paradigms have been referred to in *The Structure* as universally recognized concrete scientific achievements, with a twofold function. They establish, inspire and foster particular coherent scientific traditions, and they issue patterns and models of scientific research. They include as components law, theory, application, and instrumentation together. Their study and repeated application initiate practitioners into specific scientific communities (pp. 10, 11, 23). Paradigms are open-ended and are subject to further articulation and specification in the course of normal science, that is itself a puzzle-solving activity induced by the paradigms. During that period, scientists do not handle 'genuine' problems. Instead they build their competence, working with paradigmatically provided projects, the puzzles, which are formulated in the concepts and language of the paradigms. Assembling the solutions, which is guaranteed by the paradigms, is a mopping-up operation. Rather than investigating and revealing the world, the scientists test their ingenuity and skills, increasing the accuracy and scope of the paradigms either in theory or in their match with the world (Chapter IV).

The above locutions from *The Structure* are very well known. It can even be claimed that they have become the jargon of modern philosophy of science. What is interesting for our purposes is Kuhn's references to the notion of rules. Even though Kuhn went to great lengths in analyzing it (pp. 38–43, Chapter V), it has unfortunately attracted little attention. Rules regulate normal scientific activity. For example, there must be rules that limit both the nature of an acceptable solution to a problem and the steps by which such a solution is to be obtained. These rules are either equated to 'preconceptions' and/or 'established viewpoints' or they function as explicit guidelines for conducting research. "[They] provide much information about the commitments that scientists derive from their paradigms" (p. 40). These are conceptual, theoretical, commitments to preferred types of instrumentation, or of a 'higher level', the quasi-metaphysical commitments. Rules literally give meaning and form to the daily routine of normal science. Based on them, the scientists give shape to the world and come to understand it. When the concepts and laws of the paradigm are put in the use suggested by the paradigm itself, that is, the use expressed in the rules, the theoretical abstractions and sophisticated instrumentation of science are related to the world.

However, although scientists follow and can identify the rules derived from the paradigm they hold – displaying in their actions the necessary (for a research tradition) coherence – they nevertheless cannot, in general, agree on a full interpretation or rationalization of their paradigm. They cannot verbalize and completely agree upon a reduction of their paradigm to rules. They cannot fully reconstruct it, and they cannot unanimously attribute the cohesion exhibited in their scientific practice to a particular set of shared rules or assumptions. Normal science as a research activity

is a process that, one could say, goes on unwittingly, entirely in silence. Ruels and commitments are absorbed unintentionally by the members of a scientific community.

The reason for this lies in the fact that students of a scientific discipline never learn theories, laws, or concepts by memorizing definitions and building up from there. They are not explicitly taught all the rules they are to follow. They are essentially taught to master a technique through the repeated application of concepts and laws to problem-solving. They are instructed to put the patterns of conduct and research which issued from a paradigm to the proper use. After their initiation period, what scientists do in research (following rules, employing concepts, laws, instrumentation, exhibiting commitment to metaphysical, ontological beliefs and principles) comes, so to speak, naturally to them. They do not have to stop and think and rationalize at every step. They rigidly, one could say, mechanically, employ what has been implicitly embedded through tradition and education.

Rules do not exhaust a paradigm. Adding up the elements that can be laid down, described and deduced from a paradigm does not present us with the whole thing. There always remains something which cannot be fully and explicitly put into words since it is the outcome of nonlinguistic activities. Our verbal articulations cannot capture and cannot render visible the situation in space and time in which we are immersed. They rest upon it, they perhaps express aspects of it, but they cannot open it to full view. This invisible, unassuming substratum, the bedrock on which scientific activity unfolds, explains what Kuhn calls *the priority of paradigms*, i.e. the fact that paradigms can guide research, even in the absence of explicitly stated rules.

2.2. Incommensurability

Viewing paradigms as a set of 'grammatical' drills after which scientists model their research and/or as the mesh of ontological and metaphysical commitments against which scientists' work unfolds and acquires meaning, it is now possible to discuss in the same vein the notion of incommensurability.

It is the nature of the paradigm that brings about incommensurability: permissible problems, methods, standards of solution, explanations, criteria for choosing theories, values, metaphysical beliefs, even what counts as a fact, are not only relative to a paradigm but, one could say, are constitutive of a paradigm. Consequently, scientists who live or have lived in different paradigms, who have been subjected to diverse, disparate catechisms, cannot have common standards, a common lexicon, or work on common problems. Two distinct scientific traditions cannot be fused together, cannot complement each other, cannot be reduced to a common neutral language with the help of which they can evaluate each other.

'Incommensurable paradigms' means incompatible paradigms. But con-

trary to prevalent interpretations, incommensurability does not mean and does not entail undescribability, untranslatability, incomparability, incommunicability, at least in an obvious sense. Incommensurability does not bar understanding or rational argumentation. It does not suspend judgement, and it does not open the door to irrationalism or relativism.

In view of the relevant literature, such a claim may well appear audacious. Kuhn himself has little to say in that respect in *The Structure*. Perhaps he didn't anticipate such a turmoil and did not expand on this theses. Nevertheless, he was careful enough to speak of partial communication, of scientists being "*at least slightly* at cross purposes" (p. 148), of evaluative procedures based *in part* upon a particular paradigm (p. 94). Also he explicitly stated that science does progress and the scientists do talk, communicate, and judge each other (Chapter XIII, Postscript pp. 199, 204, 206; 1970b, pp. 261–262). These rudimentary claims, however, did not succeed in blocking the conclusions which Kuhn's critics have arrived at.

The sweeping charges of irrationalism and relativism made Kuhn's project appear not only naive but incoherent as well. It has been argued that Kuhn upholds total incommunicability and unintelligibility between adherents of rival paradigms, and that he thereby disregards the existing networks of scientific communication (journals, reviews, conferences, etc.) or the work of historians and anthropologists, even his own previous work. It has also been maintained that the very use of historical material in *The Structure* undermined Kuhn's program. That it traps him into a vicious circle. Either he is begging the question, using as evidence historical examples that are themselves in need of explanation, or his account of science becomes absolutely incoherent since access to past paradigms – from which the historical examples are drawn – presupposes intelligibility, which is barred if the incommunicability thesis is upheld.[7]

Certainly, one should be at least more charitable. Kuhn would not have been so blind as to ignore such obvious facts. How could such observations have escaped the eye of a practising historian? We can grant him that. And we can also grant him that he would not have been so careless as to use circular arguments that could backfire so easily.

This 'kind act' of ours may take care of the easy criticism and may save the picture and experience we have of current scientific life, relieving perhaps the worries of those agonizing over the fate of the entire scientific enterprise. But if everything then seems settled – if, that is, Kuhn's account allows for activities such as professional translation, description, communication, etc. in the obvious sense; if, that is, incommensurability is eliminated – how can we explain the controversy the incommensurability thesis has evoked? One cannot of course claim that everybody completely misconstrued Kuhn. The incommensurability thesis is indeed there in the book. But it is not an empirical hypothesis, i.e. it cannot be verified, falsified, corroborated, etc. by historical fact. If it were an empirical hypothesis Kuhn would indeed have been caught in a vicious circle. The incommensurability

thesis is a thesis that points beyond the epiphenomena to a particular theory of meaning.[8]

3. WITTGENSTEIN'S INFLUENCE

The present paper argues the thesis that the theory of meaning on which Kuhn's theory is based is supplied by Wittgenstein's later philosophy. Wittgenstein's theses lend philosophical support to Kuhn's contention that this work does not imply relativism and help us to assess certain aspects of the philosophical issues of *The Structure.*

Kuhn himself acknowledges his debt to Wittgenstein. As reported by Cedarbaum (1983, p. 188), Kuhn had read a typescript of Wittgenstein's *Blue and Brown Books* (1958) before 1959. At that time, having formulated the basic themes of *The Structure of Scientific Revolutions*, he came upon Wittgenstein's *Philosophical Investigations* (1968),[9] a book that helped him capture basic features of normal science. The concepts of paradigm, the function of rules, the importance of tradition, training and education, all, implicitly or explicitly, drew upon such Wittgensteinian concepts as laguage games, family resemblance, forms of life. In *The Structure* itself Kuhn refers explicitly to Wittgenstein's analysis of family likeness terms, as well as his account of naming in language (p. 45). Interestingly enough, analogies can be traced even in the collection of Wittgenstein's remarks published under the title *On Certainty* (1969)[10] long after *The Structure of Scientific Revolutions* had made its appearance. In the light, then, of Wittgenstein's philosophy we will try to bring out the non-relativistic aspects of Kuhn's contribution to philosophy of science.

3.1. Wittgenstein on Meaning, Language Games, and Rules

Wittgenstein's theory of meaning can be summed up in the phrase "don't ask for the meaning, ask for the use". Words and sentences, according to traditional theories, acquire meaning either from the thoughts they are supposed to express or from the objects they stand for as names. Sounds and scribbles on paper, dead by themselves, become alive and start making sense the moment we make an occult connection (Wittgenstein, 1958, p. 73–74) posting on them something of an ethereal nature: their meaning. In contradistinction to this, Wittgenstein claimed that the meaning of words and sentences is their employment (*PI*, I 421), their use (*PI*, I 21, 23) or application (*PI*, I 21, 134, II p. 175). A sentence is understood in a multitude of ways, exactly as many as the uses it can be given. Depending on the context, the special circumstances in which a sentence or a word is uttered or written, its meaning changes. We can say it or write it down as an assertion, a question, a command, metaphorically, to tell a joke, a story, to express anger, joy, etc. (*PI*, I 23). These countless different processes of using words are the language games (*PI*, I 7). Just like the games played

by children, they do not feature a common element that characterizes them all, that reveals, so to speak, their essence. Language games may be real, imaginary, they can be invented, they may be primitive, more developed or sophisticated, they may be of the past or refer to the future. Engaging in processes of obeying and giving orders, reporting events, describing objects, forming and testing a hypothesis, greeting, praying, etc. is taking part in all these different language games. Not having a common property that runs through them all does not mean that 'game' has several independent meanings. Rather, it means that 'games' form a family with similarities overlapping and criss-crossing, just like members of a family resemble one another with respect to build, temperament, features, etc. (*PI*, I 66, 67). Game is a family likeness term.

Language games can be described but they cannot really be defined. They are not everywhere circumscribed by rules, not closed by a frontier, not rigidly limited ((*PI*, I 68). Aspects of a game, not dictated by rules evolve and become apparent as the game unfolds, as we go on playing it (*PI*, I 84, 79). This, however, does not mean that we do not know what a game is.

> Isn't my knowledge, my concept of a game, completely expressed in the explanations that I could give? That is, in my describing examples of various kinds of game; shewing how all sorts of other games can be constructed on the analogy of these; saying that I should scarsely include this or this among games; and so on. (*PI*, I 75)

This 'indefiniteness' is not always a disadvantage – sometimes an indistinct picture is exactly what we need (*PI*, I 71). It does not bar us from using the word 'game' – we can *draw* a boundary for special purposes (*PI*, I 68).

The fact that language games are not precisely defined does not mean that they are not bounded by rules, that anything can be made relevant to a game, that anything can happen. It means rather that the enumeration of the corresponding rules does not exhaust what a language game is. It is futile to expect that giving a list of rules will *fix* all the aspects of how a game is played. Learning to play a game, linguistic or other, is not a matter of memorizing definitions or interpreting rules. It is something that comes with training and therefore it cannot always be put into words. "Obeying a rule is a practice" (*PI*, I 202). "To obey a rule, to make a report, to give an order, to play a game of chess are customs (uses, institutions)" (*PI*, I 199). "To understand a sentence means to understand a language. To understand a language means to be master of a technique" (*PI*, I 199).

We stated above that, according to Wittgenstein, the fact that games are not everywhere circumscribed by rules, does not prevent us from identifying a game, differentiating it from others, playing it consistently and with precision. And this means that, despite the lack of an exhaustive list of rules, we can detect similarities in linguistic usage, conduct, and behavior of those sharing a given language game. How do these similarities

come about? Following the rules of a game implies doing the same. How is this 'game' fixed? For Wittgenstein, it is not the agreement of people sharing a language game that dictates sameness in usage; it is not an agreement that has been reached on conventional grounds, appealing to the majority or due to leverage. For Wittgenstein, "the use of the word 'rule' and the use of the word 'same' are interwoven" (*PI*, I 225). "The word 'agreement' and the word 'rule' are related to one another, they are cousins" (*PI*, I 224). Human beings agree in the language they use; this is not an agreement in opinions but in forms of life (*PI*, I 241). Training, education, tradition dictate what has to be done. 'When I obey a rule I do not choose. I obey the rule *blindly*' (*PI*, I 219). I act on the rule without appealing to anything else for guidance (*PI*, I 228). There is no intermediary between rule and acting. No gaseous medium (*PI*, I 109) like thought or some kind of standard to which we appeal for justification of our following the rule of a game (Wittgenstein, 1970, 297).

This short summary of Wittgenstein's theses already points directly to Kuhn's formulations in *The Structure of Scientific Revolutions* and constitutes a sufficient basis for a more detailed examination of Kuhn's relation to Wittgenstein's philosophy.

3.2. Paradigms in the Light of Wittgenstein's Philosophy

Just as Wittgenstein was criticized for using the term language game generously (Williams, 1974, p. 86), Kuhn has been blamed for defining the paradigms loosely, for lack of clarity, for ambiguity, and carelessness (Wisdom, 1974, p. 832; Gutting, 1984, p. 2). Critics and advocates alike got down to work to ammend and improve the situation. A sympathetic critic dissected and isolated no fewer than twenty-one different kinds of paradigms which she finds "evidently inconsistent" (Masterman, 1970, p. 68). Another sets out to "define precisely the nature and function of paradigm" (Cederbaum, 983, p. 174). According to the thesis argued here, such attempts miss the point. Paradigms are indeed used in many ways. But this is not necessarily a defect. Of course, a great deal depends on the nature and degree of vagueness that characterizes a concept. And it is the contention of this essay, that most of the criticism regarding the notion of paradigm is not due to the incoherence of Kuhn's concept but rather expresses a requirement inherited from the analytic tradition which asks for well-defined and precisely delimited concepts.

What is the priority of paradigms in *The Structure of Scientific Revolutions*? What does it mean? Why can't we logically reconstruct a paradigm? Why can't we give an exemplary interpretation of a paradigm? Why can't a paradigm be fully reduced to its elements? Why is it so hard to discover the rules that guide a normal scientific tradition? Why aren't scientists concerned to rationalize over what counts as a research problem? Why can't they justify what they are doing? (p. 46) Several answers have been

given to these questions. Margaret Masterman (1970, p. 68), though aggressively pro-Kuhnian, as she admits, in my view completely misunderstands Kuhn's thesis. Distinguishing three sorts of paradigms (the metaphysical or meta-paradigms, the sociological, and the construct-paradigms), she speaks of priority in terms of quantity or width. "(Kuhn's) construct-paradigm is less than a theory ... the meta-paradigm is something far wider than theory". She also claims that this priority is a temporal one. That is, one has to be aquainted with the corresponding general world view in order to understand a particular theory. This reduces priority to precedence with respect to a particular element of the paradigms, the theories.

Shapere (1980, p. 58) also takes up the notion of the priority of paradigms and likewise his arguments are tangential to the problem raised by Kuhn.

> Why [he asks] simply because there are differences between views or formulations of views held by members of what historians classify as a 'tradition' of science, must there be a single inexpressible view held in common by all members of that tradition?

Shapere believes that Kuhn maintains that what scientists in a scientific tradition have in common, what binds them together, is a *single* inexpressible *view*, the paradigm. But according to our reading, what binds scientists together is not agreement in opinions or much less a single opinion, it is not *agreement* with a *view*, but agreement in forms of life, that is, education, training, institutions, etc. (*OC* 298). If Shapere were right, it would be absurd to claim with Kuhn that scientists could not express their own opinions and views. For Shapere, this common point of view is inexpressible because Kuhn makes the error of supposing that, unless there is absolute identity, there must be absolute difference. Since the theories that can be abstracted from a paradigm, and can be observed in actual research, are not absolutely identical but just similar, they must be labeled different. And "since what is visible exhibits difference, what unites those things must be invisible". Therefore, he concludes, what is invisible must be inexpressible. In this twisted reading paradigms take up the status of a Hegelian substance which approximately expresses itself in similar "imperfect and incomplete theories". Paradigms become something like metaphysical entities issuing expressions of their essence.

With the help of Wittgenstein, we can maintain that what is inexpressible according to Kuhn is not a unifying point of *view* but what is implicitly embedded with training, what is 'swallowed' by the scientists while they engage in the activities dictated by a paradigm. It is these linguistic and *non-linguistic* activities (ostensive definitions, generalizations, laws, models for application, puzzle-solving procedures, modes of experimentation, etc.) that constitute a paradigm. Paradigms are not just theories. Like language games (which comprise gestures, glances, attitudes, facial expressions, primitive reaction, etc.) paradigms exhibit a mesh of linguistic and non-linguistic processes, that is, processes which, together with language, comprise modes of acting and of behaving.

4. THE CHARGE OF RELATIVISM

Kuhn's account of science has been considered to promote mob psychology, sociologism and thereby relativism (Lakatos, 1970, pp. 93, 140 n. 3). But on the present Wittgensteinian reading, adherence to a paradigm, initiation into a paradigm, and choice of paradigms does not follow an act of deciding. Scientists do not watch a procession of rival paradigms as a jury commisioned to weigh their respective merits, so as to freely form a majority decision. Scientists are immersed in their paradigms.

However, the issue of relativism in regard to both Kuhn and Wittgenstein is far more complex. It is true that Wittgenstein himself has been criticized for relativism. But we believe that, without entering into the complicated issues of Wittgensteinian scholarship, we can bring out those elements of Wittgenstein's work which, we think, point to a non relativistic reading of *The Structure of Scientific Revolutions*.[11] Establishing the affinities between Kuhn and Wittgenstein would provide us with arguments for tackling the problem of incommensurability in a perspective that would deter relativistic deviations.

4.1. Wittgenstein's Nest of Basic Propositions

We have said that, according to Wittgenstein, initiation into a language game, that is, initiation into both its linguistic and non-linguistic aspects, confers upon the people sharing it, apart from knowledge and expertise, a network of commitments. Either latent or explicit, these commitments are held fast; they are not questioned, doubted, or judged. They find expression in a nest of propositions (*OC* 225) which forms the basis of action (*OC* 411). Against the background they provide, questions are raised and problems are posed and solved. These propositions are fused into the foundations of our language game (*OC* 411, 558), they are the hinges on which the door turns (*OC* 341, 343) so as to leave open the field for our investigations. And although they belong to the scaffolding of our thoughts (*OC* 211), they are not rigidly there. They drift.

These propositions are of a special kind. "There are countless general empirical propositions that count as certain for us" (*OC* 273). "Here is a hand". "We all have parents" (*OC* 211, 240, 279, 282, 335), or scientific propositions (*OC* 599). They are neither the protocol or sense-data sentences of empiricism, nor the *cogito* of rationalism.[13] That is, they are not certain propositions

> striking us immediately as true, i.e., it is not a kind of *seeing* on our part; it is our acting, which lies at the bottom of the language game (*OC* 204).

We cannot claim to *know* these propositions. Nor do we *believe* them to be true. It seems presumptions to say "I know that I am now sitting on

a chair" (unless in specific language games 'I know' or 'I believe' have a special use) (*OC* 553, 554). These propositions are not like axioms. They are not taught and we do not learn them. (Nor do we learn that we know them (*OC* 374).) We cannot claim we know them. "Knowledge depends on what we learn" (*OC* 286). If somebody says "I know that that's a tree" it seems like the matter has not been settled (*OC* 481) and we have to conduct tests to confirm it. These propositions are not assumptions or hypotheses that we test. "We do not, for example, arrive at any of them as a result of investigation" (*OC* 138).

These propositions are exempt from doubt. No one can doubt them at will (*OC*, 219, 221). To doubt them "would seem to drag everything with it and plunge it into chaos" (*OC* 613). Any kind of scepticism concerning them is senseless. These propositions form the picture we have of the world. Of course people sharing different language games or systems form different pictures. Such systems are "something that a human being acquires by means of observation and instruction. I intentionally do not say 'learns' " (*OC* 279). The role of these propositions is like that of rules of a game: "and the game can be learned purely practically, without learning any explicit rules" (*OC* 95).

Where do we get the certainty regarding this kind of propositions? It is arbitrary or a matter of hard-headedness or thoughtlessness on our part? "Now I would like to regard this certainty, not as something akin to hastiness or superficiality, but as a form of life" (*OC* 358). Did I first satisfy myself of their correctness? "No: it is the inherited background against which I distinguish between true and false" (*OC* 94). As difficult as it is to accept it (*OC* 166), or perhaps unsatisfactory, these propositions that found our language games are groundless, we cannot justify them. We can give reasons, but justification comes to an end (*OC* 192). And this end in its turn "is not an ungrounded presupposition: it is an ungrounded *way of acting*" (*OC* 110, emphasis added). Otherwise we could be caught in a circle. We would arrive at a point where we would be asked to substantiate the justification with reasons that would be equally or more in need of justification (*OC* 307).

To go on with Wittgenstein's approach, we cannot say that a language game can be justified by an appeal to a higher order language game. Nowhere does Wittgenstein mention anything that could suggest a *hierarchy of language games*.[13] His talk of the use of the word 'philosophy' in philosophical discourse may be suggestive to the contrary:

> It is, rather, like the case of orthography which deals with the word 'orthography' among others without then being second order (*PI*, I 121).

Besides, what could justify a language game being of a higher order? One would have to step out of the language game (in what Quine calls the Cosmic Exile) he/she is taking part in, look down and recognize the supposed

hierarchy. But where would he/she stand? Is there a neutral standpoint floating around independently of any language game? Such a conclusion would be inadmissible to Wittgenstein.

Although we do not challenge these basic propositions, although it is senseless to seek to justify them, it so happens and we come across different language games, different systems, different paradigms.

> ... what men consider reasonable or unreasonable alters. At certain periods men find reasonable what at other periods they found unreasonable. And vice versa (*OC* 336).

What can we say of these different or successive paradigms? If meaning is possible only within the limits, the frame of reference that a given language game determines, then the only thing that can be said, least or most, is that they are incommensurable, i.e. that they cannot be put under a common measure.

When language games change, concepts change, and with the concepts the meanings of words change as well (*OC* 65). And this seems to bring in the problem of relativism with a vengence.

1. If concepts, methods, standards, problems, etc., are all relative to a language game, then it seems that it would be extremely difficult to identify a different framework from the standpoint of a given one (More on this in Davidson, 1973–1974).
2. Translation and, thence, communication between people entertaining different world pictures seems to be barred. Incommensurability is equated to mutual unintelligibility.
3. Rational decision seems to be reduced to power relations. Persuasion and rhetorical techniques seem to take the place of evidence and proof.
4. The breadth of support seems to provide the decisive factor in evaluating whether to accept or reject a new system or paradigm. Scientific progress becomes a matter of investigating sociological aggregates with respect to their psychology. A relativist and 'anything goes' reasoning reigns.

4.2. Wittgenstein's Ficticious Tribe

We must now call up from Wittgenstein's work the arguments that would take care of this network of objections. We will try to do that through a parable. In several cases Wittgenstein comments on imaginary situations in order to illuminate his arguments. We will reconstruct here what he has to say in the case of a fictitious tribe we call primitive.

The parable of the primitive tribe is supposed to present us with a situation where two radically different forms of life and their respective language games clash. Are we in a position, first to identify this rival language game and then to converse with the people sharing it? That is, are we not trapped in an all-embracing, well-insulated language game, our language game? And secondly, are we justified in holding and using this language game to combat

the primitive one? Can we objectively compare and evaluate the two?

Wittgenstein asks: "... if we come across (such a) tribe and we see that instead of a physicist they consult an oracle", are we, first, "right or wrong to combat their language game?" And in doing so, second, "aren't we using our language game to combat theirs?" (*OC* 609). Wittgenstein's second question concerns the problem of mutual intelligibility including the problem of identifying a different framework (objections 1 and 2), while the first question Wittgenstein raises refers to the problem of rationality (objections 3 and 4).

Wittgenstein (1979) took up these questions in his criticism of Frazer's *Golden Bough*.[14] Frazer tried to explain primitive practices using standards of twentieth-century England. Writing on rituals, he made people in the tribe he studied look as if they acted out of sheer stupidity, making errors, and falling into inevitable slips. Magic was equated to false physics, medicine or technology, depending on the case, and therefore condemned to infamy. Wittgenstein opposed this view. Rituals cannot be equated to science.

> ... it is nonsense for one to go on to say that the characteristic feature of *these* (ritualistic) actions is the fact that they arise from faulty views about the physics of things. (*Fr* 67).

Instead of providing explanations that aim at just rendering these primitive activities plausible, one should only describe and say: this is what human life is like (*Fr* 63). Coming up with an explanation that supposedly proves this life's significance, confers upon it meaning and plausibility is a senseless and useless move.

Does this mean that "every view has its charm?" (*Fr* 71). That, Wittgenstein claims, would be false.

> The correct thing to say is that every view is significant for the one who sees it as significant (but that does not mean, sees it other than it is). Indeed, *in this sense* every view is equally significant.

Giving historical explanations is but a superfluous assumption that explains *nothing* (*Fr* 72). We must not interpret these remarks as an attack on historical reconstruction and research in general. It is rather argued by Wittgenstein that it is not always appropriate to provide causal explanations where description and a network of associations are wished for (Cioffi, 1981).

However, what if this language game of the primitive tribe, springing from a quite alien form of life, violates, challenges, or glosses over the requirements our world picture poses? What if someone from the alleged tribe insists that he has been on the moon or that water does not boil at circa 100°: "... is there no objective truth?" (*OC* 108). Can we objectively contemplate these other alternatives and decide for the right one?

Wittgenstein leaves no room for wavering here. Our whole system of physics – that is, the very grounds we have for judging anything – forbids us to believe such contentions. "We belong to a communnity that is bound

together by science and education" (*OC* 298). "What we believe depends on what we learn" (*OC* 286). "This body of knowledge has been handed on to me and I have no grounds for doubting it ..." (*OC* 288). "Nor have I grounds for basing my actions on such beliefs. The grounds I could give are not as certain as the very thing they were supposed to be grounds for" (*OC* 307, crf 111). That is, we could not even consider giving up our system of reference for some other. "My life consists in my being content to accept many things" (*OC* 344). "We are satisfied that the earth is round" (*OC* 299).

This does not mean that we cannot offer reasons for our attitude, that we cannot compare the two statements or the two systems of belief, that we cannot cast and justify our preference.[15] "We say: these people do not know a lot that we know. And, let them be never so sure of their belief – they are wrong and we know it" (*OC* 286). We actually do say that. And we may combat their language game. But this is not in the line of offering reasons. This is where persuasion starts. "At the end of reasons comes persuasion" (*OC* 612). It is what missionaries do when converting natives. Simplicity, symmetry, clarity, order, etc. comprise the arsenal of persuasion. They are the values that supposedly dictate choice of language games, whereas they really function as pretence. They are offered by the powerful in place of beads and mirrors in return for the allegiance and submissiveness of the powerless.

Let us summarize the points illustrated by Wittgenstein's parable.

a. We should not measure a different form of life, system, language game on a Procrustean bed, trying to make it conform, one way or the other, to our world picture. What we can describe (using translation techniques or modes of interaction), we should not bend and twist in order to make it intelligible to us,
b. Loyalty to or preference for a language game is not a matter of choice, of compliance with a set of ideal rules, of assimilating likes and dislikes, but a matter of training and education.
c. Combating an alien language game, enjoying a feeling of superiority is not a consequence of rational contemplation. It lies in the realm of power relations.

Are these theses still susceptible of relativistic readings? Let us summarize, by way of a conclusion, what we have so far drawn from Wittgenstein's views, so as to answer the objections raised.

1. Talk of language games supposedly prohibits us from differentiating conceptual systems, since we cannot break loose from our own framework. But, knowing how to play a game, whether linguistic or not, implies, among other things, knowing what does not belong to that game, what is other or different. Failure of radical translation, in the

case of incommensurable theories, does not preclude the possibility of identifying that other framework as different. The requirement for a common conceptual ground as the necessary precondition for the ability to translate and, therefore, to differentiate follows from justification demands.

2. Communication between people committed to different or even incompatible language games is not barred. Translation may be a painstaking operation, may not be radical, but it is not fatally doomed. Their language games are open-ended and may interact. Or people may share language games other than the one that keeps them apart, by way of which they can communicate. Finally, when every linguistic means of communication fails, they, as human beings, can depend on praxis and instinctive reaction as the last resort arbitrator for establishing contact.
3. Rationality is not abolished. We are guided in our actions by science. Employing the standard techniques of rational discussion, we may argue about our beliefs and defend them vehemently. The point, however, this paper stresses is that we cannot prove these beliefs. We cannot justify, reconstruct, or reason about the foundations of our language games. We just bear them. We manifest them, we display them. We display our certainty acting in confidence.[16] The claim of incommensurability refers to that which eludes rationalization. The leap from reason to persuasion.[17] The lack of mutual understanding between two incompatible forms of life.
4. Finally, taking into consideration communities and culture does not immediately and necessarily leave the door open to relativistic deviations. Tradition and training are not equivalent to the sum of individual opinions and preferences. They point to something unavoidable and inescapable. So, to paraphrase, 'not anything goes'.

5. CONCLUSION

Wittgenstein's parable and his theses on meaning that we have cited, provide Kuhn with a philosophical basis for his *Structure of Scientific Revolutions.* Under this reading, Kuhn may indeed sound unexciting. Rationality is preserved, communication between mutually incompatible language speakers is reinstated, comparisons are made possible. The important thing is that this is not a move of retreat. We have seen that Kuhn avoids relativism without taking refuge in the good old Cartesian rationality his critics measured him against. He does not seek and he shows that we cannot have at our disposition an independent rationality standpoint emitting neutral standards of adequacy and truth. Therefore, he is left with the alternative he has been repeatedly suggesting: the modification of the current notion of what rationality is (Kuhn, 1971 p. 144; 1977, p. 306; 1983).

Under this reading, Kuhn's account of science is fully coherent. The theses defended in the book and the answers Kuhn offers to his critics

no more sound symptomatic and *ad hoc*. *The Structure of Scientific Revolutions* is still original, innovating, unconventional.

NOTES

[1] All page references, unless otherwise noted, are to the 2nd enlarged edition (1970), also referred to as *The Structure*.

[2] For this line of criticism see: Shapere (1980, 1981); Scheffler (1967); Lakatos (1970); Popper (1970); Watkins (1970); Briskman (1977); Papineau (1979); Lamb (1980); Radnitzky (1982); Gallacher (1977); Trigg (1973); Munz (1985).

[3] Consult the bibliography in Gutting (1980), pp. 324–339.

[4] A. Musgrave (1980, p. 51) gives such an account pointing out that Kuhn, responding to his critics, emerges in his *Postscript* "but a pale reflection of the old, revolutionary Kuhn".

[5] See especially the characterization of such Kuhnian phrases as "with the change of paradigm the scientists afterward works in a different world" (p. 121), "the proponents of competing paradigms practice their trades in different worlds" (p. 150) in Margolis (1984–1985, p. 91) and Rorty (1979, pp. 324, 344).

[6] This encompassing propensity of the paradigms, their broad scope, has been considered their Achilles's tendon. Shapere (1980, p. 38) has dubbed them 'blanket terms', and Masterman (1970, p. 61) has discerned no fewer than twenty-one different uses. But this very nature of the paradigms, so broad and not precisely delimited, will be shown to enhance the line of reasoning of the present paper.

[7] See note 2 above. Also Kitcher (1978); Putnam (1981); Scheffler (1972). For an answer see Kuhn (1982).

[8] Shapere (1981, p. 55) has also claimed that the incommensurability thesis is not the result of investigating in actual science and its history. He has also seen that it is the logical consequence of a theory of meaning. The difference from the present line of reasoning is that he construes that conclusion negatively. The theory of meaning is shrunk to "a narrow preconception about what 'meaning' is", a contention that yields, according to Shapere, idealism and thereafter relativism.

[9] All quotations from this book, hereafter referred to as *PI*, I paragraph, *PI*, II page.

[10] All quotations from this book are hereafter referred to as *OC* paragraph.

[11] Reference to Wittgenstein's work may be selective but it is not unfounded. It is based on and falls in with the readings of such Wittgensteinian scholars as N. Malcolm, P. Winch, H. Ishiguro, C. McGinn.

[12] The sense-data sentences are supposedly indubitable since they give us a privileged access to the world. They provide an unmediated juxtaposition of world and experience. *Cogito ergo sum* is a self-justifiable proposition, since my doubting it entails its truth. Both are considered epistemologically privileged.

[13] Referring to Kuhn's work, several authors, explicitly or implicitly, consider a hierarchy of paradigms: Meynell (1975); Austin (1972); Scheffler (1972); Laudan (1976); Stegmüller (1976).

[14] All quotations from this paper, hereafter referred to as *Fr.* page.

[15] Will all that be phrased in my language? The question expresses nothing but a truism. Of course, one is using one's own language! See also Morawetz (1980, p. 59), and *OC* 599.

[16] cf. Wittgenstein's *Tractatus* (1961, 4.121):

Propositions cannot represent logical form: it is mirrored in them.
What finds its reflection in language, language cannot represent.
What expresses itself in language, we cannot express by means of language.
Propositions show the logical form of reality.
They display it.

[17] Even persuasion may be absolutely rational and fruitful. It does not always encompass

irrational tactics, nor does it necessarily disguise violence. Power relations dominate when considerations other than mutual intelligibility become important.

REFERENCES

Austin, W. H.: 1972, 'Paradigms, Rationality, and Partial Communication', *J. General Philos. Science* **3**, 203–218.

Barnes, D.: 1982, *T.S. Kuhn and Social Science*, New York: Columbia University Press.

Bearn, G.: 1985, *Relativism and Realism: The Nature and Limits of Epistemological Relativity*, Ph.D. Dissertation, Yale University.

Briskman, L.: 1977, 'Historicist Relativism and Bootstrap Rationality', *The Monist* **60**(4), 509–539.

Cedarbaum, D. G.: 1983, 'Paradigsm', *Stud. Hist. Phil. Sci.* **14**(3), 173–213.

Cioffi, F.: 1981, 'Wittgenstein and the Fire-festivals', in Block, I. (Ed.), *Perspectives on the Philosophy of Wittgenstein.* Cambridge Mass: MIT Press.

Davidson, D.: 1973–74, 'The Very Idea of a Conceptual Scheme', *Proc. & Addr. Amer. Philos. Assoc.* **47**, 5–20.

Doppelt, G.: 1978, 'Kuhn's Epistemological Relativism: An Interpretation and Defence', *Inquiry* **21**, 33–86.

Gallacher, H. P.: 1977, 'The Author of *On Certainty* and Franco-American Conventionalism', in Leifellner E. (Ed.), *Proc. 2nd Int. Wittgenstein Symp.* pp. 226–230.

Gutting, C.: 1980, *Paradigms and Revolutions*, Notre Dame: Univ. of Notre Dame Press.

Gutting, G.: 1984, 'Paradigms and Hermeneutics: a Dialogue on Kuhn, Rorty, and the Social Sciences', *Amer. Philos. Quart.* **21**, 1–15.

Kutcher, P.: 1978, 'Theories, Theorists, and Theoretical Change', *Philos. Rev.* **87**, 519–547.

Kuhn, T. S.: 1962, *The Structure of Scientific Revolutions.* Chicago: The University of Chicago Press, (1970a) 2nd ed. enlarged.

Kuhn, T. S.: 1970b, 'Reflections on my Critics', in Lakatos, I. and Musgrave, A. (Eds.), *Criticism and the Growth of Knowledge.* Cambridge: Cambridge University Press.

Kuhn, T. S.: 1971, 'Notes on Lakatos', *Boston Studies in the Philosophy of Sciences* **VIII**, 137–146.

Kuhn, T. S.: 1977, 'Theory-Change as Structure-Change: Comments on the Sneed Formalism', in Butts and Hintikka, J. (Eds.), *Historical and Philosophical Dimensions of Logic, Methodology and Philosophy of Science.* Dordrecht: Reidel.

Kuhn, T. S.: 1982, Commensurability, Comparability, Communicability', *PSA 1982*, Vol.2.

Kuhn, T. S.: 1983, 'Rationality and Theory Choice', *J. Philosophy* **LXXX**(10), 563–570.

Lakatos, I.: 1970, 'Falsification and the Methodology of Scientific Research Programmes', in Lakatos I. and Musgrave, A. (Eds.), *Criticism and the Growth of Knowledge*, Cambridge: Cambridge University Press.

Lamb, D.: 1980, *Hegel – From Foundation to System*, The Hague: Martinus Nijhoff.

Laudan, L.: 1976, 'Two Dogmas of Methodology', *Philosophy of Science* **43**, 585–597.

Margolis, J.: 1984–1985, 'Objectivism and Relativism', *Proc. Aristotelian Soc.* **85** (new series).

Masterman, M: 1970, 'The Nature of a Paradigm', in Lakatos, I. and Musgrave, A. (Eds.), *Criticism and the Growth of Knowledge*, Cambridge: Cambridge University Press.

Meynell, H.: 1975, 'Science, the Truth, and Thomas Kuhn', *Mind* **84**, (333), 79–93.

Morawetz, T.: 1980, 'Understanding, Disagreement, and Conceptual Change', *Phil. & Phenom. Research* **XLI**, 46–63.

Munz, P.: 1985, *Our Knowledge of the Growth of Knowledge*, London: Routledge & Kegan Paul.

Musgrave, A.: 1980, 'Kuhn's Second Thought', in Gutting Gary (Ed.), *Paradigms and Revolutions*, Notre Dame: Univ. of Notre Dame Press.

Papineau, D.: 1979, *Theory and Meaning*, Oxford: Clarendon Press.

Popper, K. R.: 1970, 'Normal Science and its Dangers' in Lakatos, I. and Musgrave, A. (Eds.), *Criticism and the Growth of Knowledge*, Cambridge: Cambridge University Press.

Putnam, H.: 1981, *Reason, Truth, and History*, Cambridge: Cambridge University Press.
Radnitzky, G.: 1982, 'Analytic Philosophy as the Confrontation Between Wittgensteinians and Popper', in Agassi, J. and Cohen, R. S. (Eds.), *Scientific Philosophy Today – Essays in Honor of Mario Bunge*, Dordrecht: Reidel.
Rorty, R.: 1979, *Philosophy and the Mirror of Nature*, Princeton: Princeton University Press.
Scheffler, I.: 1967, *Science and Subjectivity*, Indianapolis: Bobbs-Merrill.
Scheffler, I.: 1972, 'Vision and Revolution: A Postscript on Kuhn', *Philos. of Science* **39**, 366–374.
Shapere, D.: 1980, 'The Structure of Scientific Revolutions', in Gutting Gary (Ed.), *Paradigms and Revolutions*, Notre Dame: Univ. of Notre Dame Press.
Shapere, D.: 1981, 'Meaning and Scientific Change', in Hacking, I. (Ed.), *Scientific Revolutions*, Oxford: Oxford Univ. Press.
Stegmüller, W.: 1976, *The Structure and Dynamics of Theories*, Berlin: Springer-Verlag.
Trigg, R.: 1973, *Reason and Commitment*, Cambridge: Cambridge University Press.
Watkins, J.: 1970, 'Against "Normal Science" ', in Lakatos, I. and Musgrave, A. (Eds.), *Criticism and the Growth of Knowledge*, Cambridge: Cambridge University Press.
Williams, B.: 1974, 'Wittgenstein and Idealism', in Vessey, G. (Ed.), *Understanding Wittgenstein*, Ithaca: Cornell University Press.
Wisdom, J. O.: 1974, 'The Nature of "Normal Science" ', in Schilpp, P. A. (Ed.), *The Philosophy of Karl Popper*, The Library of Living Philosophers, Volume XIV, Book II, LaSalle: Open Court.
Wittgenstein, L.: 1958, *The Blue and Brown Books*, Rhees, Rush (Ed.), Oxford: Blackwell.
Wittgenstein, L.: 1961, *Tractatus Logico-Philosophicus*, Pears, D. F. and McGuinness, B. F. (trans.), London: Routledge & Kegan Paul.
Wittgenstein, L.: 1968, *Philosophical Investigations*, Anscombe, G. E. M. (trans.), 3rd edition, MacMillan, New York.
Wittgenstein, L.: 1969, *On Certainty*, Anscombe, G. E. M. and von Wright, G. H. (Eds.), Oxford: Blackwell.
Wittgenstein, L.: 1970, *Zettel*, Anscombe, G. E. M. and von Wright (Eds.), Berkeley: Univ. of California Press.
Wittgenstein, L.: 1979, 'Remarks on Frazer's *The Golden Bough*', in *Wittgenstein: Sources and Perspectives*, Luckhardt, G. (Ed.), Sussex: Harvester.

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