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## A New Approach to the Incommensurability of Scientific Paradigms in T. Kuhn's Theory

The notion of incommensurability as applied to competing scientific theories has been much debated and seriously challenged on various grounds by many philosophers ever since its first appearance in the original publication of *The Structure of Scientific Revolutions* (1962). The ongoing controversy about the correct interpretation of what it means for the two (or more) paradigms to be incommensurable is partly due to Kuhn's equivocal use of the term '*paradigm*' (as he himself admitted in the *Postscript* in the Second edition), as well as to his apparently insufficient explication of the concept of incommensurability in its relations to the neighboring semantic concepts of intranslatability and incomparability. As a result, several eminent critics of Kuhn's theory took it as their task to expose the claim to the incommensurability of opposing scientific paradigms as either incoherent (when interpreted as '*intranslatability*', e. g., Putnam, Davidson), or simply false (when construed in terms of the impossibility of meaningful comparison between the paradigms, e. g., Moberg, Kordig).

Much of this paper's argumentation will be directed against such interpretations. I will attempt to show that the claim that certain scientific paradigms as they appear historically are incommensurable implies neither that the one cannot be successfully translated into another's "language", nor that they cannot be compared with each other with regard to the scope of their respective applications, precision of their predictions, simplicity, aesthetic appeal, etc. However, it will be argued that there is a sense in which it can be legitimately claimed that the two incommensurable theories cannot be meaningfully compared, namely, when by '*comparison*' is meant 'a comparison of theories with *how the things really are*'. That such an ideal test for competing theories cannot be achieved seems to be one of the most crucial points of Kuhn's overall project.

While arguing against the reduction of the notion of incommensurability to either intranslatability or incomparability, I will suggest a way of understanding this notion by briefly observing its function in mathematics (where the notion first appeared historically), and by developing an analogy between

the incommensurable scientific theories and “incommensurable” systems of religious beliefs.

*The Comparison of the Incommensurable Theories*

Before we can reach a decision whether the incommensurability of rival theories implies, among other things, that they cannot be compared with each other due to the radical meaning variance of their respective terms or basic assumptions, as some critics have supposed<sup>1</sup>, we should look closely at the way the thesis of incommensurability is introduced in Kuhn’s book. Since some other original advocates of the historical school of the philosophy of science may have used the term with somewhat different connotations<sup>2</sup>, I will mainly refer to Kuhn as the primary authority on the intended meaning of the word for his theory of the successive paradigm shifts.

The term ‘*incommensurable*’ occurs for the first time only toward the last third of *The Structure* and is first used to characterize the major differences between the past and the current fields of research of a scientist, who is now committed to a very different scientific project:

At times of revolution, when this normal scientific tradition changes, the scientist’s perception of his environment must be re-educated [...] After he has done so the world of his research will seem, here and there, *incommensurable* with the one he had inhabited before (my emphasis)<sup>3</sup> (p.112).

Although the term itself is new at this point of the development of Kuhn’s argument, the *idea* of incommensurability has been present from the very beginning of the book in a somewhat disguised form. The most common synonym to ‘*incommensurable*’ that was used up to that point was ‘*incompatible*’<sup>4</sup>, and it becomes clear from many instances, that Kuhn considers the two terms to be fully interchangeable, and in the same manner these terms will be used in this paper. Some other ways of expressing the same notion in *The Structure* include the stressing of the “irreconcilable differences”<sup>5</sup> between successive paradigms (i. e., the impossibility to derive one from another, e. g., classical Newtonian physics from the General Theory of Relativity of Einstein), and pointing to the

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<sup>1</sup> Cf. Moberg D. Are there Rival, Incommensurable Theories? // Philosophy of Science, 46, 1979; Kordig C. The Justification of Scientific Change. – Dordrecht: D. Reidel., 1971, pp. 52ff.

<sup>2</sup> Cf. Feyerabend P. K. Against Method. – London: NLB., 1975.

<sup>3</sup> Kuhn T. S. The Structure of Scientific Revolutions. – 2<sup>nd</sup> ed., Chicago: The University of Chicago Press, 1970.

<sup>4</sup> Ibid. p. 6; p. 92; p. 94; et al.

<sup>5</sup> Ibid., p. 103.

“incompleteness of logical contact”<sup>6</sup> that always characterizes paradigm debate.

Without providing the formal single definition of incommensurability, Kuhn proceeds to develop and unfold the concept by introducing several analogies, which are meant to bring the idea of incommensurable theories into the more familiar context. A particularly revealing one deals with the parallel between scientific and political revolutions, both of which are brought about through the struggle of the incompatible views on the underlying nature of their respective subjects.

What an incompatible position on the desired changes of a political system or institution implies, is that the possibility of such changes are in principle ruled out by the very nature of the current political regime and its various political institutions. For instance, however many modifications the monarchy might undergo during the period of its historical development, some of these under the legitimate pressure from its subjects, one thing this particular form of government cannot do while still remaining true to itself is to abolish monarchy altogether, and establish, say, a republic. The latter change requires a revolution inspired by a very different social-political theory, which can never be reconciled with, nor derived from, the current monarchical one. The new political theory thus would be truly incompatible (or incommensurable) in a sense that it differs from the old one in the most fundamental assumptions about the nature of, say, a just state. This basic disagreement cannot be settled by any amount of theorizing, let alone by conclusive proofs, but only by the actual outcome of the inevitable political struggle.

The incommensurable scientific paradigms, Kuhn argues, go through much of the same process on their way to recognition:

Like the choice between competing political institutions, that between competing paradigms proves to be a choice between incompatible modes of community life. Because it has that character, the choice is not and cannot be determined by merely evaluative procedures characteristic of normal science, for these depend in part upon a particular paradigm, and that paradigm is at issue<sup>7</sup> (p. 94).

The arguments, which one of the rival groups of scientists may advance in defense of their unique way of doing science will inevitably depend on the acceptance of some basic beliefs characteristic of that particular group, and thus be always circular. It is one of the main tenets of *The Structure* that this sort of radical disagreements cannot be rendered in a theory-neutral language, and

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<sup>6</sup> Ibid. p. 110.

<sup>7</sup> Ibid. p. 94.

thus no “unbiased” decision as to whether the one paradigm is “true” and the other “false” can be reached.

We may now be in a better position to turn directly to the question whether incommensurability implies that the two theories are also incomparable (i. e., that there are no evaluative standards that are applicable to both). Among many, Moberg and Kordig have treated the two terms as interchangeable, and offered an extensive criticism of Kuhn on this ground, as well as a way to modify his theory to avoid an apparently embarrassing conclusion that “incommensurable theories cannot be ranked as better or worse”<sup>8</sup>. Both of them argue that the paradigms *can* be compared *in spite of* Kuhn's presumed intention to make them totally ‘*incomparable*’. I want to argue in the rest of this section that such an interpretation of Kuhn's argument is mistaken, and it may well represent what Gholson and Baker call a “Kuhnian” rather than Kuhn's own conception of incommensurability<sup>9</sup>. It will hopefully become evident from the material below that the competitive scientific paradigms can be compared with each other quite *in accordance* with Kuhn's original account.

Cederbaum reports that the fact that several translations of *The Structure* have rendered ‘*incommensurable*’ as ‘*incomparable*’ has been a source of consternation for Kuhn<sup>10</sup>. And indeed, more than once in *The Structure* Kuhn is stressing the rational basis on which the choice between the rival paradigms is made. That is not to say, however, that the radical change of the predominant scientific theory occurs with necessity, merely in virtue of the pressure from the new and irresistible facts (“the truth of nature”), or in virtue of its proven falsity. But the charges of relativism and subjectivism that are often raised against Kuhn's account of the scientific progress seem to be unwarranted especially in view of his explicit and detailed description of the gradual development of revolutionary science and its struggle with the “normal” scientific practice which precludes any arbitrariness in the theory choice. The replacement of one paradigm with another is always, in the long run, a *pragmatic* (and thus also rational) choice based on a comparison of relative utility (in the widest sense of this word) of the theories in question<sup>11</sup>. Kuhn is very clear on this point:

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<sup>8</sup> Moberg D. Op. cit., p.246.

<sup>9</sup> Gholson B., Baker P. Kuhn, Lakatos, and Laudan // *American Psychologist*, 40, 1985, p. 756.

<sup>10</sup> Cederbaum D. G. Paradigms // *Studies in the History and Philosophy of Science*, 14, 1983, p. 207.

<sup>11</sup> It is true, as Kuhn points out, that the advantages of the new scientific paradigm in solving the problems and explaining the anomalies of the old one are not always apparent on the initial stage. Sometimes, the new theory will create even more theoretical complications while resolving only a few problems (as it was the case with Copernican system before Kepler), so that the first adherents of it are making a decision in its favor truly “on faith.” Yet this “leap of faith” never lacks some rationale which would make the expectation of the future success of the theory justified nonethe-

The act of judgment that leads scientists to reject a previously accepted theory is always based upon more than a comparison of that theory with the world [...] The decision to reject one paradigm is always simultaneously the decision to accept another, and the judgment leading to that decision involves the comparison of both paradigms with nature *and* with each other<sup>12</sup> (p. 77).

This particular passage is very important for Kuhn's argument in general, and contains several major points, but for now we should only note that, according to *The Structure*, the comparison *in some sense* of the incommensurable theories *with each other* does in fact take place. The presumed "radical meaning variance" (Moberg) of the terms of the different paradigms apparently does not exclude their meaningful comparison, nor the rational choice between them based on the results of such comparison. Later in the book Kuhn emphasizes this once again when he says: "It makes a great deal of sense to ask which of two actual and competing theories fits the facts *better*"<sup>13</sup>. Thus it seems that Moberg's worry that "incommensurable theories cannot be ranked as better or worse" is unfounded: the theory that fits the facts better, i. e., provides a reasonable account of the existing phenomena and explains the anomalies (at least some of them) that beset the old paradigm (other criteria may of course be added), is in fact *a better theory*. That all the important advantages of the new theory often do not appear until enough scientists or institutions become "converts" and invest their time and resources in its proper development and conceptual shaping cannot prevent us from ranking it as a better theory (i. e., as having a better potential) from the time it was first proposed.

With all this said, we should yet observe that Kuhn indeed proclaims (partial) semantic incompatibility of the incommensurable theories. What the advocates of the Ptolemy's system in part *mean* by the term '*Earth*' is that it is the unmoved absolute center of the universe, and likewise the *definitions* (rather than descriptions based on observation) of space and time would vary significantly for Newtonian and Einsteinian scientists. Given this semantic disparity of the terms it seems meaningless to inquire which one, say, ancient Egyptian's or Ptolemy's account of Earth's position in the system of planets is closer to the contemporary view simply by comparing the respective descriptions with the modern heliocentric theory. From this it does follow, however, that the whole paradigm cannot thus be described in the evaluative terms, and

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less: "There must also be a basis, though it need be neither rational nor ultimately correct, for faith in the particular candidate chosen" (Kuhn T. S. Op. cit., p. 158).

<sup>12</sup> Kuhn T. S. Op. cit.

<sup>13</sup> Ibid, p. 147.

ranked as better or worse. But this evaluation will always be anthropocentric – it is always better or worse for us, for our current interests and goals.

It is hardly surprising that this account of scientific progress leaves many philosophers and especially scientists very unhappy. It is one of our deep and much-honored intuitions that the “better” theory should not only be a more useful theory for practical matters, but also in some sense the “truer” one, the one closer to reality. After all, the Earth *does* rotate around the Sun, and not otherwise, whether we find it pleasant or disturbing - one only needs to go in some point in space and *see* it to be the case. We shall pick up the question of the relation between a paradigm and truth, or a theory about nature and nature herself after briefly suggesting a positive way of understanding incommensurability by tracing the term to its mathematical origins in Ancient Greece.

Historically the term ‘*incommensurable*’ (in its Greek equivalent literally meaning ‘*not of the same measure*’) was applied to certain magnitudes the ratio of which could not be expressed as a fraction of integers. The Pythagorean discovery that the magnitude expressing the length of hypotenuse of a right isosceles triangle cannot be related to the side of this triangle by a simple proportion of two integers provoked, as many historians agree, a first serious crisis in ancient mathematics. The side of a square and its diagonal appeared to be of fundamentally different natures – incommensurable with each other. This was particularly troubling in view of the Pythagorean doctrine that all numbers could be expressed in terms of integers or ratios of integers. Euclid in his *Elements* defines it as following: “Incommensurable magnitudes do not have to one another the ratio which a number has to a number”<sup>14</sup>, but does not provide any solution to the apparent problem.

Plato is famously using the puzzle of incommensurability in *Meno*, when a slave-boy, who never studied geometry before, is asked by Socrates to figure out the relation between the side of a given square and its diagonal, and is of course genuinely perplexed when the doubling of a side fails to produce a square twice as big as the original<sup>15</sup>. Jacob Klein in his commentary on *Meno* observes that in the course of the conversation Socrates first repeatedly exhorts the boy *to tell* the correct answer, but at a decisive turn of the search he changes his strategy and encourages the boy “*just to show (deixon)* from what line the double square will result”<sup>16</sup>. The invitation *to show* the correct answer rather than *to tell* it clearly hints on the ‘*ineffable*’ character of the relation between incommensurable lines.

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<sup>14</sup> Euclid, *Elements*, Book X, Prop. 7.

<sup>15</sup> Plato, *Meno*, 82c - 85b.

<sup>16</sup> Klein J. A Commentary on Plato’s *Meno*. – Chapel Hill: The University of North Carolina Press, 1965, pp. 99-101.

This extremely incomplete historical review of the origin of the term and its function in mathematics seems yet to be relevant for understanding of incommensurability in Kuhn's theory. Cederbaum reports a conversation with Kuhn, in which he acknowledged that he had been well aware of the paradigmatic use of the word in Greek mathematics while working on *The Structure* and in some sense had modeled the incommensurability of scientific theories on the incommensurability of magnitudes<sup>17</sup>. If that is indeed the case, we can perhaps have a clearer view why incommensurable paradigms may nonetheless be compared with each other. Although one may be unable *to express* the relation between the two incommensurable magnitudes as a ratio of two integers, yet one is still in a position to say which line is *shorter* and which is *longer*, i. e., to compare them with respect to their length. Or perhaps, as Eudoxes of Cnidus showed more than two thousand years ago, that ratio can be approximated by the use of irrational numbers to a desired degree of certainty, although never entirely precise. If the analogy with mathematics holds, it is reasonable to conclude that likewise the incommensurability of paradigms does not preclude their comparison. The paradigm produced by a scientific revolution, say, Einsteinian physics, cannot be shown to "contain" in itself the older paradigm, e. g., Newtonian physics in its entirety, as merely one of its special cases, but may be successfully compared with it as far as the precision of their predictions, scope of application, simplicity or their practical usefulness are concerned.

It is now time to come back to the question in what sense it can be rightfully said that the incommensurable paradigms elude comparison. As it was observed earlier, there seems to be a deeper worry in Moberg's criticism of Kuhn, namely, that the introduction of the concept of incommensurability strips natural sciences of one of their most prized possessions – objectivity. If scientific progress unfolds in the way that Kuhn describes it, then it desperately lacks the idea that has been central for centuries – the gradual approximation of science to Truth. According to *The Structure* the question whether this or that theory better reflects or describes the ultimate reality, i. e., the things as they *really* are, is not a particularly useful or interesting one: "To historian it makes little sense to suggest that verification is establishing the agreement of fact with theory"<sup>18</sup>. Whatever is the process by which one theory supersedes the other it is not the one of comparison of these theories with the brute "facts" and thus choosing the one that fits "nature" the best. It is always a process, although its descriptions may differ, rather than *the criterion* by which the revolutionary paradigm is chosen among several exiting candidates in the course of history. The surviving candidate, however, cannot claim any special

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<sup>17</sup> Cederbaum D. G. Op. cit., p. 206.

<sup>18</sup> Kuhn T. S. Op. cit., p. 147.

relation to “truth”, a word that Kuhn is careful to avoid up until the last pages of his book. The following quotation reveals his direction quite well: “We may have to relinquish the notion, explicit or implicit, that changes of paradigm carry scientists and those who learn from them closer and closer to truth”<sup>19</sup>.

It is not the right place either for endorsing or denying this controversial claim, but we should point to its origins in philosophy of Quine and address the objection based on commonsensical intuition that scientists do seem to construct and alter their theories in response to the discovery of some new phenomena, and thus they respond to some undeniable facts “out there”, rather than merely forcing these facts into a pre-given framework of a theory. Besides, one may point out, Kuhn himself speaks on several occasions of the comparison of a theory “with nature” or “with the world”<sup>20</sup>, and these statements look very much like the resort to the traditional verificationists’ procedures.

The image of mature science as the one which discovered the “language that Nature herself speaks” (Rorty) has been prominent at least since the Enlightenment. In the 20th century the Popperian picture of science, according to which science develops inductively through the process of constant comparison of theories with “facts” and, as a result, “natural” falsification or ‘*corroboration*’ of these theories, has only reinforced the long-held picture in its main features. The powerful alternative to this view, and more particularly, to the assumptions that underlie that view, was presented by Quine in the early 50’s, and had a major influence on Kuhn’s philosophical position.

Quine’s influence can be seen throughout *The Structure*. Kuhn admits his dependence on Quine’s early work in the *Preface* when he says that “W. V. O. Quine opened for me the philosophical puzzles of the analytic-synthetic distinction”<sup>21</sup>. The idea of “ontological relativity” introduced by Quine in his essay *Two Dogmas of Empiricism* and elsewhere has found a fertile soil in Kuhn’s historical approach to the philosophy of science.

Roughly speaking, Quine maintained that no amount of observation (facts) could determine one single account (theory) about these facts, to the exclusion of all other accounts. The famous “Gavagai” example in *Word and Object* is meant to demonstrate this claim by showing that any translation based on the observable fact of speech behavior will remain “indeterminate” as soon as we give up our prior commitments to any ontological assumption and try to “extract” the meaning (or the reference) of the word purely from the available observation. As it turns out, Quine argues, there is always a multiplicity of perfectly coherent translations (“theories”) which “fit” the observed

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<sup>19</sup> Ibid., p. 170.

<sup>20</sup> Ibid., p. 77.

<sup>21</sup> Ibid., p. vi.

facts (*'speech behavior'*) equally well, but are nonetheless incompatible with each other: "There can be no doubt that rival systems of analytic hypotheses can fit the totality of speech behavior to perfection, and can fit the totality of dispositions to speech behavior as well, and still specify mutually incompatible translations of countless sentences insusceptible of independent control"<sup>22</sup>. In other words, however obvious and undeniable the truth of a certain observational statement *P* may seem, there is always a possibility to render this statement false by suggesting another theory which would successfully account for phenomena without committing itself to the truth of *P*. The ease with which this can be done varies considerably from the one area of human activity to another, but even the most stable of our beliefs (e. g., basic rules of logic) are not exempt from the possibility of radical revision:

The totality of our so-called knowledge or beliefs, from the most casual matters of geography and history to the profoundest laws of atomic physics or even of pure mathematics and logic, is a man made fabric which impinges on experience only along the edges [...] No statement is immune to revision. Revision even of the logical law of the excluded middle has been proposed as a means of simplifying quantum mechanics; and what difference is there in principle between such a shift and the shift whereby Kepler superseded Ptolemy, or Einstein Newton, or Darwin Aristotle?<sup>23</sup>

The immediate consequences of this analysis of Quine for the philosophy of science are difficult to overestimate. The very notion of *'objectivity'* gets a very different connotation after Quine, and loses, as it were, much of its power to mesmerize the natural scientists. Kuhn builds on this discovery when he argues that strictly speaking no scientific theory can be said to be closer to "nature itself", but only more or less adequate for our growing needs, and ever-changing interests. It is important to notice, however, that Kuhn's claim is not of the same sort as Kant's skeptical conclusion that we are inherently inadequate for knowing nature as it is "*an sich*", with the implicit assumption that ideally (perhaps for God only) such knowledge is possible. For Kuhn there is no single "correct account of the world" not because of our inability to ever reach it, but because, "in a situation where there are only human beings" (Sartre), it is the very nature of the "facts" in general and our perception of them that no single theory about the world can be universally compelling and thus immune from future changes. The underlying foundation of any given scien-

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<sup>22</sup> Quine W. V. O. *Word and Object*. – Cambridge, Mass.: MIT Press, 1960, p. 72.

<sup>23</sup> Quine W. V. O. *Two Dogmas of Empiricism* // Quine W. V. O. *From a Logical Point of View*. – 2<sup>nd</sup> ed., New York: Harper and Row, 1961, p. 20.

tific paradigm is not merely “the given” but also various ontological commitments which always affect even the most “objective” observation.

To press the above analogy between political and scientific revolutions a little further, we can observe that whereas it makes perfect sense to ask whether a current political regime (say, a republic) is better or worse than the one overthrown by a revolution (say, a monarchy), it seems quite meaningless to wonder whether the current political system is more legitimate (i. e., conforms to the laws better) than its less fortunate predecessor. It is obvious that the basic assumptions of the law codes of the two political systems would be fundamentally different, equally well legitimating the respective regimes, which are thus built on them. In the absence of some Absolute Legal Code, the two political systems cannot be compared in respect to their ultimate legitimacy. Likewise, Kuhn argues that the same verdict can be issued for natural sciences as well – no competing scientific paradigm can claim a special relation to Truth (i. e., being a “truer” paradigm), but the “correctness” of a theory is relative to the theory itself.

Lastly it remains to consider in what sense does Kuhn nonetheless employ the procedure of comparison of a theory “with nature” in *The Structure*, although this question was partially answered already. To be sure, scientists do test their hypotheses empirically and claim to “observe” this or that state of affairs, which would either confirm or invalidate them. Kuhn by no means denies this standard process of doing scientific research for what he calls periods of “normal science”. Yet the revolutionary scientific theory appeals to observation as well; indeed, its very appearance on the historical scene is provoked (in part) by various observable anomalies, which the normal scientific practice fails to solve. The new theory steps forward to “save the phenomena” where the old one fell short of success. It confirms to the phenomena, although never perfectly so, and it claims to explain the phenomena in a more satisfactory manner, but still, Kuhn argues, lacks the status of the “only possible explanation of the world”. As we have seen earlier, the observation never yields a single compelling theory, but always allows (in principle) for multiple alternatives.

To conclude this section with a vivid illustration of the above discussion, we may take one of the most indisputable current “facts”, namely that the Earth revolves around its axis from East to West relative to the more or less stable position of neighboring planets and stars. Let’s assume that this simple theory is derived from the empirical observations with certain phenomenal descriptions, it accounts for these descriptions quite well, and has been confirmed ever since on many occasions. From this one may hastily conclude that it is not merely *a theory* about the movement of our planet, but indeed the expression of the absolute truth about how things *really are* “out there”.

All the relative observable phenomena, however, could be equally well “saved” if one postulates instead that the Earth is in fact immovable, but *the whole Universe* with its billions of stars, galaxies and planets revolves around the Earth from West to East, creating the impression, say, for an observer in the outer space who moves around the planet together with the rest of the Universe with constant speed, that our planet is in constant motion around its own axis. Presumably, with all the necessary modifications made, this new paradigm would leave all the relevant observed “facts” fully intact, but would still account for them in a radically different way. Of course it is hard to imagine now the circumstances under which we may want to discard the deeply held belief in the rotation of the Earth and substitute it for such an extravagant alternative, but the “Quinian” point that I would like to emphasize here is that there is nothing in “nature itself” which would in principle preclude us from doing so<sup>24</sup>.

### *The Intertranslatability of the Incommensurable Paradigms*

In the rest of this paper I will address the related criticism of Kuhn that takes its force from the interpretation of incommensurability as a full or partial *failure of intertranslatability*. In its general form the criticism proceeds as follows. If science, as far as its most fruitful and interesting developments are concerned, progresses in a non-cumulative way in the manner Kuhn describes it, and the cataclysmic events that radically change the whole network of meanings of the relevant scientific terms indeed take place (i. e., “the world of the scientists” somehow changes), then the “native speakers” of the paradigm that emerged after such an event would be unable to comprehend, let alone meaningfully describe, the previous scientific practice, which would inevitably seem to them as superstitious and utterly irrational. The fact that we are nonetheless able to understand, say, geocentric astronomy of Ptolemy and with little effort could explain its relative predictive and explanatory success *from the point of view* of our current scientific beliefs seems to witness against the claim that the two paradigms are incommensurable.

This or similar line of reasoning has convinced many philosophers that the notion of incommensurability as used by Kuhn is ultimately incoherent. Thus Putnam frankly states that “to tell us that Galileo had ‘*incommensurable*’ notions *and then go on to describe them at length* is totally incoherent”<sup>25</sup>. Likewise Davidson in his influential essay *On the Very Idea of a Conceptual*

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<sup>24</sup> For one thing, this alternative would surely go quite well with the strong ancient and especially medieval intuition that human beings, and thus the planet they inhabit, should be in some or another way central to all of the creation.

<sup>25</sup> Putnam H. *Philosophers and Human Understanding*, Herbert Spencer Lecture delivered at Oxford University, Nov. 1979. Quoted in Cederbaum D. G. Op. cit., p. 207.

*Scheme* opposes the concept of incommensurability on the very same ground. He sees the fact that “Kuhn is brilliant at saying what things were like before the revolution using – what else? – our post-revolutionary idiom”<sup>26</sup> as a self-defeating strategy of Kuhn. Moreover, Davidson further points out, although apparently conflating the notions of intranslatability and incomparability, that the two rival paradigms or views cannot even be meaningfully said to be different unless there is a third overarching point of view common to both: “Different points of view make sense, but only if there is a common co-ordinate system on which to plot them; yet the existence of a common system belies the claim of dramatic incomparability”<sup>27</sup>.

In connection with the above remarks we should first observe that no one questions whether the older paradigm can *de facto* be meaningfully rendered using the language of the current scientific community – both Putnam and Davidson agree that this was rather successfully done at least by Kuhn – but the criticism is aimed at Kuhn’s original description of incommensurability, which presumably is of such a sort as to imply, perhaps against his best wishes, that the community of scientists raised in a certain new scientific tradition in some sense works in *a radically different* world from that of the old one, and thus acquires a very different conceptual scheme (system of categories), which bars any effective communication between the two communities. Davidson, for instance, seems to take this for granted when he says: “‘*incommensurability*’ is, of course, Kuhn and Feyerabend’s word for ‘*not intertranslatable*’”<sup>28</sup>. We will yet have to see whether such an interpretation is indeed invited by Kuhn’s text<sup>29</sup>.

Admittedly, the original edition of Kuhn’s book in 1962 gave rise to a number of very problematic issues and created a considerable stir in both philosophical and scientific communities. Kuhn himself later recognized the shortcomings and ambiguities of that initial version of *The Structure*. The *Postscript* written for the second edition, which appeared eight years later, was meant in part to remedy the faults of the main text as well as to guard against the misinterpretation of his intentions. Interestingly enough, the question of intertranslation between the incommensurable paradigms receives a lengthy treatment there – apparently this being Kuhn’s reaction to the persisting problem of misunderstanding of the nature of incommensurability. Whatever ambi-

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<sup>26</sup> Davidson D. On the Very Idea of a Conceptual Scheme // Davidson D. *Inquiries into Truth and Interpretation*. – Oxford: Clarendon Press, 1984, p. 184.

<sup>27</sup> *Ibid.*

<sup>28</sup> *Ibid.*, p. 188.

<sup>29</sup> I must say here that I find the main line of Davidson’s argument against the coherence of the notion of radically different organizations of experience to the point where any attempt of mutual communication breaks down rather convincing. It is against invoking Kuhn’s reasoning from *The Structure* as clearly exemplifying such a notion that I mostly object.

guities may have plagued the first edition, his very clear discussion of intertranslation between rival theories in the *Postscript* would eliminate, one would think, any further attempts to construe incommensurability of paradigms in terms of totally (or partially) untranslatable conceptual schemes.

The breakdown of communication between the advocates of different paradigms and the presumed impossibility to demonstrate the truth of one's theory by some proofs, derived from a theory-neutral observation, does not exclude however the meaningful intertranslation of the "languages" of the competing theories. Davidson is quite right to insist that the possibility of intertranslation (and thus their mutual comparison) requires "a common coordinate system" on which to plot the different points of view. That such a common to both sides medium exists was never denied by Kuhn: "The men who experience such communication breakdowns must, however, have some recourse. The stimuli that impinge upon them are the same. So is their general neutral apparatus, however differently programmed"<sup>30</sup>. The material world of the scientists involved in the debate is still the same, even though it resists a single definite description. The great number of basic beliefs is still shared even after the scientific revolution. The fundamental differences between the competing theories are conditioned by "a gestalt switch" which the one side of the conflict refuses to accept as the correct (or more fruitful, more promising, etc.) "gestalt". One's refusal to accept the alternative scientific picture of the world does not imply one's inability to understand it nonetheless quite well. The translation of one theory into another theory's language is possible, according to Kuhn, although not without some efforts:

What the participants in a communication breakdown can do is recognize each other as members of different language communities and then become translators [...] Each will have learned to translate the other's theory and its consequences into his own language and simultaneously to describe in his language the world to which that theory applies. That is what the historian of science regularly does<sup>31</sup> (p. 202).

The crucial contrast that Kuhn employs here is that between the members of the same scientific community (normal science), who speak "the same language", and the participants in the revolutionary paradigm, who develop over time a very different idiom. But both groups live on Earth, and the relation between them, as we can gather from *The Structure*, is more akin to the relation between the diverse ethnic groups – but *not* like the relation between the

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<sup>30</sup> Kuhn T. S. Op. cit., p. 201.

<sup>31</sup> Ibid., p. 202.

inhabitants of Earth and Plutonians (i. e., the species with radically different sets of mental categories) as Davison seems to interpret Kuhn in his essay.

To put this point in a clearer light, I would like to introduce an analogy, which is not Kuhn's own but which seems to be encouraged by Kuhn's language in *The Structure*. More than once he talks of the decisions "made on faith", of the advocates of the new paradigm who "have faith" in its merits, and discusses at some length the "conversion experience" of a scientist<sup>32</sup>. The vocabulary that is clearly taken from the domain of religion invites an analogy that might be helpful for further understanding of the notion of incommensurability. It is understood however, that along with many suggestive similarities between the cases of "incommensurable" religious systems and incommensurable scientific theories, many fundamental differences exist. To mention only one, the conversion experience from one religion to another is always reversible, whereas in science, once the new paradigm was genuinely embraced, no possibility of return to the old way of thinking is envisaged<sup>33</sup>.

The two religious systems may be said "incommensurable" if they attach different descriptions to the same phenomena. Imagining that the world's population is evenly divided between the adherents of, say, Christianity and those of Islam, we may observe that whenever Christians refer to Jesus they have in mind a person with such and such descriptions, who did such and such things. The person with the same name occurs in Koran as well, but the descriptions of him differ considerably. Assuming something like realists' theory of meaning to be true, i. e., that it is one and the same person that both sides refer to, we are having a clear case of the communication breakdown. Furthermore, we may suppose, that most other relevant and important names and terms in both religions suffer from the same semantic asymmetry.

Thus in the ongoing debate the two camps may be found using the same names and terminology, but still fail (initially) to understand, let alone to persuade, one another, partially due to the various meaning attached to the same terms. As a consequence, the two groups may be said to speak two different languages, even if the sounds that one group utters were indistinguishable from those of the other. In the absence of a third party, which would be able to evaluate both claims from a neutral viewpoint, can we still hope that the doctrines of the one religion can ever be adequately grasped by the adherents of another? It seems that the wide range of beliefs that they nonetheless

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<sup>32</sup> Ibid., pp. 158, 204, 206.

<sup>33</sup> It is possible, however, as Kuhn observes, that some of the obsolete and discredited standards of explanation (i. e., what counts as a satisfactory explanation for some puzzling fact) are revitalized in a new paradigm. After Newton, the explanation that made reference to "occult" properties (such as gravity) was credible once again. Cf. also Kuhn's claim that "in some important respects Einstein's general theory of relativity is closer to Aristotle's than either of them is to Newton's" (p. 207).

share may serve as a basis for the possibility of meaningful communication. With some scrutiny, one will find out that the description the other side of the conflict attaches to a familiar name is crucial for understanding its meaning as it is perceived by the other. No absolute “objective” viewpoint is required for being able to describe the other’s beliefs quite accurately, even if it were presented by an inquiring side as false and entirely untenable position. However, in this case, just as it is in the case of the warring scientific camps in time of a revolution, “translation does not guarantee persuasion”<sup>34</sup>.

The above analogy by no means was meant to bring science down to the level of subjectivity of religious beliefs. Science after all, progresses in response to newly discovered real phenomena and constantly puts its theories to the test of the “facts in the world”. But after Quine and Kuhn we may have to abandon at last the time-honored idea that “objectivity” of the scientific method is exclusively privileged to all other aspects of human cultural activity.

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<sup>34</sup> Ibid., p. 203.