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Science, Christianity and the Post-Modern Agenda

Modernists equated rationality with science and thus supposed that religious belief was irrational. Post-modernists show a welcome openness to non-scientific belief systems, yet tend to endorse relativism. This article examines the transition from modernist to post-modernist philosophy of science with particular reference to the work of Thomas Kuhn. The manner in which Kuhn’s work undermines the rationality of science and tends towards an objectionable relativism will be examined. However, Kuhn’s work can be re-interpreted within a broadly realist framework, which sees paradigm choice as a rational procedure, and scientific progress as leading towards an objectively true account of the world. This re-reading of Kuhn yields a partially post-modern philosophy of science, which succeeds in retaining post-modernism’s openness towards religion, without lapsing into a denial of the possibility of objective truth.

Keywords: Post-modernism, rationality, relativism, realism, paradigm, incommensurability.

Modernism, Post-Modernism and Science

As a rough generalization, philosophy of science in its modernist phase held that science was an objective, truth-seeking discipline, in which scientists communicated in a shared language and assessed theories according to the rules of a logical method held to be equally binding on all scientists. The ‘scientific method’ told them to aim steadfastly at a single goal, namely, THE TRUTH, and encouraged them (by reminding them of past successes) that if they played by the rules, they could reasonably expect to make progress towards it.

Science, in the eyes of the modernist, had an exalted position. The modernist picture of science presented it as an exemplar of the process of the rational, objective pursuit of truth. Modernists were so impressed by the successes of scientific methodology that it came to seem that the only rational method for attaining knowledge of the nature of the world was by application of scientific techniques. The expressions ‘rational’ and ‘scientific’ came to seem equivalent in the popular mind.

The enthronement of ‘the scientific method’ as the arbiter of what is rational meant a corresponding downgrading of non-scientific systems of belief. In particular, it seemed to the modernist that the blinding light of science had exposed the poverty of the rational credentials of religious belief. The scientific
method had been proven to yield a steadily increasing amount of knowledge concerning the physical world. By contrast, there seemed to be no indication of progress towards agreement within the domain of religious belief. For the modernist, the failure of religious belief to match up to the criteria provided by scientific methodology (namely, that beliefs should be confirmed by experimental testing) indicated the fundamentally irrational nature of religious belief.

To be post-modern is to reject some, or all, of modernism’s characteristic doctrines. The postmodernist rejects modernism’s elevation of science above other possible perspectives on the world. Western science, western religion, primitive magic, eastern mystical world-views – each of these different systems of thought have their own, internal standards of what is reasonable to believe. The modernist supposed that all belief systems should be measured against a single set of ‘rational’ standards, embodied in scientific method. The post-modernist allows that what is rational varies according to one’s perspective, and that western science is simply one such perspective among many. As Feyerabend puts it:

‘We can only speak of what does, or does not, seem appropriate when viewed from a particular and restricted point of view, different views, temperaments, attitudes giving rise to different judgements and different methods of approach’ (Feyerabend 1970 ‘Against Method: Outline of an Anarchistic Theory of Knowledge’, *Minnesota Studies in the Philosophy of Science*, IV, p.21).

To the religious believer who feels the oppressive force of modernism’s rejection of the rationality of religious belief, this post-modern openness will come as a great relief. Religious belief is a permissible world-view from a post-modern standpoint. The believer need not retain their religious commitments at the expense of a commitment to a scientific world-view. Religion and science are independent of each other and can therefore co-exist, since the tests for the acceptability of a religious doctrine or a scientific theory are entirely internal to these respective systems.

This emphasis on the compatibility of religion and science appears to be a welcome feature of post-modernism. Yet there remain questions about the general acceptability of post-modern perspectives. Is religion simply one belief system amongst many others? If so, how can it be recommended to the unbeliever as a ‘rational’ choice for a world-view? To make such an appeal is to assume, against the post-modernist, that there are standards of rationality which are independent of particular systems of belief, and can be applied to make a rational choice amongst world-view options.

A further question concerns the concept of truth. For the modernist, truth has an objective character. Truth is not simply a matter of human agreement.

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1 It should be noted that by no means all post-modernists would view religious belief as permissible. But their critique, unlike that of the modernists, would not be that it is ‘unscientific’, but would be more likely to focus on the putatively intolerant or authoritarian character of religious institutions.
but depends upon how things are, in a reality which exists independently of human beliefs and concepts. Post-modernists tend to assert, however, that truth is not objective in this way. There are many different belief systems, all of which are equally valid. In place of the idea that one system may be objectively correct, the post-modernist will prefer to speak of world-view options as 'true' in a relative sense. One religious system may be true (or acceptable) for one community of religious believers, another system may be true relative to a different community.

For the post-modernist, science may come to be treated as merely one option on the world-view shelf, alongside various options such as occultic, mystical or magical world-views. We may judge that a scientific world-view contains more truth than the folk-lore of primitive tribes, but this judgement is simply being made from a western perspective. There is no objective sense in which a scientific outlook contains more truth.

For the Christian, post-modernist approaches to science have both appealing and objectionable aspects. There is thus a challenge to be faced by the Christian who seeks to make a discerning response to postmodernity. The following question must be addressed: how is it possible to accept the post-modernist critique of the excesses of modernism (in particular, the modernist exaltation of scientific method as the only means for forming a rational world-view), without lapsing into the relativism which characterizes much of postmodern thought?

In this paper, the nature of the transition from modernist to post-modernist philosophy of science will be examined. This transition will be traced out by reference to the work of Thomas Kuhn, whose writings contain the materials for a powerful critique of modernist assumptions about science. The manner in which Kuhn's work tends towards an objectionable relativism will be examined. Finally, it will be argued that Kuhn's work can be re-interpreted in a non-relativist framework. This reading of Kuhn suggests a partially post-modern philosophy of science, which succeeds in retaining the post-modern openness towards religion, without lapsing into a denial of the possibility of objective truth.

**Kuhn's Philosophy of Science**

There is an appealing picture of scientific progress which, prior to Kuhn, many philosophers would have found acceptable. This is the theory of *convergent realism*: science aims at the truth, and the progress of science has consisted in a steady development of theories towards the truth. Scientific progress is made possible by scientific method, which consists of a rule-governed system for assessing the theory which, given the available data, is most likely to be true. When scientists are guided by this method, they are exemplifying rationality. With its commitment to objective truth as science's goal, together with the assumption of a binding scientific methodology which enshrines the canons of rational theory choice, convergent realism fits neatly into a modernist framework.
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It was the opinion of Thomas Kuhn that the convergent realist image of science appears defensible only because philosophers of science focus their attention predominantly upon the finished products of scientific enquiry, namely mature theories. But the exposition of theories in the textbooks of science, Kuhn noted, betrayed a mischievous tendency on the part of scientists to rewrite scientific history, portraying it as a smooth progression towards the favoured theories of contemporary science. Kuhn's important work on scientific revolutions is an explicit attack on the notion of a steady progression towards objective scientific truth.

Kuhn drew attention to the fact that science is a human activity. Instead of simply considering the polished products of scientific enquiry found in the textbooks, he addressed himself to science as an institution. Scientists operate, in the normal phase of scientific enquiry, under the guidance of a paradigm. The paradigm is the disciplinary matrix. The term is used by Kuhn in a slightly loose fashion to point towards all that binds a group of scientists together – the theories they hold to, the model solutions to past problems, shared values and metaphysical principles. In ordinary research, the paradigm dominates. It directs the researcher's attention to particular puzzles – places where the paradigm doesn't quite fit nature – and suggests methods to guide them in puzzle solving.

All this may sound quite amenable from the standpoint of the convergent realist. But Kuhn's work became much more contentious with the introduction of the idea of scientific revolutions. Kuhn observed that, from time to time, scientists find that puzzles resist solution by the methods countenanced by the reigning paradigm. The puzzle becomes an anomaly, perhaps gaining attention by leading workers in the field. If the anomaly proves particularly recalcitrant, the discipline enters a crisis phase, since the legitimacy of its paradigm is now being called into question. The agreement which characterized normal science comes under threat, as various different modifications, or relaxations, of the rules enshrined in the paradigm are advocated.

The crisis in the discipline becomes acute if, in this period of instability, a novel paradigm is articulated which offers to resolve the anomalies of the existing paradigm, as well as offering the discipline the promise of a fertile new approach. If a sufficiently large number of scientists are disaffected with the existing paradigm, they may transfer their allegiance to the new one – a process which Kuhn calls a scientific revolution.

Kuhn is quite consciously using a political metaphor to describe this phase of theory choice. Political revolutions occur in a social context of deep dissatisfaction with existing structures. The very institutions within which normal political debate and decision take place are themselves called into question, so

that revolution tends to be a deeply disturbing, violent affair, in which the
direction of future political activity is determined, not by any process of rational
political debate, but rather by such factors as which side can muster most force.
Kuhn suggests that there is a comparable break-down in rationality during
scientific revolutions:

'As in political revolution, so in paradigm choice – there is no standard
higher than the assent of the relevant community. To discover how scientific
revolutions are effected, we shall therefore have to examine not only the
impact of nature and of logic, but also the techniques of persuasive argu-
mentation effective within the quite special groups that constitute the
community of scientists.' (Kuhn, SSR, p.94).

We might like to read Kuhn as simply saying that, alongside rational consid-
erations, non-rational factors enter into the actual process of theory choice
during revolutions. Yet Kuhn seems to be making a much stronger claim,
namely that there is no possibility of rational comparison between paradigms.
Rival paradigms are, to use his technical term, *incommensurable*:

'The normal-scientific tradition that emerges from a scientific revolution is
not only incompatible but often actually incommensurable with that which
has gone before.' (Kuhn, SSR, p.102).

The term 'incommensurability' means simply that rational choice between
paradigms is not possible; different paradigms cannot be rationally 'co-meas-
ured'.

Kuhn has a number of reasons for his claim that paradigms are incommen-
surable. In the first instance, it is simply the corollary of the emphasis he placed
upon the normative role of paradigms in normal science. It is the role of the
paradigm under which a scientist works to provide guidance in the process of
theory choice – to tell the scientist what a good theory looks like. Indeed, the
paradigm itself should contain an exemplary model of a solved problem, which
the scientist can examine and employ when attempting to solve novel puzzles.
But if the paradigm itself supplies the rules for theory choice, to what can a
scientist appeal when seeking to rationalize a choice of paradigm? As Kuhn
notes, there is here a problem of circularity: a scientist's conception of what
makes for a good theory is so determined by the paradigm into which he has
been inculcated, that any attempt at rational debate between proponents of
different paradigms would find both sides arguing in a question begging manner
(See Kuhn, SSR, p.108).

Clearly, if there is incommensurability due to the paradigm dependence of
the standards for theory choice, the prospects for the convergent realist
interpretation of scientific progress are dim. For the claim of the convergent
realist is that, if scientists adhere to the canons of rational theory choice, they
will select theories which come steadily nearer to the truth about nature. But
this presupposes that there are such canons – that there are principles to which
the scientist may appeal, when faced with a choice between paradigms, which
will guide him towards the paradigm which is most likely to contain truth. If, however, Kuhn’s claim is correct, there are no ‘paradigm independent’ canons to guide the theorist in the critical, revolutionary phases of science. We are reduced to a situation in which assessments of the value of a paradigm are themselves paradigm-relative.

The first argument for incommensurability is that the values which guide theory choice are themselves paradigm-dependent, so that there is no neutral basis for comparing two paradigms. But Kuhn claimed that there were further obstacles in the path of the convergent realist. The second source of incommensurability is connected to considerations about meaning.

Kuhn adopted a theory of meaning according to which the meaning of a theoretical term, such as ‘mass’, was determined by the role the term played in the paradigm to which it belonged. But it follows from this ‘holistic’ approach to meaning, that a change in paradigm implies a change in the meanings of theoretical terms. This seems to imply a new threat of incommensurability, for if theorists operating in different paradigms do not even mean the same when they speak of concepts such as mass, how can they engage in rational debate about the merits of their respective paradigms? As Kuhn puts it:

‘In the transition from one theory to the next words change their meanings or conditions of applicability in subtle ways. Though most of the same signs are used before and after a revolution – e.g. force, mass, element, compound, cell – the ways in which some of them attach to nature has somehow changed. Successive theories are thus, we say, incommensurable.’ (Kuhn, in CGOK, p.266).

The two sources of incommensurability do not, by themselves, imply that there is no such thing as scientific truth. It remains possible that there is a single paradigm which accurately characterizes the way the world is. However, the impossibility of rational comparison between paradigms implies that there is no basis for the claim that science is steadily progressing closer to the truth. We are left in a situation of scepticism – we are unable to know whether any paradigm’s success indicates that it is more likely to be true than a rival. Yet, for all that, the notion of a single true paradigm remains.

However, Kuhn has further arguments against the idea of objective scientific truth. The classical version of an objective theory of truth is provided by the correspondence theory, according to which truth is a matter of correspondence between a theory, and a world which exists in some independent sense. Kuhn considers that this theory of truth is untenable. For we have no access to the way the world is in itself, so to speak – all that we may speak of is the world as described by the paradigm we adopt:

‘One often hears that successive theories grow ever closer to, or approximate more and more closely to, the truth. Apparently generalizations like that refer not to the puzzle-solutions and the concrete predictions derived from a theory but rather to its ontology, to the match, that is, between the entities.
with which the theory populates nature and what is 'really there'. . . . Perhaps there is some other way of salvaging the notion of 'truth' for application to whole theories, but this one will not do. There is, I think, no theory-independent way to reconstruct phrases like 'really there'; the notion of match between the ontology of a theory and its ‘real’ counterpart in nature now seems to me illusive in principle.' (Kuhn, SSR, p.206).

This denial of any clear notion of an objective world commits Kuhn to a strongly relativist position. There is no such thing as 'the way the world is', independently of how we believe it to be. In some sense, the nature of the world is determined by our beliefs about it. This radical relativism makes sense of one of Kuhn’s most notorious observations, namely that, when a scientist changes paradigm, his entire world changes:

‘In a sense that I am unable to explicate further, the proponents of competing paradigms practise their trades in different worlds. One contains constrained bodies that fall slowly, the other pendulums that repeat their motion again and again. In one, solutions are compounds, in the other mixtures. One is embedded in a flat, the other in a curved matrix of space. Practising in different worlds, the two groups of scientists see different things when they look from the same point in the same direction.’ (Kuhn, SSR, p.150).

Kuhnian relativism finds its most vivid expression in what Kuhn has to say about perception. As he sees it, previous philosophers had hoped to establish a language for reporting observational data which made no theoretical commitments. Such a theory-neutral language was thought to be required if observation was to play the decisive role in theory choice which classical philosophy of science considered it to have. If all reports of observation presuppose some theory, it would seem that observation could not provide the ultimate grounds for belief in theory. Philosophers toyed with the suggestion that it would be possible to describe the results of experiments in terms which enshrined no commitments to any theory whatsoever. An example of such a ‘neutral’ language was the language of ‘sense-data’, which simply reported on the nature of sensations.

The work of Kuhn challenged the assumption that there could be such a language. According to Kuhn, the language scientists use to report their observations is 'theory-laden'. That is, the observational language embodies some theoretical commitments. Scientists operating in different paradigms will accordingly conceptualize what they see in different ways. It is in this sense that the contents of their perceptual experience will differ. Where an Aristotelian would see a constrained object falling slowly, Galileo would see a pendulum.

Kuhn illustrated this strong claim of theory-ladeness by comparing the process to the manner in which visual images such as the duck/rabbit could be seen firstly as a duck, then as a rabbit. It is not simply a matter of having a single visual experience and entertaining two different interpretations of it – a change in paradigm induces a change in the very nature of what is seen. This is the import, at the perceptual level, of Kuhn’s idea that the world itself changes with a change in paradigm.
Post-Modern Aspects of Kuhn’s Critique of Realism

Kuhn’s work embodies a substantial challenge to the image of science portrayed by the convergent realist. Two central tenets of that image – the idea that scientific history may be seen as a rational progression from one paradigm to the next, and the idea that this progress is directed towards the goal of an objectively true description of nature – are both under threat. In place of convergent realism, Kuhn substitutes an image of science as a human, political institution, without any especially rational canons for theory choice, and without any ‘extra-theoretic’ objective truth as its goal. Realism has been supplanted by relativism, and rationality by sociology.

The generally postmodern flavour of Kuhn’s philosophy of science is evident. The modernist liked to think that there was something ‘special’ about science – that it was an activity governed by a method which was, in a distinctive fashion, ideally rational. In place of this exalted conception of scientific rationality, Kuhn suggests that, at critical moments in scientific development, rationality is no more a part of decision making than it is during political revolutions. Instead of looking for a ‘logical’ account of the nature of theory choice, it would be more appropriate to investigate the sociological factors which influence scientists (i.e. which paradigm is backed by the strongest propaganda?). Scientific rationality is demoted from its modernist pedestal.

There is another respect in which Kuhn’s critique of realism may be termed ‘post-modern’. The convergent realist, in claiming that science is a rational enterprise, was not committed to claiming that scientists always act rationally. The claim was rather that there are canons which guide scientists – a scientific method – which, when followed carefully, will yield progress towards truth. The convergent realist wishes to show that it is at least possible to provide a reconstruction of the historical development of science which brings out its rational character. For such a realist, this amounts to a demonstration of a steady progression towards truth in the course of scientific history.

Convergent realism is offering an interpretation of the activity of science by setting it within a particular philosophical context which specifies truth as the goal, and a rational method as the means of achieving that goal. Post-modernism, in general, rejects this tendency of philosophers to attempt to ‘stand outside’ an activity in order to offer a philosophical ‘legitimation’ or ‘justification’ of it. In Lyotard’s terms, post-modernism can be defined as ‘incredulity towards meta-narratives’.

us in our current paradigms, and explicate scientific rationality in terms suggested by this paradigm.\(^4\)

Kuhn’s philosophy of science encourages a post-modern restriction of vision to the view from within the paradigm. Indeed, following Kuhn’s lead, sociologists of science proposed that it should be possible to understand scientific development in purely sociological terms, without any reference to concepts such as truth or reason.\(^5\) Scientists are influenced, when choosing theories, not by factors which may be taken as reliable indicators of truth, but instead by ‘extrinsic’ considerations such as which theory is supported by the most eminent proponents, which theory will attract most funding, and so on. This so-called ‘strong programme’ represents a bold rejection of convergent realism, more severe than that countenanced by Kuhn himself. It illustrates the harsh face of post-modernity – its radical rejection of the role of rationality, and its abdication of any notion of truth.

The post-modern flavour of Kuhn’s philosophy of science also emerges with his suggestion that, in some sense, a change in paradigm brings with it a change in the very nature of the world. This makes reality dependent upon our beliefs about it. Such a thought is at home in a post-modern context, which stresses the ‘social construction’ of reality. Instead of saying, as the convergent realist would, that the history of science has consisted in a succession of theories which are progressing steadily closed towards an objectively correct account of nature, Kuhn presents us with a vision of science as a ‘world-changing’ activity, in which the conceptual transformations which accompany paradigm shifts may be said to lead scientists into a new reality. The thought that there is a theory-independent reality which theories aim to describe seems to be lost at this point.

**Re-Working Kuhn**

Kuhn himself was disturbed when the relativist, irrationalist implications of his theory of the incommensurability of scientific paradigms were pointed out. In a significant postscript to *The Structure of Scientific Revolutions*, he aimed to clarify the meaning of certain critical claims, especially those surrounding the notion of incommensurability.\(^6\) It was not his intent, he claimed, to reject the

\(^4\) In this respect, Arthur Fine’s rejection of realism in favour of what he terms the natural ontological attitude (or NOA) could be deemed post-modern. Fine comments that ‘NOA urges us not to undertake the construction of teleological frameworks in which to set science. It suggests the subversive idea that perhaps there is no need for authority (outer or inner), nor for general authenticating. NOA whispers the thought that maybe we can actually get along without extra attachments to science at all...’ See Fine (1986) ‘Unnatural Attitudes: Realist and Instrumentalist Attachments to Science’. *Mind*, 95, p. 172. Against such a post-modern stance, Trigg argues that there is a need for a metaphysical justification for science. On this point, and other issues related to the general question of rationality in science, see Trigg (1993) *Rationality and Science* (Oxford: Basil Blackwell).


\(^6\) The postscript is to be found in the second edition of SSR (published in 1970).
notion of scientific rationality, or to dispense with (as the social constructivists might wish) the notion of truth. Kuhn makes significant modifications to the picture of science described above, in a direction which makes it less hostile (although still challenging) to convergent realism.

In the first place, the critical argument for incommensurability due to the paradigm-dependence of standards is qualified significantly. Kuhn does not return to the 'modernist' ideal of characterizing scientific method via a uniquely binding set of rules. He does, however, point to the existence of a number of values, or *theoretical virtues*, which are paradigm-independent, in the sense that all scientists agree that these are good features for a paradigm to possess. The possession by a theory of qualities such as accuracy, scope, simplicity and fruitfulness provides good reason for belief in that theory.⁷

What then is the import of his claim that successive paradigms are incommensurable? It is not, Kuhn says, that rational debate is impossible. Rather, his point is that there is no logical, rule-governed decision procedure available to adjudicate decisively between paradigms during revolutions:

'What I am denying then is neither the existence of good reasons nor that these reasons are of the sort usually described. I am, however, insisting that such reasons constitute values to be used in making choices rather than rules of choice. Scientists who share them may nevertheless make different choices in the same concrete situations.' (Kuhn, *CGOK*, p.262).

A helpful analogy can be made at this point with wine-tasting.⁸ There is no rule-governed decision procedure to which appeal can be made when seeking to judge the relative merits of a pair of wines. It does not follow, however, that all wines are equally good. There is such a thing as the quality of a wine. Many of us can judge at a primitive level whether one wine is better than another. There are cases in which we are not competent to judge, but would be prepared to defer to the decisions of specialists, who have been trained to recognize the various characteristics which make a good wine. Similarly, although philosophers of science would now tend to agree that there is no rule-governed procedure which can be used to tell us which scientific theories are the best, it does not follow that all theories are equally good. We all know that some theories are poor (geocentrism, phlogiston, caloric theory), and in other cases we defer to the judgement of the relevant experts, whose experience and training enables them to make judgements concerning theoretical value at a sophisticated level.

Abandoning the hope for a rule-governed procedure in favour of the idea of shared theoretical virtues does represent a significant concession by the realist. There may be shared values – but it does not follow that these values will always

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⁷ Kuhn, *CGOK*, p.261
be interpreted in the same way by all scientists (the concept of theoretical 'simplicity' is a notoriously difficult one). Moreover, the problem of underdetermination presents itself. Just as there can be cases of seemingly irresoluble disagreement between wine-tasters as to which of a pair of wines is 'better', we can envisage cases in which a pair of theories may equally well 'fit with the available data'. The philosopher of science will be concerned to examine the possibility that underdetermination may obtain, even in the limiting case that all experimentation has been done. A further question may also be asked, namely why it is that we should suppose that the subjective preferences of scientists concerning matters such as simplicity, coherence and elegance, should be taken to reliably indicate truth. Why should we suppose that the 'loveliest' theories are the 'likeliest' to be true?  

The realist, then, is not out of the woods. But at least there seems to be a promising route to take away from entanglement in Kuhnian relativism. Emphasizing the values which scientists do share (values which will typically be taken to be reliable guides in the task of seeking out truth), helps to restore confidence in the workability of the notion of scientific objectivity. The strongly modernist flavour of pre-Kuhnian realism has been tempered by Kuhn's emphasis on sociological considerations. But we are not obliged to dispense entirely with realism as an ingredient in a desirable philosophy of science.

This conclusion is borne out by reflecting on the question of the meanings of theoretical terms. Kuhn argued that one source of incommensurability was the fact that theoretical terms are assigned different meanings in different paradigms. The realist may concede that paradigm change does induce a change in the meanings of theoretical terms, yet question whether this implies a complete break-down in communication. Why not simply allow that meanings do vary, but translation is a possibility? Kuhn does not argue against this, and indeed, in his more temperate comments, suggests that he never intended to claim that total communication breakdown occurs during revolutions. The relativistic nature of his comments about rationality had been overstressed and his comments about meaning had been similarly misappropriated.

Allowing translation between paradigms is a significant concession in favour of the realist. The radical, relativistic interpretation of Kuhn suggests an image of scientists locked into isolated worlds, constituted by their differing paradigms. The discontinuity between paradigms is so great that a scientist is not able even to render intelligible the sentences uttered by rivals in another paradigm. On the less radical, non-relativist reading of Kuhn being proposed here, we are left

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9 For the Christian, there is a tempting line of argument at this point. The fact that our judgements about the apparent virtues of scientific theories provide us with reliable insight into theoretical truth is well explained by supposing that God, in his benevolence, ordained a harmonious relation between the order of the natural world, and the human intellect. For a development of this argument, see the final chapter of Walker (1989) *The Coherence Theory of Truth* (London: Routledge and Kegan Paul).
10 Kuhn. CGOK, pp.266–278.
with a more plausible scenario in which the meanings of theoretical terms do vary, so that there may on occasion be difficulties of communication, but such difficulties may be resolved by attention to the task of translation.

In place of the radically relativist picture of Kuhn which the post-modernist will be tempted to paint, a more modest picture is emerging. This is a picture, inspired by Kuhn’s philosophy of science, which is not ultimately inimical to convergent realism. It allows for inter-paradigm communication, and holds that there is at least the possibility that this communication will take the form of rational debate, being guided by the values which are shared by all scientists.

It would not be fair to Kuhn to claim that his philosophy of science can be given an interpretation which poses no threats to the realist. Although his concessions on the questions of rationality and meaning make the Kuhnian picture more amenable to the friends of realism, Kuhn never retracts his more relativistic pronouncements about truth and the nature of the reality. He remained hostile to a conception of truth as correspondence with a theory-independent world.

The correspondence theory of truth states that truth is a relation of correspondence between sentences and facts. This theory is not without philosophical problems.\textsuperscript{11} However, defenders of the correspondence theory are concerned to defend something which is important about the concept of truth, namely its objectivity. The correspondence theory embodies one way of expressing a commitment to the thought that truth and falsity have to do with how things lie in a world which exists independently of ourselves.

In place of this emphasis on the objectivity of truth, Kuhn speaks about paradigm shifts being ‘world-changing’. This strongly suggests that he would adhere to a relativist analysis of truth in terms of human agreement. Whilst it would seem too simple-minded to equate truth with what humans believe to be true, the relativist will, in some sense, assert that truth depends upon the existence of a community who agree about certain things. If there are communities with fundamentally different beliefs (such as two groups of scientists working in incommensurable paradigms), then what is ‘true’ for the one community will differ from what is ‘true’ for the other. This is a conclusion which concurs with Kuhn’s metaphor of ‘world-changing’ paradigm shifts.

The realist will object that relativism is an inadequate analysis of the concept of truth. Against the relativist, the realist will urge that what is true cannot be dependent upon the existence of human agreement. For it is consistent to suppose that a theory could be true, even if I (or, for that matter, my community, or human beings in general) had never existed. Truth cannot

\textsuperscript{11} The central problem is that it has proved hard to give illuminating accounts of either the nature of facts, or of the relation of correspondence. Rorty comments that ‘several hundred years of effort have failed to make interesting sense of the notion of “correspondence” (either of thoughts to things or of words to things).’ See Rorty (1982) Consequences of Pragmatism (Brighton: Harvester), p. xvii. For a detailed attempt to provide a realist approach to truth which seeks to avoid this problem, see Alston (1996) A Realist Conception of Truth. (Ithaca: Cornell University Press).
therefore be dependent upon the existence of communities of shared belief, as the relativist supposes.

Against the relativist’s attempt to ground truth on human agreement, the realist insists that what is true and what is false is a matter of how things lie, in a world which exists independently from us. From the basis of this resilient resistance to the relativization of truth to systems of belief, the realist may address some critical comments to Kuhn’s talk about ‘world-changes’. It will seem to the realist that there is a clear sense in which the world itself does not change during paradigm shifts. The essential nature of the sun did not change when scientists moved from a geocentric paradigm to a heliocentric view. In a clear sense, both Kepler and Brahe, when they looked at the sun, saw the same object, and thus had the same experience, albeit that they went on to offer differing interpretations of this experience.

The realist’s verdict on talk about ‘world-changes’ will be that Kuhn has been swept away by the power of his own metaphor. To liken scientific activity to a political process was a novel, fruitful proposal. Kuhn has helped us to see science as a human institution, thereby helping to moderate the exalted position to which modernism had raised scientific rationality. But though we may learn from Kuhn’s sociological perspective on science, we are not obliged to follow Kuhn’s more radical, relativistic pronouncements. By refusing to be carried along by the force of the metaphor of world-changing paradigm shifts, it is possible both to learn from Kuhn’s most salient points, whilst still not abandoning the role of the notion of objective truth in understanding science.12

Modernism, Post-Modernism and Christianity

This paper opened with a problem, namely the question of how it is possible to appropriate a ‘post-modern’ openness to the rational acceptability of non-scientific belief systems, without thereby buying into post-modern relativism. By way of conclusion, we may note that the ‘non-relativist’ interpretation (or perhaps ‘re-interpretation’) of Kuhn which this paper has advocated offers a way to resolve this difficulty.

We have seen that it is possible to accept much of what Kuhn has to say about the role of paradigms in science without endorsing his view that there is no such thing as objective scientific truth. Building on Kuhn, the general structure of a philosophy of science has been developed which makes space for the idea of rational comparison of paradigms, and which endorses the realist belief that scientific theories aim at describing the nature of a paradigm-independent reality. By retaining the possibility of rational comparison of paradigms, and an objective notion of truth, this approach succeeds in avoiding

12 For some recent reflections on Kuhn, and Kuhn’s responses to his critics, see Horwich (1993) World Changes (Cambridge, Mass.: Massachusetts Institute of Technology Press). In particular, McMullin’s paper ‘Rationality and Paradigm Change in Science’ develops a realist response to Kuhn broadly consonant with that given in this article.
the negative assessment of rationality and objectivity which can be found in
the more radical of post-modern philosophies of science.

Whilst allowing for the rationality of science, this approach does not fall into
the modernist trap of equating rationality with scientific method. Science may
be a rational activity, but it is not the sole exemplar of rationality, as modernists
tended to suppose. This emerges most clearly when we note that the account
proposed in this paper of the possibility of rational choice between paradigms
is applicable in more general contexts. In particular, I would argue that a choice
of a religious belief system such as Christianity may be rational in much the
way that a scientist's choice of paradigm is rational.

We have seen that scientific paradigm choice is informed by a set of values
which all scientists share. Scientists seek theories which possess such virtues as
accuracy, scope, simplicity and fruitfulness. In the absence of logically compel-
ling reasons for choosing one paradigm over another, the individual scientist
must make a judgement, in the light of these values, as to which paradigm
makes best sense of the available data. Being guided by these values, the
judgement may be rational, but it will not be one which is demonstrably
logically correct.

Unresolved anomalies persist, even in science. A new paradigm clears up
some difficulties, but will have other difficulties of its own. There are points of
tension, where it is not clear how different parts of a theory may be rendered
consistent. Again, this means that to choose between paradigms requires an
exercise of judgement. On balance, does the value of the paradigm in making
good sense of a wide range of the data, outweigh the weaknesses due to data
which cannot be explained, or the fact that there are points where it is hard
for the paradigm to escape contradiction?

The situation is not, in principle, different when someone faces the choice
of whether or not to embrace Christianity. There is a distinctively Christian
paradigm, a set of principles and convictions which constitutes the Christian
worldview, and provides the way in which Christians make sense of their
experience of the world. According to the Christian paradigm, our inquiry into
the world proceeds from the belief that the world was created by an all-
powerful, loving, Personal Being, who sustains his creation and reveals
himself in it, in both general and special ways. The analogy with scientific
paradigms suggests to us that we should not expect to find a knock-down
argument for this view. The inquirer will need to assess the individual pieces
of evidence which comprise the cumulative case for Christianity – the evidence
of design, the evidence of revelation, of individual religious experience and so
on. They will need to weigh this against the counter-evidence provided by the
existence of evil, and consider the adequacy of Christian efforts to cope with
this tension in their world-view. They will eventually have to make an act of
judgement in deciding whether or not, on balance, the Christian scheme
makes best sense of the available data of experience (which will include their
personal experience).
The parallel between the process of paradigm choice in science and the process of religious conversion is striking. Kuhn himself noted the parallel, although his use of the term 'conversion' was intended to reflect upon the irrational element in scientific paradigm choice. Yet we have seen that a choice of scientific paradigm may be rationally justified by appeal to values such as simplicity, accuracy, and so on. Accordingly, there is the possibility of rationally defending the Christian world-view as a system of beliefs which exemplifies similar values.

Christianity offers a 'religious paradigm'. It can be rationally defended by arguments demonstrating the simplicity, coherence and accuracy of the explanation of experience that it provides. We may thus invert Kuhn's analogy. Instead of viewing both scientific revolutions and the adoption of a religious belief system as processes of irrational conversion, we can conclude that the choice of a religious belief system may be rational in much the way that choice of a scientific paradigm may be rational.

The analogy between Christianity and a scientific paradigm thus leads us to conclude, against the modernist, that rational justification for religious belief is possible. In one respect, this is a post-modern conclusion, since it represents a rejection of the modernist doctrine of the irrational nature of religion. Yet this conclusion also runs counter to the relativism which is part of much post-modern thought. Postmodernists are inclined to proclaim the incommensurability of different world-views. The view that one could compare different religious paradigms in an effort to discern which system is rationally preferable is not one to which the post-modernist will incline. If the views defended in this article are to be thought of as post-modern, it should be stressed that this is simply because they diverge from modernism by allowing that the domain of reason is not restricted to purely scientific matters.

The post-modern relativist will, like Kuhn, be sceptical about the concept of objective truth. Yet we have seen that it is possible to appropriate much of Kuhn's analysis whilst retaining an insistence on the objectivity of truth. The relativist grounding of the concept of truth upon human agreement seems inadequate. Realists are on solid philosophical grounds when they defiantly insist that objective truth is a viable concept, and indeed, that the goal for the scientific enterprise is an objectively true account of nature.

Traditionally, Christian faith has been proclaimed as an objectively true account of the ultimate nature of things. In a post-modern era, it is tempting to endorse relativism as an interpretation of the nature of religion. To do so would be to reject the concept of objective truth in the religious domain. For

13 See Kuhn, *SSR*, p. 151.
the post-modernist. Christianity should not be recommended on the basis that there are good reasons for supposing it true (in an objective sense). Instead, when the Christian asserts that their belief system is true, they should be taken as reporting their subjective preference for the Christian perspective.

It is not the purpose of this article to engage fully with an argument against relativist interpretations of religion. But if we accept a realist philosophy of science, the analogy between religious world-views and scientific paradigms suggests a similarly 'realist' approach to religious belief. We have seen that it is possible to re-work Kuhn's treatment of scientific paradigms in a manner which eschews relativism, and affirms the validity of treating scientific paradigms as systems which aim at objective truth. By analogy, a case can be made for rejecting the relativist interpretations of religious paradigms which are such a prominent part of post-modern thought.

**Conclusion: Partial Post-Modernism**

The philosophy of science which this paper advocates may be termed 'partially post-modern'. We have seen reasons to reject modernism's exaltation of science as the sole arbiter of what is reasonable. To reject this central doctrine of the modernist world-view is to be, in part, post-modern. Yet rejecting an exalted conception of scientific rationality does not mean a recoil into a post-modern relativism, where all world-views are equally valid. The arguments in favour of the rationality of scientific paradigm choice, and the viability of the concept of objective scientific truth have a wider application. They demonstrate the possibility that a religious world-view, such as Christianity, may be rationally defensible, and they suggest the applicability of the concept of objective truth in the religious domain. We can thus achieve the goal of accepting the post-modern openness to religion, without lapsing into post-modern relativism.

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