

Incommensurability Localized: Problems in Types of Justification

BY

Ramon Rempel

**A Thesis/Practicum submitted to the Faculty of Graduate Studies of The University of
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of**

Master of Arts

Department of Philosophy

University of Manitoba

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Abstract

Incommensurability has presented difficulties for theory comparison in philosophy of science since the work of Feyerabend and Kuhn. However, the strong versions of it have suffered from damaging objections since incommensurability has often been overcome. Still, the incommensurability thesis remains as a practical problem, indexed to a particular time, for forward looking explanation and it is largely absent as a consideration in backwards looking explanation. Lakatos and Laudan are examined but are both found wanting for their lack of recognition of the directionality of explanation. Finally, a theological dispute between Denny Weaver and Jim Reimer is explored to show the parallel discussion outside the philosophy of science.

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Introduction

The notion of incommensurability, though once fashionable in the philosophy of science, has been much pilloried over the last twenty or thirty years. While the claim that theory comparison can be an impossible social task appears unproblematic - given the characters of particular scientists and the social reality of their work - the claim that it is possible for there to be no rational ground for theory comparison is oft denied.

Early versions of the incommensurability thesis claimed that proponents of rival theories are unable to understand the statements of the respective theories. Following the rejection of the analytic/synthetic distinction - and noting the theory ladenness of even the basic terms of any theory - it is claimed that terms of one theory cannot always be restated in the language of another. Theories are incommensurable if such 'translation' between the languages of rival theories is impossible. While this semantic version of the incommensurability thesis is clear, it appears to rely on a notion of semantic holism which makes the actual existence of this version of incommensurability implausible.

Another version of the thesis, value incommensurability, focuses on the methods of evaluation of the enquiry. Here the meanings of terms is not the issue; two theories can be incommensurable even if the meanings of their terms are expressible in the other's language. Rather, the problem lies in how the theories are evaluated. If the standards of theory evaluation are internal to particular theories then the choice between them appears to be arbitrary. Consequently, two

theories are incommensurable if they each contain sufficiently divergent standards of theory evaluation: that is, if they disagree on what the goal of a successful theory should be. Value incommensurability is often thought to be on stronger theoretical ground than the semantic version. Yet problems remain. It is not clear how prevalent such incommensurability is and thus it is not clear how useful the notion is in understanding the nature of theory choice.

Despite the obvious differences between semantic and value incommensurability, they do share a common characteristic: they rely on a static and abstract notion of theory. Both versions of the incommensurability thesis highlight the difficulties of theory comparison but neglect to acknowledge how incommensurability is overcome as theories change and develop. I will argue later that the problem of theory comparison is an irresolvable problem only when the adaptability of theories isn't recognized. The significance of incommensurability to an account of theory choice depends on its ability to explain both particular failures of communication and instances where failures of communication have been overcome.

A fluid and historical account of theory refines both the notion of incommensurability and the problems associated with both the semantic and value versions. The implausibility of semantic holism is weakened when we acknowledge that theories change over time; while at any particular time translation of meaning between theories may be impossible, this does not imply that such translation cannot subsequently occur. Furthermore, the practical significance of incommensurability depends on a strong account of the historical and social nature of theories

themselves.¹

Thus, there are two tasks to follow: first, to present the standard account of, and the problems associated with, both semantic and value incommensurability; and second, to make the case for a different account of incommensurability, one which allows for both the plausibility of the thesis and the possibility of rational theory choice. This case must explain both the plausibility and implausibility of the standard accounts as well as redeem the notion of incommensurability as part of a larger understanding of what rational theory choice is. Also, we will employ a case study to suggest ways this new account can be helpfully applied.

1. However, a strong account of the historical and social nature of theories is beyond the scope of this paper. We will attempt to show the importance of these factors in theory comparison notwithstanding their abbreviated mention here.

Versions of Incommensurability

In this chapter we will first examine in more detail the background to the incommensurability debate, the early views of Kuhn and Feyerabend, the criticism of these early views, the responses to these criticisms, how Kuhn revised his early views and how these subsequent revisions were criticized.

Background

The incommensurability debate became active in the 1960s primarily through the work of Kuhn and Feyerabend. In order to understand why their work was found initially plausible, it is important to present a sketch of the background to the discussion. Prior to the middle of the twentieth century and largely due to the work of the logical positivists, the prevailing assumption in the philosophy of science was that theories were evaluated against observations.² Theories are developed to explain observations and theories make predictions with respect to future observations. The best theory does the best job of explaining observations. Despite the various difficulties in appealing to the empirical record, "... the existence of a base of observation statements that can be shared by proponents of competing theories is an essential ingredient in the traditional account of rational theory resolution."³ Thus, theories were understood to be evaluated against the empirical record.

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2. While the claim here is made specifically with respect to the philosophy of science, it appears clear (though it is not defended here) that this claim is also consistent with the basic presentation of practice by scientists themselves (however inconsistent it was with actual scientific practice).
 3. Michael A. Bishop, "Why The Semantic Incommensurability Thesis is Self Defeating," *Philosophical Studies* 63 (1991): 343.

The Logical Positivists most clearly articulated the direct connection between the empirical record and the evaluation of theories. They actively worked for the reduction of knowledge to its empirical foundations. Any claim not based on direct observation was rejected. The goal was to eliminate the abstractions of previous philosophy. Their primary tool was the verification criterion of meaning: a claim is meaningful only to the extent that one can confirm its veracity. In fact, the meaning of a claim was understood to simply be the conditions under which it could be verified.⁴

Duhem, at the beginning of the twentieth century, tore a plank out of the common understanding and, anachronistically, out of the logical positivist understanding of how theory comparison functions.⁵ He noted that observations are themselves at least partially dependent on theory. For example, any theory of subatomic particles must account for observations of such particles. However, subatomic particles are not themselves directly observable. To obtain empirical results with respect to such particles one requires experiments, which in turn depend on experimental theory involving the functioning of the experimental apparatus. The problem is that when an experiment yields an anomalous result there appears to be no way to determine whether the problem lies with the overarching theory of subatomic particles or with the theory of the

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4. "... one must hold that his [sic] statement does not have any other factual meaning than what is contained in at least some of the relevant empirical propositions; and that if it so interpreted that no possible experience could go to verify it, it does not have any factual meaning at all." A.J. Ayer, *Language, Truth & Logic* (New York: Dover Publications Inc., 1952), p. 15. "According to the logical positivists, the meaning of each synthetic statement is given by its implication for experience and observation," and "According to the verifiability principle of meaning, embraced by the logical positivists, the meaning of a synthetic statement is identified with the set of its verifiable consequences." Martin Curd & J. A. Cover. eds., "Commentary" in *Philosophy of Science* (New York: W.W. Norton and Company, 1998), p. 371, 399.
 5. See Pierre Duhem, *The Aim and Structure of Physical Theory*, trans. Philip P. Wiener (Princeton, N.J.: Princeton University Press, 1954), pp. 180-95, 208-18.

experimental apparatus.⁶

With respect to theories which depend on sufficiently complex experimental theory, there is reason to doubt the utility of observations in theory evaluation, since the observations are themselves laden with theory. Furthermore, since all observations depend on experimental theory to some degree, we have reason to assume that all observations are theory laden.

Consequently, it was no longer clear that a simple appeal to the empirical record was sufficient to evaluate competing theories.

Quine's work caused further questions with respect to the use of the empirical record as the ground for theory evaluation. Since Kant, the analytic/synthetic distinction had been a philosophical truism. It had been assumed that there was a clear line between truths which are true by definition (analytic) and those which tell us something about the world (synthetic). Scientific theories were thought to contain synthetic claims; science purports to tell us something about the world and it is evaluated against what we find in the world. Quine, in his famous article "Two Dogmas of Empiricism," argued that there was no possible clear demarcation between analytic and synthetic truths.⁷ Since the strong distinction between analytic and

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6. It is not meant here to imply that there is no effective response to Duhem apart from holding to some form of the incommensurability thesis (perhaps there are independent ways of determining the reliability of the apparatus). The brief mention of Duhem here is simply to show how he influenced the debate by raising questions about the naive use of observations in science. The specific details of the responses and potential responses to Duhem are beyond the scope of this paper.
 7. W.V.O. Quine, "Two Dogmas of Empiricism," *Philosophical Review* 60 (1951): 20-43. Though questions arise with respect to the consequences of Quine's work here (especially regarding the strength of his argument), it seems clear that Quine gives us reason to doubt the viability of the

synthetic was no longer obviously viable, it was no longer clear that theories could be evaluated strictly against the empirical record.⁸

Quine's attack on the analytic/synthetic distinction was the basis for his form of holism.⁹

Knowledge should be understood as a web of interconnected beliefs. This interconnection is a natural consequence of Quine's arguments against the analytic/synthetic distinction. If there is then no sure guide to the referential success of theory terms, one could claim that all terms are in effect analytic: true by definition.¹⁰

Experience can cause beliefs in the web to be revised, but we have the choice at what level to revise. Furthermore, the revision of a belief in the web has implications for the others, so we are naturally reluctant to revise those beliefs on which many others depend. It is the 'fuzziness' of the analytic/synthetic distinction which demotes experience from its status as the primary guide.

Even if one takes the weaker interpretation of Quine's work, that the boundaries between analytic

analytic/synthetic distinction.

8. "Abandonment of the first dogma means that all statements are now accorded the status of synthetic judgements. There can, therefore, no longer be any thought of identifying our contribution to the scientific picture by appeal to the class of statements that express the principles by means of which the given is organized." Marie McGinn, "The Third Dogma of Empiricism," *Proceedings of the Aristotelian Society* 82 (1981): 90.
9. Michael Friedman, "Kant, Kuhn, and the Rationality of Science," *Philosophy of Science* 69 (2002): 176.
10. "Following Quine, many philosophers have rejected this distinction, and the breakdown of the analytic/synthetic distinction led Feyerabend and other incommensurabilists to conclude that all of the features associated with a term are part of its definition — in essence, that every sentence is analytic." Rhonda Martens and Carl Matheson, "Incommensurability Pragmatized," unpublished essay, p. 2.

and synthetic claims are essentially unclear but the distinction still is viable, his work still raises problems for theory comparison. For instance, it is uncertain whether enough 'pure' synthetic claims remain to justify theory comparison. Questions and concerns with respect to Quine's work can be addressed without resorting to incommensurability, but it is sufficient for our purposes here to show that Quine's work lent some degree of plausibility to those who questioned the grounds for theory comparison.

The questioning of the empirical record as the guide to theory evaluation was the context in which Kuhn's and Feyerabend's initial discussions of incommensurability arose. Though the problem of the feasibility of the empirical record as a guide to theory choice was not new, Duhem and Quine had caused many to question anew whether the empirical record could always arbitrate between rival theories.¹¹ Since the empirical record was no longer a sure and absolute guide, the question arose whether any sure and absolute guide to theory choice exists. Perhaps theory comparison can only be done on grounds internal to theories. Reason acts internally to theories and the grounds for theory choice are essentially arbitrary. It was these strong implications that led to the first explication of incommensurability.

11. Some logical empiricists had already started to worry about this. "An empirical law may be justified by making observations of single facts. But to justify a theoretical law, comparable observations cannot be made because the entities referred to in theoretical laws are nonobservables." Rudolf Carnap, *Philosophical Foundations of Physics* (New York: Basic Books Inc., 1966), p. 225.

The Early Views of Kuhn and Feyerabend

Discussion of the incommensurability thesis began in earnest after Kuhn and Feyerabend published separate but related accounts of semantic incommensurability.¹² As a consequence of the general questioning of the empirical record by Duhem and Quine, and due to their suspicions with respect to logical positivism (especially its empirical criterion of meaning), they both denied that observations provide a neutral standard for theory evaluation.¹³ In other words, there is no neutral observation language.¹⁴ Furthermore, if theories are sufficiently distinct, there is no rational way for them to be compared.¹⁵ According to Kuhn and Feyerabend, the meaning of theoretical terms is set by the theoretical context in which they occur. Since the terms of such theories hold no common meaning, there is no way to deny or uphold the claims of one theory

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12. See P.K. Feyerabend, "Explanation, Reduction and Empiricism," *Minnesota Studies in the Philosophy of Science* (1962): 1-20, and Thomas S. Kuhn, *Structures of Scientific Revolutions* (Chicago: The University of Chicago Press, 1970).
 13. It is not here claimed that the consequences of the work of Duhem and Quine must be along the lines given by the supporters of the incommensurability thesis. Rather the claim here is again that Duhem and Quine opened a door of plausibility which Kuhn and Feyerabend exploited. Criticism of the thesis will follow.
 14. Irzik and Grünberg, however, argue that Kuhn and Carnap were much closer in their views than is popularly believed (they claim that Carnap even subscribed to a notion of semantic incommensurability). Gürol Irzik and Teo Grünberg, "Carnap and Kuhn: Arch Enemies or Close Allies?" *British Journal for the Philosophy of Science* 46 (1995): 285-307. Reich also argues that Carnap did not see Kuhn as a challenge to his own views. George A. Reich, "Did Kuhn Kill Logical Empiricism?" *Philosophy of Science* 58 (1991): 264-277. Watanabe also claims that there was nothing essentially new in Kuhn's views. See Santosi Watanabe, "Needed: A Historico-Dynamical View of Theory Change," *Synthese* 32 (1975): 113-134. However, Laudan is clear that Kuhn represented a change: "If Kuhn was right, all the then reigning methodological orthodoxies were simply wrong." Larry Laudan, "Dissecting the Holist Picture of Scientific Change" in *Philosophy of Science: The Central Issues* Martin Curd and J.A. Cover, eds., (W.W. Norton & Company, 1998), p. 139.
 15. Since observations are theory laden, experimental results are indeterminate for theory comparison. Such results have different meanings within the corresponding theory. In the words of Kuhn, "Philosophers have now abandoned hope of [achieving a pure sense-datum language] but many of them continue to assume that theories can be compared by recourse to a basic vocabulary consisting entirely of words which are attached to nature in ways that are unproblematic and, to the extent necessary, independent of theory. ... Feyerabend and I have argued at length that no such vocabulary is available." Thomas Kuhn, "Reflections on my Critics," in *Criticism and the Growth of Knowledge*, I. Lakatos and A. Musgrave, eds., (Cambridge: Cambridge University Press, 1970), pp. 266-267.

over the other. The failure in comparison is due to the impossibility of expressing the rival claims in neutral language.¹⁶ Consequently, Kuhn and Feyerabend claimed that for sufficiently distinct theories the meanings of theoretical terms cannot be rationally compared.

Crucial to Kuhn's views on incommensurability was the notion of paradigm. Kuhn's use of the word 'paradigm' is contentious since he has used it in a variety of ways.¹⁷ In its early usage, 'paradigm' referred to a semantic world view. The shared elements of a paradigm allow for comparison and the meanings of the theoretical terms of theories within a paradigm overlap to the extent that the meanings can be compared.¹⁸ If theories belong to different paradigms, they essentially belong to different worlds: they see the world in a radically different way.

Furthermore, according to Kuhn's understanding of paradigm, the practitioner of it cannot reduce it to a system of rules.¹⁹ This is because practitioners learn a paradigm by adopting patterns of action and research particular to that paradigm.

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16. Agazzi claims that notwithstanding a discussion of the merits of the theories of Feyerabend and Kuhn, their work served to undermine the previous deductive model of the positivists: that theories are combinations of observation sentences and hypotheses, logically connected. Evandro Agazzi, "Commensurability, Incommensurability and Cumulativity in Scientific Knowledge," *Erkenntnis* 22 (1985): 57-61.
 17. See Paul Hoyningen-Huene, "Kuhn's Conception of Incommensurability," *Studies in the History and Philosophy of Science* 21 (1990): 481-492. Also, Polikarov notes that Kuhn uses the term 'paradigm' in at least twenty different ways and that he vacillates between strong and weak notions of incommensurability throughout his career. See A. Polikarov, "Is There an Incommensurability between Superseding Theories?: On the Validity of the Incommensurability Thesis," *Journal for General Philosophy of Science* 24 (1993): 129-139, and Laudan, "Dissecting the Holist Picture of Scientific Change," p. 140, and Eugene Lashchuk, "Incommensurability and Incompatibility of Paradigm-Theories," *Scientific Revolutions*, (1969) <<http://www.ditext.com/lashchuk/kuhn2c.html>>.
 18. Consequently, the main focus of work within a paradigm is puzzle solving rather than innovation. See Kuhn, *Structures of Scientific Revolutions*, pp. 35-42.
 19. Vasso P. Kindi, "Kuhn's 'The Structure of Scientific Revolutions' Revisited," *Journal for General Philosophy of Science* 26 (1995): 78.

The shift from one paradigm to another is like a gestalt shift in visual perception.²⁰ But whereas with respect to visual perception we can shift back and forth between the ways of interpreting what we see, the sudden, inexplicable paradigm shift allows for no retreat. Members of different paradigms essentially see the world differently. Within a particular paradigm, however, theory change can occur rationally since the meanings sufficiently overlap. However, paradigm change cannot itself be rational since there is no ground for comparing rival paradigms.

Feyerabend treated incommensurability as a theory of meaning; his focus was on issues of translation. Indeterminacy of meaning implied that there is no language into which rival incommensurable theories can be translated without loss. Incommensurability between theories means that the statements produced by the one cannot be fully understood by the other. While Feyerabend does not use the notion of a paradigm he also claims a radical shift in understanding between incommensurable theories. This shift is due to loss of meaning in translation, but also to the particular practice of naming within a theory. Assigning meaning to a theoretical term is to name it and to resist other ways of naming. Thus, the failures of translation between incommensurable theories is not an accidental or capricious fact; rather, such theories are designed (whether intentionally or unintentionally) to be comparatively oblique.



20. The standard example is with respect to the duck/rabbit picture. duck or rabbit but never both at the same time.

One sees either a

Feyerabend advocates an odd form of dialectic: given the (at least partial) loss of meaning between incommensurables, there appears to be little cause to call for any form of dialectic. In fact, it is difficult to understand the ground on which Feyerabend expects dialectic to proceed. He denies that there is any advance specification of the rational ground for theory choice, yet he believes that some theories are better (or worse, or more deserving of attention) than others. "[The sciences] may proceed in an orderly way but the patterns that occur are not stable and cannot be universalized."²¹ His claim is not precisely that theories are incomparable but rather that *any* rational formalization of the grounds of theory comparison problematically limits the possible ways we can compare theories. "*Every case must be judged on its own merits*, independently of the practical confidence and the theoretical fashions of the time."²² Rational assessment of theories (of a sort) can occur after the fact - at least with respect to the pragmatic value of the 'advance' - but such rationality is not a useful tool for progress itself. "... the success of 'science' cannot be used as an argument for treating as yet unsolved problems in a standardized way."²³ So progress (of a sort) exists in science but it is essentially uncharacterizable.²⁴ "For every statement, theory, or point of view believed (to be true) with

21. Paul Feyerabend, *Farewell To Reason* (London: Verso, 1987), p. 11.

22. *Ibid.*, p. 32.

23. Paul Feyerabend, *Against Method* (London: Verso, 1975), p. 2.

24. Further discussion of Feyerabend and progress in science will occur below but it is worth noting here that Feyerabend argues that the presence of rivals actually increases the empirical content of the existing theory. See Paul Feyerabend, "Problems of Empiricism," in *Beyond the Edge of Certainty: Essays in Contemporary Science and Philosophy*, ed. R. G. Colodny, (Englewood Cliffs: Prentice Hall Inc., 1965), pp. 145-260 and Paul Feyerabend, *Against Method* (London: Verso, 1975), p. 2. For a defence of Feyerabend's arguments over the objections of Laudan and Worall see Robert P. Farrell, "Rival Theories and Empirical Content Revisited," *Studies in History and Philosophy of Science* 31A (2000): 137-149.

good reasons *there exist* arguments showing a conflicting alternative to be at least as good, or even better."²⁵ There can be no one final way of expressing meaning; there is no one way of resolving disputes. For Feyerabend incommensurability is, oddly enough, the beginning of theory comparison and not the end.²⁶

So, Feyerabend contrasts dialectical persuasion with dogmatic rational argument. The existence of incommensurable theories limits the utility of dogmatic rational argument. His famous epistemological anarchism ('anything goes') is not a sort of isolationist stance. Rather, he is making the case for including any and all voices in the discussion. Thus incommensurability is, for Feyerabend, a consequence of his commitment to free dialectical enquiry and not vice versa.

The problem with standard rational justification, according to Feyerabend, is that it seeks to enshrine particular principles as universal. And since there can be no such justification ('all principles are revisable' is the only universal principle he is prepared to accept), rational justification can only limit options and hinder progress. Incommensurability is problematic only

25. Feyerabend, *Farewell To Reason*, p. 76.

26. Feyerabend makes no discernible formal distinction between the rational assessment of theories by practitioners choosing a research direction and final rational assessment of theories in historical reflection. Rational theory comparison is, for Feyerabend, all about predetermined standards (and not about anything else, such as truth). Whether these standards are applied to the past or to the future is formally irrelevant to him. The natural interpretation of his work is that he denies that any rational formalization of theory comparison in fact exists. We can claim *post-hoc* rationality but, under Feyerabend's account, it isn't clear that this amounts to anything since such justification is useless in determining future research directions. Consequently, one could claim that the fact that we can't characterize grounds for progress or theory comparison in advance doesn't entail that the grounds we end up using are non-rational. But Feyerabend would no doubt claim that justification after the fact is irrelevant since, again, it has no pragmatic value for the future. In fact, his worry is that such justifications hinder future progress.

for those who expect theories to be sharp and unambiguous; once we reject this requirement and open ourselves to free dialectical enquiry we will no longer see incommensurability as a problem. In other words, Feyerabend denies that rationality (whatever in the end he means by the term) is the explanation of either what scientists do or what makes what they do successful.²⁷ Any sort of reasons, scientific or non-scientific, can be used in theory comparison.

Feyerabend believes that due to the difficulties involved in rational theory comparison, the only recourse is to acknowledge that theories are essentially rationally incomparable. Kuhn, though he is perhaps more nuanced by allowing rational theory comparison within paradigms, also turns to incommensurability in the face of these difficulties. Both positions are no doubt extreme. We will deal with specific criticisms of their positions below, but it is worth noting an important general question is this: is this extreme response to the difficulties of theory comparison justified? The discussion of the various criticisms of incommensurability below lead to the conclusion that the extreme view overstates the case. In the following chapter we will develop an alternative approach which accounts for the difficulties of theory comparison without incorporating the problematic characteristics of the extreme view.

Criticism and Responses

The claims of Kuhn and Feyerabend led to more extreme conclusions than they were willing to

27. Lugg points out that Galileo is praised by Feyerabend because he had the good sense to jettison proper scientific method at particular points in his life. Andrew Lugg, "Feyerabend's Rationalism," *Canadian Journal of Philosophy* 7 (1977): 759.

acknowledge. Neither Feyerabend nor Kuhn claimed that all theories are incommensurable.

Rather, both believed that incommensurability between theories was relatively rare. Sufficiently distinct theories, or paradigms, are incommensurable but this was not meant to imply that rational progress was never possible in science.

For Kuhn and Feyerabend there is a sense in which theories are comparable in that there is some overlap between them. However, the issue is whether this overlap is sufficient to fix grounds for rational comparability. Kuhn and Feyerabend maintain, in effect, that whatever overlap exists is inadequate to the task, since the meaning of terms is not fixed by its reference but by its use within a particular theory or paradigm.²⁸ Still, while rational evaluation is impossible between incommensurable theories, Feyerabend and Kuhn want to argue that we can understand the competing claims of rival theories.²⁹ Thus, incommensurability is not meant to be a bar to understanding.

But this is exactly the point where critics object.³⁰ Putnam attacks the compatibility of

28. So while one could claim that ostensive definition provides a ground for comparison, if the focus is on how terms are used, it is clear that such definition is insufficient for rational comparison. The issue of whether the stress on use over reference is itself coherent is considered below.

29. Kuhn implies that understanding in the face of incommensurability is possible in the following: "... in some fundamental ways Einstein's general relativity resembles Aristotle's physics more than Newton's." Thomas S. Kuhn, "Reflections on My Critics," in *The Road Since Structure* (Chicago: The University of Chicago Press, 2000), p. 161. In the same section Kuhn argues that incommensurability points not to the impossibility of translation but rather only to its difficulties. Feyerabend denies, in arguing against Putnam, that understanding foreign concepts requires translation (commensurability). Feyerabend, *Farewell To Reason*, p. 266. Feyerabend also claims, contra Putnam, that "it is possible to assert, without becoming incoherent, that the Galilean notions are 'incommensurable' with our own 'and then to go on and to describe them at length'." *Ibid.*, p. 271.

30. Shapere, for instance, denies that one can bar comparability between theories even under the

understanding and the incommensurability thesis by claiming that the thesis is self-refuting in its holistic approach.³¹ The thesis essentially claims, according to Putnam, that adherents of incommensurable paradigms speak untranslatable languages (since they belong to 'different worlds'). But the notion of an untranslatable language is incoherent since the characterization of noises as a language means that translation is possible. In other words, the possibility of translation is already present if we can label certain activities as a language. If a "language" were in fact untranslatable, we would be unable to tell it is a language at all. Consequently, since the notion of an untranslatable language is incoherent and since the incommensurability thesis depends on this notion, the thesis itself is incoherent.

Putnam's argument relies on a strong condition for understanding. We cannot recognize untranslatable languages as languages since we can't understand them as languages.³² Defenders of the incommensurability thesis claim that translatability is compatible with incommensurability by weakening the condition for understanding and claiming that partial translatability or local lack of translatability is possible.³³ Sankey, for example, considers Putnam to have an overly

assumptions of Kuhn and Feyerabend. Even with a contextual understanding of meaning there must remain some basis of comparison between theories. If we can understand rival claims this gives us some measure of comparison. In other words, we can question whether it is possible to understand rival theories and still claim they are incommensurable. See Dudley Shapere, "Evolution and Continuity in Scientific Change," *Philosophy of Science* 56 (1989): 419-437. See also Allan Franklin, "Are Paradigms Incommensurable?" *British Journal for the Philosophy of Science* 35 (1984): 57-60 for a demonstration of how classical and relativistic mechanics are (supposedly) comparable despite the apparent difficulties.

31. Hilary Putnam, *Reason Truth and History* (Cambridge: Cambridge University Press, 1981), p. 114.

32. Untranslatable languages are for Putnam indistinguishable from random noises.

33. Read, for instance, argues that the only type of translation Kuhn supposes incommensurability is a bar to is a mechanical Quinian one. Rupert Read, "Thomas Kuhn's misunderstood relation to Kripke-Putnam essentialism" <<http://www.uea.ac.uk/~j339/Kuhnnatkins.htm>>. Sankey denies that incommensurability entails untranslatability into a total language. Rather, it is a thesis on the

strong condition for understanding: we can understand the speaker of a foreign language, to a degree, even if we cannot translate the expressions exactly. If translation was required for understanding then no translations of language could have ever occurred, since we can't translate before we understand. Translation needs some ground if it is possible at all. One does not need to translate between languages in order to understand meaning.³⁴

Similarly, Feyerabend attempts to refute Putnam's critique by denying that translation is required for understanding and denying that successful translation leaves the translating language unchanged.³⁵ Feyerabend accepts Putnam's critique only at a particular point: theories can change and adapt to include new concepts. Feyerabend accuses Putnam of a naive and abstract account of how language works: we constantly 'play' around with unintelligible concepts till something falls into place - we give new meanings to the same old words.

languages of theories which are themselves only a part of a total language. It is the larger portions of a total language, separate from the theoretical subdivisions, which allow for translation. Furthermore, to the claim that we cannot even attribute any meaning to untranslatable languages Sankey lists various ways in which unknown languages are recognized as such prior to understanding, such as codes, dead languages, or unknown foreign languages. See Howard Sankey, "In Defence of Untranslatability," *Australasian Journal of Philosophy* 68 (1990): 3.

34. Bombardi also claims that partial translations, and therefore conceptual schemes, are possible. He argues that Davidson makes the unjustified assumption that the translation has to be a symmetric relation. Theory comparison depends on shared referential apparatus which determines the meaning and the denotation of defined terms. All that is necessary for such comparison to take place is that the 'translation' of terms occur in one direction. His best example is with respect to translation between Roman and Arabic numbers; Arabic numbers have a zero character but Roman Numbers don't; translation can occur from Roman to Arabic but not vice versa. Since translation is possible in one direction but not in the other, partial untranslatability is compatible with alternate conceptual schemes. See Ron Bombardi, "Davidson in Flatland," *Australasian Journal of Philosophy* 66 (1988): 67-74. Bishop claims that Putnam's criticism of incommensurability fails, since incommensurability entails only a partial loss of communication between rival theories. Bishop, "Why The Semantic Incommensurability Thesis is Self Defeating," *Philosophical Studies* 63 (1991): 353.
35. Paul Feyerabend, "Putnam on Incommensurability: Comments on 'Reason, Truth and History,'" *British Journal for the Philosophy of Science* 38 (1987): 75-81.

Davidson makes a similar point to Putnam's with respect to conceptual schemes (his analog of 'paradigm').³⁶ The key idea for Davidson is the issue of translation: speakers of different languages can be members of the same conceptual scheme if the languages are translatable.³⁷ Essentially, Davidson equates 'not translatable' with 'incommensurable'.³⁸ In other words, people who speak two non-translatable languages belong to separate conceptual schemes. He then claims that the notion of a non-translatable language is incoherent.³⁹ We cannot claim that speakers of another language hold beliefs, desires, etc., unless we can translate their words into ours. Furthermore, against the claim that conceptual schemes change as language develops, Davidson argues that we have no way of telling what the mental concepts of the speakers are.⁴⁰ People can use multiple forms of language and still have the same mental concepts. Consequently, since the notion of multiple conceptual schemes is incoherent, no sense can be made of the notion of incommensurability.

Berriman, though, claims that alternative conceptual schemes are possible.⁴¹ He attempts to demonstrate this with reference to language learning. "Human beings routinely learn unknown

36. Donald Davidson, "On the Very Idea of a Conceptual Scheme," *Proceedings and Addresses of the American Philosophical Association* 47 (1973): 5-20. It is clear that by 'conceptual scheme' Davidson means something close to what Kuhn means by 'paradigm.'

37. *Ibid.*, p. 6.

38. *Ibid.*, p. 12.

39. *Ibid.*, pp. 7-8.

40. *Ibid.*, p. 10.

41. W.A. Berriman, "Alternative Conceptual Schemes," *Metaphilosophy* 9 (1978): 230.

languages without reliance upon translation into a language they already know."⁴² What makes second language learning possible is the act of putting aside what one already knows: one learns a second language in the same way one learns the first. We have the capacity to learn independent of our already existing languages. Thus, it is possible to have multiple conceptual schemes. Learning and not translation is the real issue.

Forster makes a similar point as he argues that Davidson is mistaken in assuming that languages can always be translated with available resources.⁴³ The issue is what needs to occur for successful translation to obtain. The problem with Davidson's critique is that he trivializes the process of language learning. Hacker argues, contra Davidson, that his case against the impossibility of translation only holds for logical impossibility.⁴⁴ Translation may prove be practically impossible, though logically possible. Two languages may be (logically or practically) untranslatable at any particular time, depending on the available resources in either language. But this does not necessarily imply that such languages are always untranslatable. As languages change and develop, new resources are developed which allow for translation. The capacity for language learning is not strictly internal to existing languages and it is this capacity which allows for first languages to be learned at all.⁴⁵ All Davidson can say then is that there are no essential (unresolvable) alternate conceptual schemes, he can't deny that such schemes exist.

42. Ibid..

43. Michael N. Forster, "On the Very Idea of Denying the Existence of Radically Different Conceptual Schemes," *Inquiry* 41 (1998): 137.

44. P.M.S. Hacker, "On Davidson's Idea of a Conceptual Scheme," *Philosophical Quarterly* 46 (1996): 291.

45. A 'capacity' for language learning does not by itself allow for translation. Rather it is such a capacity which allows for translation resources to be developed within any particular language.

However, to make the criticism clearer, Matheson makes an even stronger point than Davidson's. He argues that Feyerabend's version of the incommensurability thesis is problematic since it entails that proponents of differing theories, no matter how small the difference, cannot understand each other.⁴⁶ "If the strength of holism holds, then not only will Newton be unable to understand Einstein, but no two people who differ in even a single belief will be able to understand each other."⁴⁷ If the meaning of theoretical terms is entirely determined by theoretical context, then there is no way for the proponents of one theory to understand the claims of the other. Since the meanings of the terms of a theory are internal and since the context of terms in a theory determines their meaning, theories that differ in as little as one central term form distinct webs of meaning. And since we have no extra-theoretical guide to meaning, there is no way to bridge the gap in understanding between such theories.

So, the problem is that semantic holism is incompatible with the plausible level of understanding that appears between theories. Kuhn never deliberately subscribed to semantic holism.⁴⁸ But the issue is not what Kuhn intended but rather what is entailed by his claims. Whatever the difficulties in comparison between rival theories, it is intuitively implausible to assert that there can be no understanding between them. Thus, according to its critics, incommensurability implies untenable consequences. One cannot claim semantic incommensurability without

46. Carl Matheson, "Critical Notice of James Robert Brown's 'The Rational and the Social'," *Canadian Journal of Philosophy* 23 (1993): 125-150.

47. Martens and Matheson, p. 3.

48. See Paul Hoyningen-Huene, "Kuhn's Conception of Incommensurability," *Studies in the History and Philosophy of Science* 21 (1990): 489.

acknowledging the problem of understanding. But since there doesn't appear to be an essential problem of understanding, semantic incommensurability itself is problematic. The success of the defence against this criticism is double edged for if languages can be partially translated then it appears that we have only partial incommensurability. In other words, the stronger the arguments for partial translation become, the correspondingly weaker becomes the incommensurability thesis itself.

A further issue on which the views of Kuhn and Feyerabend can be attacked is with respect to relativism and progress. If rational comparison between incommensurable theories is impossible, then theory choice is arbitrary. While Feyerabend and Kuhn sought to acknowledge the difficulties in theory comparison, they both claimed that science did advance. Brown notes that neither Kuhn nor Feyerabend claim that incommensurability entails non-comparability. Kuhn claims that instead we just have a 'fuzzy' basis of comparison and Feyerabend never meant to develop a logical system of comparison at all.⁴⁹ Their issue was not with the prospect of progress in science but rather with the prospect of rational progress expressed as confirmation by the empirical record. For Kuhn, advancement in science takes place in two ways: progress in normal science (where there is no incommensurability) occurs through rational evaluation of theories; progress through revolutionary science (where the theories are incommensurable) occurs through non-rational factors. While Kuhn is vague on the specifics of what these are (especially in his initial presentations), he does claim that science progresses.

49. Harold I. Brown, "Incommensurability," *Inquiry* 26 (1983): 3-29.

Feyerabend is even more committed to the notion of scientific progress. As we have already seen, Feyerabend is suspicious of any attempt to formalize any notion of the criterion for rational progress, yet he is committed to the claim that science can progress. He believes that such formalizations enshrine a particular approach to the exclusion of other potential fruitful ones; formal criteria for rational progress are but dogmatism in disguise. His commitment is to open the dialogue regarding theory evaluation to any and all avenues.⁵⁰ The idea appears to be that by increasing the number and diversity of voices involved in theory evaluation we increase the chance that the "better" theory is chosen.

The natural criticism of Feyerabend with respect to the nature of scientific progress is that his vision is strictly arational. There is and can be no formal basis for comparative theory evaluation. Consequently, science advances haphazardly and irrationally according to Feyerabend. While this type of 'progress' may be seen to follow from his reluctance to specify in advance methods of theory evaluation, Feyerabend claims that it is the absence of such methods which allows for progress itself. However, if there is no way to rationally compare theories then it is difficult to understand how progress is possible. The fact of progress in science appears to discount Feyerabend's claims. Szumilewicz, for instance, criticizes the incommensurability thesis on the grounds that it would forbid not only the rationality of revolutionary theory change

50. "My thesis is that anarchism helps to achieve progress in any one of the senses one cares to choose." Feyerabend, *Against Method*, p. 18.

but also the rationality of any theory change at all.⁵¹ Giere helpfully reminds us that the claim of irrationality in scientific progress, such as displayed in Feyerabend's work, is a minority position: Lakatos, Toulmin, Laudan, and Shapere are all committed to show rational progress in science.⁵² Furthermore, since Feyerabend wants to include consideration of non-scientific factors, Broccard claims that all Feyerabend is left with is improvised 'solutions' devoid of rational content.⁵³ Without rational content it is difficult to say to what sort of progress Feyerabend refers.

Kuhn has also been attacked on his characterizations of relativism and progress in science. There can be no independent evidence supporting Kuhn's paradigm account since theory evaluation is always internal to paradigms.⁵⁴ So, as a consequence of Kuhn's relativism, we are denied a compelling reason to suppose Kuhn's claims are true.⁵⁵ Holcomb notes that Kuhn is aware of this circularity but that he finds it unproblematic.⁵⁶ But for Holcomb the lack of compelling reasons to accept one paradigm over another is a decisive problem for Kuhn. Similarly, Watanabe finds little support for Kuhn's account of radical theory change.⁵⁷ Theories change for reasons more significant than the randomness of the Kuhnian 'gestalt switch.' Kuhn's relativism is problematic, according to Watanabe, in that he doesn't take the history of science

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- 51. Irena Szumilewicz, "Incommensurability and the Rationality of the Development of Science," *British Journal for the Philosophy of Science* 28 (1977): 343-350.
 - 52. Ronald N. Giere, "Philosophy of Science Naturalized," *Philosophy of Science* 52 (1985): 332.
 - 53. Nicolas Broccard, "Going on with Systematology," *Metaphilosophy* 13 (1982): 263-266.
 - 54. Harmon R. Holcomb, "Circularity and Inconsistency in Kuhn's Defence of Relativism," *Southern Journal of Philosophy* 25 (1987): 467-480.
 - 55. This of course is but a variant of the standard attack on relativism: if all claims are relative then the claim that all claims are relative is itself relative.
 - 56. Holcomb, p. 470.
 - 57. Watanabe, p. 114.

seriously enough.

Kuhn claims that paradigms are never abandoned unless a successor is available, since such a failure would mark a presumably grounded standard of theory evaluation. Stone claims that paradigms are often rejected even without a successor.⁵⁸ In fact, the development of successor paradigms (a pragmatic rejection of the existing paradigm) is due to the epistemic rejection of the prevailing paradigm. Stone claims that paradigms fail, and alternatives are sought, due to their internal problematic. Watanabe finds support for this pragmatism even within Kuhn's writings.⁵⁹ He notes that Kuhn claims that a successor paradigm should be able to solve outstanding problems plus include the problem solving ability of the previous paradigm. While Kuhn does claim that we cannot judge a paradigm on its problem solving ability alone, Watanabe argues that the greater ability to solve problems is the main reason why the new paradigm is chosen.⁶⁰

None of these objections have been developed in detail, yet it should be clear that problems with incommensurability and progress remain. The common thread to the objections is that success

58. Mark A. Stone, "A Kuhnian Model of Falsifiability," *British Journal for the Philosophy of Science* (1991): 177-185. Matheson and Kline show that many scientific claims have been abandoned in the absence of alternatives. They claim that alternatives are perhaps required when considering theories on a large scale ('sweeping claims'). Even if we grant a form of methodological incommensurability where evaluation is based on success, non-comparative theory evaluation is possible. Carl A. Matheson and A. David Kline, "Rejection Without Acceptance," *Australasian Journal of Philosophy* 69 (1991): 167-179.

59. Watanabe, p. 117.

60. But it is unclear that Watanabe is here any less *ad hoc* than Kuhn. See esp. his discussion of languages. *Ibid.*, p 118.

and progress in science must be rationally explainable and the worry is that both Kuhn's and Feyerabend's work have made such explanation impossible.

Finally, there is a suspicion of idealism within the work of Kuhn and Feyerabend. The focus of their work is strongly on how the various elements of a theory interrelate. The relationship of the elements forms the meaning of the theory's central terms and it is this meaning holism which gives rise to the notion of incommensurability. If a theory is evaluated simply on the relationship of its parts then the accuracy of its description of the real world is irrelevant. In other words, the picture presented by Feyerabend and Kuhn is strictly idealistic. However, there are different accounts of reference available which are more compatible with the realist agenda.

Michael Devitt, for instance, argues against the incommensurability thesis by claiming that even in controversial cases logical relationships hold between competing theories. His claim is that incommensurability is a thesis in semantics and not epistemology; the truth value of particular statements are to be considered separate from their meaning. Furthermore, the appropriate realist understanding of reference will grant theory comparison in all cases despite the difficulties of theory ladenness.⁶¹ Scheffler argues that a sufficient number of reference terms hold even through radical theory change to allow for theory comparison despite the same pending difficulties.⁶² Leplin claims that reference terms maintain through theory change and thus that it

61. Michael Devitt, "Against Incommensurability," *Australasian Journal of Philosophy* 57 (1979): 29-50.

62. Israel Sheffler, *Science and Subjectivity* (New York: Hackett Publishing Company, 1967).

is possible to compare competing theories.⁶³ The early presentations of the incommensurability thesis implied that reference is discontinuous between theories since the reference of the object is set by its description (its role within the theory). Consistency of reference is maintained between theory change, not through the descriptions, but rather through the existence of something which the descriptions were about.⁶⁴

Devitt, Scheffler, and Leplin in essence claim that a retreat to idealism in the face of incommensurability is premature. Incommensurability presents problems for theory comparison but these difficulties are not such that realism needs to be abandoned. What is required is a further refinement of existing accounts of realism.⁶⁵ In other words, the problem of theory

63. Jarrett Leplin, "Is Essentialism Unscientific?" *Philosophy of Science* 55 (1988): 493-510.

64. The criticism of this understanding of reference is that once essential properties of have been determined, they are irrevocable. Leplin agrees that if this is what the causal theory of reference is claiming then it is false. But Leplin claims both that essential reference is only definitively established in 'final science' and that reference can be shown to fail when the role of evidence changes (for instance, nothing plays the role of ether now, so ether never referred).

65. Sankey also believes that the appropriate realist account defeats the problems of incommensurability. He argues that Feyerabend's early work relies on a descriptive theory of reference which is problematic. He characterizes the problem of incommensurability, as presented by Feyerabend, as one of shifting reference: since central terms of conflicting theories share no common reference, they cannot be compared. Sankey argues that this reliance on reference is a problem since it ignores practical ostensive determination of reference. In other words, whereas Feyerabend is right with respect to high level conceptual definitions, the practical ostensive reference remains constant between rivals. Again the issue is reference and realism: theories can be compared since they can be checked, though this will be difficult at times. Howard Sankey, "Feyerabend and the Description Theory of Reference," *Journal of Philosophical Research* 16 (1991): 223-232. Shapere seeks an understanding of reference which would allow for rational theory comparison, given the problems of incommensurability. He examines Putnam's claim that the solution to theory comparison is to replace questions of meaning with those of reference: the meaning of 'neutron' may change from theory to theory but as a transtheoretical term its reference remains constant. Shapere claims that Putnam's account lacks historical credibility. He proposes that the continuity of reference from theory to theory is established by the existence of reasons to change the descriptions of the objects involved. The existence of these reasons gives ground for continuity of reference and for theory comparison. Dudley Shapere, "Evolution and Continuity in Scientific Change," *Philosophy of Science* 56 (1989): 428.

comparison is a practical problem internal to realism.⁶⁶

Nola makes the idealist accusation explicit: Kuhn is himself an idealist since he claims that the reference of all the central terms of theories change through paradigm shifts.⁶⁷ There are no non-conventionalist grounds under which theories can be compared. Kuhn, Nola claims, resorts to idealism in the face of incommensurability yet still wants some relation to hold between theories which would grant one or the other superiority. However, this is an inconsistent position. Feyerabend is at least more consistent than Kuhn in that while he is an idealist he denies that there is any rational relation between incommensurable theories: anything goes. The key for Nola is the recognition that realism is strictly incompatible with incommensurability.

Again, the consideration of objections has been brief, but the common thread is the call for semantic realism. Incommensurability poses problems for theory comparison but these problems can be defeated or answered through an appropriate theory of reference. Despite the internal holistic aspects of theories, in the end, they tell us something about the world. Defenders of incommensurability can possibly claim compatibility with realism. The meanings of theoretical terms had been thought to tell us something about how the term relates to the world. For example, the theoretical term 'proton' has a function within subatomic theory but it also refers to an actual physical object in the world. 'Proton' can function differently in rival theories of

66. We will return to incommensurability and pragmatics in the next chapter.

67. Robert Nola, "'Paradigms Lost, or the World Regained' -- An Excursion into Realism and Idealism in Science," *Synthese* 45 (1980): 317-350.

subatomic particles, but even in rival theories it can refer to the same object in the real world.

The terms of incommensurable theories are so because they function differently within their respective theories, yet still refer to the same object. This sameness of reference is enough to show the sameness between the terms but it is insufficient to establish the basis of rational comparison because such comparison depends on more than reference itself (it also depends on how the terms function within the theory). Still, whether such an account of reference works is debatable.⁶⁸ Furthermore, if terms both refer to real objects and function within a theory, then it is difficult for the incommensurability theorist to explain why the reference does not provide enough of a basis for theory comparison despite the differences in function.

The defenders of semantic incommensurability did not abandon it in the face of criticism.

However, as the defence of incommensurability becomes more elaborate, the thesis itself becomes even more implausible: as the strong thesis is weakened to meet objections, we have

68. Grayling, for instance, argues against Feyerabend's contention that radical change in meaning must be accompanied with a discontinuity of reference in the terms of theories (which entails incommensurability). He claims that there are necessary elements to experience which would make the radical change in reference, as needed by Feyerabend, impossible. John Shand, "Grayling, Feyerabend and the Consistency of Sense," *Analysis* 46 (1986): 211-212. Zheng points out that Kuhn and Feyerabend rely on a contentious understanding of meaning which asserts that the meaning of theoretical terms depends on their context and thus there is no logical basis for theory choice. Zheng thinks Putnam's work is problematic in that it only applies to specific types of terms and that it amounts to no more than a bald assertion of continuity. Zheng claims that meaning and reference are more connected than Putnam allows, and that continuity of reference is not sufficient to allow for logical comparability. Lan Zheng, "Incommensurability and Scientific Rationality," *International Studies in the Philosophy of Science* 2 (1988): 227-236. Still, the continuity of reference is an issue. Sankey argues that claims to continuity of reference over all paradigm shifts is problematic. There have been many cases of radical changes in reference and he questions whether the particular occurrences of continuity in reference are sufficient to allow for rational theory comparison. In fact, Sankey argues that the simple effect of Scheffler's work was to shift the discussion to a consideration of reference. Howard Sankey, "Incommensurability - An Overview," <http://www.hps.unimelb.edu.au/staff/staff_papers/howard/Incommensurability.PDF>, p. 7.

good reason to suspect that semantic incommensurability does not actually occur. In addition, both the rare occurrence of historical incommensurability and the occasions where apparent instances of it have been overcome have yet to be explained successfully.⁶⁹ Responses can be made to all of the criticisms but a cursory glance at the literature implies that a consistent defence of semantic incommensurability either weakens the notion to the extent that one questions whether it remains an intelligible concept or maintains a strong notion of incommensurability at the expense of plausibility.

Revised Kuhn

In response to early criticism of semantic incommensurability, Kuhn revised the notion.⁷⁰ While his early views suggest relativism, Kuhn resisted the claim and developed his theory in part to avoid it (Kuhn was unhappy with semantic holism whereas Feyerabend found it unproblematic).⁷¹ Rather than thinking of incommensurability as a failure of translating the

69. One could resort, at this point, to claiming that while general incommensurability is problematic, partial or local incommensurability can occur. This will be dealt with below: either it is a bar to rational progress or it is not. If it is, then it remains to be explained how progress still occurs. If it is not, then such incommensurability is a minor historical detail. In either event, incommensurability, even so construed is not an essential problem to theory comparison. The practical problems it addresses will be dealt with in the next chapter.

70. See Thomas S. Kuhn, *The Essential Tension* (Chicago: The University of Chicago Press, 1977). Kuhn claims that he never actually revised his theory at all. The difficulties that were found in his earlier versions were due to misunderstandings. See Thomas S. Kuhn, "Reflections on My Critics" in *The Road Since Structure* (Chicago: The University of Chicago Press, 2000), pp. 123-175. But Holcomb contends that Kuhn has vacillated between different presentations of his views. Holcomb, p. 477. Also, Watanabe claims that Kuhn dramatically changed his early views. Watanabe, p. 132n. See also A. Polikarov, "Is There an Incommensurability between Superseding Theories?: On the Validity of the Incommensurability Thesis," *Journal for General Philosophy of Science* 24 (1993): 129 and Laudan, "Dissecting the Holist Picture of Scientific Change," p. 139.

71. See Howard Sankey, "Kuhn's Changing Concept of Incommensurability," *British Journal for the Philosophy of Science* 44 (1993): 759-774.

meaning of the central terms in different theories, it is best understood as a difficulty arising from varying values of competing theories. Incommensurability arises when we have no logical, principled method of comparing theories. Theories could be evaluated on a variety of different scales or values: simplicity, pragmatic value, explanatory power, testability, etc. The five values that Kuhn identifies are accuracy, consistency, scope, simplicity and fruitfulness. This list of values is not meant to be exhaustive. Other values are possible, but these provide a basis for discussion. While a particular theory is in force, there is substantial agreement on what the values of that theory are. Minor revisions of a theory are close to the original, proposing no substantive corrections. Consequently, theories are relatively easy to revise internally.

Difficulties arise, however, when substantive changes to a particular theory are proposed. When two theories are so different as to stress different values there is no principled method of comparison between them. The values of a theory are its criteria of rational evaluation. Without sufficiently shared values, and in the absence of rational assessment of these values, theories are incommensurable. If one theory explains more of the empirical data, but the other is more testable, then the theory we choose will depend on which value is more important. But if these values are internal to the particular theories then there is no way of rationally preferring one (as long as the theories in question differ significantly with respect to their values and content).⁷²

72. Gupta, however, argues that Kuhn is committed to external criteria for theory comparison. But Gupta appears to miss the point in that Kuhn's commitment to 'partial' incommensurability implies only that there are shared (non-external) standards. Kuhn's aim in weakening his version of the incommensurability thesis is to keep his distance from the problematic aspects of Feyerabend's semantic holism. See Chhanda Gupta, "Putnam's resolution of the Popper-Kuhn Controversy," *The Philosophical Quarterly* 43 (1993): 319-334.

The standard example of this form of incommensurability is the case of Copernicus vs. Ptolemy. Consider the problem of the rational adjudication of these theories early in the dispute. They were relatively equal in their ability to accurately predict the movements of the planets. The Ptolemaic theory had the advantage of being consistent with the known Aristotelean physics of the time, though at the cost of complexity. The Copernican theory had the advantage of an internal conceptual simplicity but at the cost of inconsistency with the then current physics. How then does one choose between them? If one values conceptual simplicity, one would choose Copernicus. If one values consistency with the other current theories, one would choose Ptolemy. But there is nothing telling one whether to value simplicity or consistency. There is consequently no principled method of choosing between them.

Change in paradigm is not a matter of rational choice.⁷³ How, then, do scientists choose between paradigms? Two views are possible. First, changing paradigms is like a Gestalt switch. A scientist operating in one paradigm instantaneously switches to another. Second, choice between paradigms is irrational but is based on the good judgement of the scientific community. As the

73. Assuming of course that 'rational choice' implies a rules based procedure for discriminating values. Kuhn thought that such a rules based procedure did not exist but that the choices between theories that scientists made were still 'rational.' See Rhonda Martens and Carl Matheson, "Incommensurability Pragmatized," unpublished essay, p. 5. Zheng explicates this point in how he argues against Davidson's critique of incommensurability: Davidson has shown the need for interpretation between languages but not the need for translation. Lan Zheng, "Incommensurability and Scientific Rationality," *International Studies in the Philosophy of Science* 2 (1988): 227-236. Zheng claims that Kuhn never intended to claim that incommensurability implies incomparability. Rather he claims that comparison cannot be done using the methods of the logical empiricists (using a neutral language to make a point by point comparison). Furthermore, Kuhn develops, in his later work, the notion of taxonomy to show how comparisons can be made (Feyerabend is of course fuzzier on this point).

later Kuhn would ask, who are more able to make judgements between scientific paradigms than the scientists themselves? The second option, while not fully rational, preserves in some sense the notion of Duhem's scientific good judgement: choice between paradigms may not be explicitly rational but it is not completely arbitrary.

It is this revised view of Kuhn's, with its tenuously rational appeal to judgement based on the taxonomy of value, which allows for theory comparison. Kuhn is attempting here to leave open a door to theory comparison which his earlier views left shut. Whereas his previous views essentially forbade any ground for theory comparison, he now claimed the only significant difference between theories lay in value. There was at least some ground left open for theory comparison even if theories are incommensurable.⁷⁴

Criticism

This form of incommensurability is more viable than the earlier semantic forms. There is no difficulty in translation between theories; proponents of competing theories have no difficulty (at least in principle) understanding each other. This version of incommensurability is not vulnerable to the criticism of semantic holism. The earlier form was implausible in that there is

74. Hernandez-Iglesias notes that Kuhn's focus on critique had caused him to overstate his case and question scientific objectivity in claiming that progress must be pragmatic and theory choice depends on personal and aesthetic considerations. Kuhn himself notes that the accusations of relativism have their source in the following: first, revolutionary theory choice is not driven by logic or experiments; second, revolutionary choice is made by the community; third, paradigms are incommensurable. Kuhn defends himself against the first two by claiming that the criteria shared between paradigms function not as rules but rather as values (instantiated in communities); simply because there is no algorithm of choice between such theories does not mean that such choice is irrational. Manuel Hernandez-Iglesias, "Incommensurability without Dogmas," *Dialectica* 48 (1994): 29-45.

always (at least the appearance of) the possibility of translation between theories. This presentation of the concept does not face the plausibility challenge that the earlier one did. It is at least plausible that theories could differ in ways that this form would require.

However, despite the apparent plausibility, there remain difficulties. Are the standards of evaluation or values of a theory internal to that theory or simply part of general scientific activity? Are there sufficiently divergent values which theories can display? How often do theories display this variance in values?

Key to this notion of incommensurability is the claim that values are internal to a paradigm. In other words, theories in paradigms not only make claims but also contain the standards by which these claims are to be judged. On a small enough scale this is certainly true. However, it is debatable whether theories themselves contain their values of evaluation on a larger scale. If theories are similar enough, comparing them is relatively straightforward: if they both claim the same type of simplicity as a virtue, we can evaluate them on this basis; if they both claim explanatory power as a virtue, we can evaluate them on that basis. The fact that similar enough theories are rationally comparable on their values is reason to believe that these values are external to the theories. Another way to state this concern is to suppose that the activity of science has a goal and the various values claimed by particular theories are simply paths to the same goal; in the end we evaluate theories by how well they advance the goal of scientific

activity.⁷⁵

In the case of Ptolemy vs. Copernicus, the difficulty in comparison lay in the lack of available information. While it is true that they each claimed superiority with respect to different values, given enough time and evidence it became clear which theory was superior. Consequently the difficulty in comparison was not due to any theoretical or principled problem; rather, it was a practical problem in determining the better theory.

Even if one grants the possibility that the required divergence in values can exist between competing theories it is questionable how often it occurs.⁷⁶ In the normal course of events, we can determine which theories are rationally preferable. In other words, the sort of value discrepancy required to instantiate this form of incommensurability is rare in scientific history (if it occurs at all). Consequently, value incommensurability does not point to any absolute barrier to theory comparison. Rather, it names a temporary and resolvable problem.⁷⁷

Incommensurability appears to be like the smile of the Cheshire Cat: the more we look for it the harder it is to find.

Oddly enough, a strong critic of Kuhn is Feyerabend himself. Kuhn is essentially looking for internal scientific grounds for theory comparison in the face of the evolving notion of

75. See Larry Laudan, *Progress and Its Problems* (Berkeley: University of California Press, 1977).

76. Martens and Matheson, p. 6.

77. See the next chapter for further discussion of this issue.

incommensurability. "... incommensurability is far from being the threat to rational claims that it has frequently seemed."⁷⁸ He names values which scientists in different theories hold to varying degrees. But Feyerabend points out that whatever values Kuhn proposes we can find scientists who deny them and non-scientists who adhere to them.⁷⁹

Even the later Kuhn is still left with relativism, since being able to understand differing theories does not mean that we can rationally compare them. Friedman argues that while Kuhn defends himself against charges of relativism through his appeal to values, this appeal fails to defeat the charge since there remains no shared ground of rational theory appraisal.⁸⁰ Kuhn wants to say that science is rational despite incommensurability since it is a successful problem solving enterprise. However, Friedman claims that this is insufficient to defeat relativism as the issue is whether standards of theory appraisal are available to the practitioners. Since this is what Kuhn denies, he is still vulnerable to the charge of relativism. In other words, Kuhn wants to defeat charges of relativism through an appeal to the ability of scientists to make rational choices in the absence of a rule based methodology. However, failing an adequate account of how such choices are and should be made, there remains the objection that even under Kuhn's revised account such choices are essentially arbitrary.⁸¹ Consequently, there is no principled scientific method for theory comparison, at least along the lines Kuhn proposes.⁸²

78. Kuhn, *The Road Since Structure*, p. 91.

79. Andrew Lugg, "Feyerabend's Rationalism," *Canadian Journal of Philosophy* 7 (1977): 758.

80. Friedman, "Kant, Kuhn, and the Rationality of Science," *Philosophy of Science* 69 (2002): 184.

81. Martens and Matheson, "Incommensurability Pragmatized," p. 5.

82. This is likely one of the reasons Feyerabend stresses the need for the inclusion of extra-scientific factors towards 'judgements' of scientific theories. Read questions whether there is any substantial

Conclusion

The references to critics and their responses given above are only partial. Much more could be said. However, one can question the pragmatic value of the continuing discussion.⁸³ The more the defenders of the incommensurability thesis tighten up and clarify their claims - the more consistent and plausible they make the thesis - the less extension it has. In other words, to make the incommensurability thesis acceptable, its defenders must weaken its force.⁸⁴ And in such weakening its application can be questioned. In the end, despite its continued and avid defence, the incommensurability thesis has been weakened to the extent that it points but to practical difficulties with respect to theory comparison and not to any essential difficulty.

difference between semantic and value incommensurability. Kuhn's 'revised' value incommensurability claims that proponents of differing theories hold values to differing degrees, which accounts for the difficulty in theory comparison. But Read wonders what this amounts to apart from saying that particular values mean something different in the respective paradigm. Consequently, it could be argued (though Read does not make the point explicit) that value incommensurability is just as problematic as the earlier form. In other words, value incommensurability is more radical than Kuhn intended. See Rupert Read, "Is there another kind of incommensurability: Kuhn and 'incommensurability of values,'" <<http://www.uea.ac.uk/~j339/Incommensvalues.htm>>.

83. Bishop, for instance, argues the continuing discussion around reference and incommensurability is unlikely to reach resolution. See Bishop, "Why The Semantic Incommensurability Thesis is Self Defeating," *Philosophical Studies* 63 (1991): 347.
84. Hernandez-Iglesias claims that Kuhn has clarified the notion of incommensurability at the cost of its application and usefulness. See Manuel Hernandez-Iglesias, "Incommensurability without Dogmas," *Dialectica* 48 (1994): 29-45.

Incommensurability Localized

Many critics see the need to push the incommensurability debate to a different level. For instance, Matteo argues that with respect to the discussion of rationality the deconstructive phase of the debate should now pass into a constructive phase.⁸⁵ Hernandez-Iglesias claims that despite the failures of the incommensurability thesis the problems that gave rise to it have yet to be sufficiently explicated. "The problem remains of accounting for communication breakdowns produced by meaning-and-theory-changes without endorsing a version of conceptual relativism."⁸⁶ There is a tension inherent in accounting for rational theory comparison in the face of the difficulties presented by the incommensurability thesis.

The incommensurability thesis takes the practical problems of theory comparison seriously. No matter how one evaluates the thesis, no one can hold that theory comparison is trivial: theory comparison is, for instance, not a matter of a simple evaluation against the empirical record. Subsequent accounts of scientific rationality, whether accepting incommensurability or not, had to increase in sophistication. Furthermore, those that introduced the incommensurability thesis brought a new focus to the study of the history of science. The historical question of how scientists actually changed theories, and how theories actually developed internally, now became important in the normative evaluation of theory development. However, despite the strengths of the incommensurability thesis, it has been strongly criticized and the extreme version of it has

85. Anthony M. Matteo, "Grounding the Human Conversation," *The Thomist* 53 (1989): 235-258.

86. Manual Hernandez-Iglesias, "Incommensurability without Dogmas," *Dialectica* 48 (1994): 37.

been found untenable (as seen above). The strong version of the incommensurability thesis suggests that rational theory comparison is impossible. The existence and status of paradigms as cognitive bars to rational theory comparison and scientific progress has been strongly criticized.⁸⁷ Any plausible account of rational theory comparison, then, needs to incorporate the strengths of the thesis while avoiding its weaknesses.

The search for rational grounds for theory choice requires a different account of incommensurability. Such an account of incommensurability needs to explain how rational progress in science is possible. The errors with respect to accounts of progress are in the extremes: on the one hand, to say that rational progress is unproblematic is mistaken in that such a view ignores the difficulties often faced in theory comparison; on the other hand, to say that there is no rational progress in science is mistaken in that it ignores the commonly acknowledged presence of such progress and the historical reality that science often at least appears to progress rationally. What is required is an account of theory change and incommensurability that finds a balance between these extremes. Rational progress is often relatively straightforward to characterize (if not to obtain) but there are often real barriers in the way of such progress. These barriers require the development of new linguistic and conceptual resources to allow for the possibility of theory comparison.

87. Nola, for instance, claims that we tend to believe that science is progressive but we find it difficult to characterize this progress because of problems of reference. Robert Nola, "'Paradigms Lost, or the World Regained' -- An Excursion into Realism and Idealism in Science," *Synthese* 45 (1980): 318 - 319.

A key suggestion is made by Hoyningen-Huene in his analysis of Kuhn. Incommensurability between theories at a particular point in time does not imply that theory comparison is forever impossible. One can learn the vocabulary of the other theory. "A proponent of the old theory has to identify and learn those parts of the new conceptual vocabulary that are different from his own."⁸⁸ Incommensurability thus is a barrier only at a particular moment. Furthermore, learning a new vocabulary is different than being able to mechanically translate between the two theories.⁸⁹ As the new vocabulary is learned, avenues for theory comparison become available. While a point by point comparison is never possible, the fact that new vocabularies can be learned gives a ground to rational theory comparison even allowing for incommensurability. Kuhn, in explaining the roots of his beliefs, explains that the concepts of 'paradigm' and 'incommensurability' came to him as he was attempting to understand Aristotle's physics.⁹⁰ It was in his looking back and learning Aristotle that the difficulties in theory comparison became apparent to him. Since languages can be learned we have some reason to believe that rational theory comparison is possible, though in some occasions it will be extremely difficult. To defeat conceptual relativism we don't need to claim that all languages are translatable, as Davidson does, we just need to say that they are all learnable.⁹¹

The natural rejoinder to such a conception of incommensurability is that it then points to no

88. Paul Hoyningen-Huene, "Kuhn's Conception of Incommensurability," *Studies in the History and Philosophy of Science* 21 (1990): 489.

89. Ibid.. Such mechanical translation is barred by incommensurability.

90. Kuhn, *The Road Since Structure*, p. 16.

91. Hernandez-Iglesias, Manuel "Incommensurability without Dogmas," *Dialectica* 48 (1994): 29-45.

special or essential difficulty in theory comparison. Theories naturally develop in the face of difficulties and thus there is no need to posit any special notion, such as incommensurability, to account for the difficulties in assessing theory change. However, while the procedure of such 'normal' science is uncontroversial, there are occasions of radical theory change and dramatic shifts which such an account of normal science is unable to satisfactorily explain. A revised understanding of incommensurability can do better. Incommensurability, thus conceived, is not a lasting bar to theory comparison. Rather it explains why theories are impossible to compare at a particular point in time.

Feyerabend's position, despite the apparent plausibility of his views, is essentially and fundamentally problematic. The fundamental problem with his views is not, however, strictly concerning the logical consistency of his semantic holism. Nor is the difficulty in his resulting relativism. Recall that Feyerabend is committed to some notion of progress. His difficulty is in the static characterizations of what rational progress entails, since any conception of rational theory comparison limits progress. He has omitted from his views an account of what progress precisely involves. If he is to speak positively of any theory shift in the history of science he is obligated to provide the grounds of this judgement. He is reluctant to do so out of a fear of orthodox rigidity but it isn't clear that an account of rational theory choice must essentially be rigid or limiting. Thus, while Feyerabend has rightly listed the difficulties in theory comparison and while he has correctly demonstrated the dangers of rigidity in our accounts of theory comparison, he has overreacted to these problems. Instead of denying the possibility of rational

theory comparison, he should have attempted to provide an account which allowed for the difficulties and allowed for the flexibility that he so cherished.

Consider Kuhn. At no point does he explicitly accept charges of idealism or relativism. At no point does he intend to deny the possibility of rational scientific progress. He attempts to take seriously the concerns regarding the viability of theory comparison and develop an account that incorporates these concerns while remaining committed to explaining how scientific progress is justified. Whether or not he is successful in this attempt - and the discussion in the previous chapter has raised serious questions - is a separate question from the one of the viability of the attempt.

One could argue that all that is called for is a further refinement of the work of Kuhn. However, this would be to neglect a characteristic which a different account of the rationality of theory change should include: justification of theory change in the face of incommensurability. What justification can be made of theory change between incommensurates *before* new resources have been added to allow for rational theory comparison? Even though the final adjudication between rivals has yet to be determined, what suggestions can be made regarding the most promising route to follow?

Consider the case of the comparison between the Ptolemaic system of astronomy vs. the

Copernican system in 1600.⁹² This date is before the invention of the telescope and long before enough evidence had accumulated to make the choice moot.⁹³ We say now that Copernicus had the more promising theory. But this is of course due to the fact that there now is a wealth of evidence on Copernicus' side. Furthermore, while, in 1600, the Copernican system lacked a corresponding conception of (integrated) physics, the strength and acceptance of Newtonian dynamics gave the Copernican astronomy crucial corroboration.

But by the time of Newton the issue between the Copernicus and Ptolemy had largely been settled. Thus the help to Copernicus given by Newton was superfluous in this respect: Copernicus had already won. It was already clear that his was the theory which was rational to explore and refine. The real question with respect to incommensurability is what justificational account could have been provided at the time, in 1600, to support the pursuit of the Copernican programme despite its lack of 'full' or 'complete' rational support? In other words, even though it is true that in 1600 the two approaches were incommensurable, a successful account of theory comparison must suggest pragmatic reasons to the Copernican, on the basis of evidence present in 1600, that pursuing the Copernican programme will eventually turn out to be the rationally justified move. Thus, an alternative account of theory comparison should include the following: an explanation of how rational progress is possible (backwards looking explanation), and the ability to make suggestions regarding the appropriate course to pursue in the event of

92. For more information on the shift from Ptolemy to Copernicus, see Thomas Kuhn, *The Copernican Revolution* (Cambridge: Harvard University Press, 1957).

93. Martens and Matheson, p. 7.

incommensurability, indexed to a particular time, between competing theories (forwards looking justification).

Martens and Matheson make a related argument in favour of the development of a pragmatic version of incommensurability.⁹⁴ They demonstrate the failings of the existing accounts of incommensurability and theory change and they call for an account which would help a particular scientist evaluate the cost and benefits of research directions in the face of the difficulties of theory choice. When the choice between research directions is rationally indeterminate, due to practical but not essential differences between theories, which direction should the practitioner pursue to maximize benefits over costs?

Their key example is with respect to Aristotle.⁹⁵ It is certainly true that Aristotle would have difficulty understanding quantum mechanics; however, they question whether this difficulty is essential. While it is of course practically impossible for Aristotle to understand quantum mechanics, they deny that it would be logically impossible for Aristotle to do this given time and resources. The question for Aristotle is *why* he should spend the time to learn quantum mechanics. In other words, what can be said to Aristotle about the costs and benefits of investing the time and energy to understand an incommensurable theory? Martens and Matheson call for further investigation and work on what the assessment of such costs and benefits would entail.⁹⁶

94. Ibid..

95. Ibid., p. 20.

96. "[A new approach to incommensurability would require] developing a theory of epistemic rationality and appropriate formalism for deciding whether and when one should devote one's time

Despite the advantages of Martens' and Matheson's account there remain difficulties and important contrasts with the account of incommensurability sketched in this paper. First, they appear committed to a circularity. How can an individual assess the pragmatic virtues of a rival account unless that account is already understood and evaluated? In other words, the existence of a pragmatic assessment appears to presuppose that a rational theory comparison procedure is already in place.

Martens and Matheson are aware of this difficulty.⁹⁷ They offer no immediate solution but the belief that rough evaluation in the face of a 'radically incomplete knowledge' may be possible. They also know that scientists in these situations have at least some idea of what the rival programme has to offer. However, they are reluctant to connect this idea to a general account of theory comparison. They claim two tasks for the development of pragmatic incommensurability: historical analysis of the cases where incommensurability obtains (where they spend the most time in their paper) and the development of a formalism which would aid one in the choice between radically different theories (the remaining task).

However, Martens and Matheson do not connect this formalism to an appropriate account of that which makes scientific progress possible. Underlying their work is a problematic dualism. They

to learning more about another radically different theory." Ibid., p. 22.

97. Ibid., p. 21-22.

want to develop a pragmatic account of theory choice which is divorced from that which accounts for scientific progress.

The problem as they describe it - and their description appears largely accurate - is that there are two types of explanation required in theory comparison. First, we need to be able to explain scientific progress looking back. In what sense can we now say that the Copernican theory is superior to the Ptolemaic? Our answer here cannot be relativistic; though the theories were incommensurable at one point, this has been overcome. It is clear to us now that Copernicus had the superior theory. Second, we need to be able to promote scientific progress looking ahead. Though theories may be incommensurable at one point in time, we need to be able to suggest reasons why one direction is preferable to another.

The problem is that Martens and Matheson do not appear to see these tasks as essentially connected. Though the form of explanation in each case will have to be different, and though the pragmatic suggestions in the face of incommensurability will have to be revisable (in a way that the other type of explanation is immune), each type of explanation must be connected to the same understanding of what epistemic rationality is. Otherwise we allow for a radical divergence between what is rationally justifiable, at a particular moment, to an individual and what will in the end prove justifiable.⁹⁸

98. It is true that any account of rational action, in the absence of appropriate evidence, is in principle revisable. However, if such a dualism is allowed then these pragmatic judgements will not be revisable. Such judgements would stand independent of that which will make the theory rational.

Alternative Ways to Continue

In the quest for such an alternative account it is important to consider alternatives already present. There have been attempts made to move the discussion regarding theory comparison in different directions. We will now consider two such attempts.⁹⁹ In particular, we will evaluate, albeit in abbreviated form, how successful each is in accounting for both forward looking and backward looking justification and whether their accounts can avoid a dualism in epistemic justification.

Lakatos

Lakatos, in his account of rational theory choice, does not work with individual theories and experiments but he rather considers them under the larger framework of the notion of research programmes. Characteristic of all programmes is a defended hard core with a flexible belt of auxiliary hypotheses and the corresponding heuristic. The hard core is the unchanging centre of the research programme. The auxiliary belt is the flexible, protective part to the research programme; it changes to account for problems and anomalies. All programmes have ‘unsolved problems and undigested anomalies’; we can say that all programmes are in some sense refuted.¹⁰⁰

The flexibility of the protective belt is evident in Newton's theory. Historically, scientists

99. These three are not an exhaustive list of the possible such accounts that could be considered. Rather, these three accounts function to illustrate and illuminate further the claims already made.

100. Imre Lakatos, *The Methodology of Scientific Research Programmes* (London: Cambridge University Press, 1978), p. 5.

assumed his theory of gravitation to be true even after the motion of Neptune appeared to contradict it. They suggested the existence of an undiscovered planet to account for the irregularities of Neptune's orbit. The positing of a ninth planet is an example of a protective, auxiliary hypothesis to the core of Newton's theory.

Lakatos distinguishes between two kinds of research programmes: progressive and degenerating. Rather than examine a proposition in isolation we need to look at how propositions change within a theory, and how theories change within a programme, to discern if a programme is progressive. A progressive programme accounts for the results of rival programmes, accounts for some of the problems of rival theories and leads to new discoveries. Novel facts play an important role in this discernment process. A programme is progressive if the succeeding theories in it predict novel facts and if at least some of these predictions are confirmed.¹⁰¹ A degenerative programme is simply one that is not progressive.

For example, Einstein's programme is superior to Newton's since it not only accomplished all that Newton's programme did but also explained more (in the form of novel facts) and some of this excess content has been confirmed.¹⁰² Conversely, Galileo's theory of circular planetary motion had no new content; no further development of his theory is possible because it neither predicted anything new nor set any limits. This theory is thus degenerative; "this theory was

101. Ibid., p. 34.

102. Ibid., p. 39.

therefore ad hoc and therefore - from the heuristic point of view valueless."¹⁰³

Progress is the crucial issue. According to Lakatos, we need to distinguish between progressive and degenerative research programmes and in doing so we replace "the central problem of classical rationality, the old problem of foundations, with the new problem of fallible-critical growth."¹⁰⁴ In essence, Lakatos believes he can account for the problems which incommensurability presents and yet maintain standards of rationality in science by examining theories not in isolation but in their relationship to each other in time.

To help distinguish between progressive and degenerating programmes, Lakatos uses the notion of heuristic. Research programmes include a heuristic, "a powerful problem-solving machinery."¹⁰⁵ This heuristic takes irregularities and explains them with respect to the hard core. There are two kinds of heuristic: negative and positive. Negative heuristic demands creation of auxiliary hypotheses to protect the hard core against anomalies. Then we direct our investigation towards this belt. This subsequent investigation leaves the hard core alone. "It is the protective belt of auxiliary hypotheses which has to bear the brunt of tests and get adjusted and re-adjusted, or even completely replaced, to defend the thus-hardened core."¹⁰⁶ If this process is successful the programme is progressive, if not, it is degenerative. Negative heuristic concentrates on the

103. Ibid., p. 40.

104. Ibid., p. 91.

105. Ibid..

106. Ibid., p. 48.

refutations of a particular theory in the programme.

Positive heuristic focuses not on the refutations but rather on the positive predictive power of the hard core. Models are created from the verifications of the hard core with each model more complicated than the last. Positive heuristic ignores refutations and flows from the 'heuristic power' of the hard core. "We may appraise research programmes . . . for their heuristic power: how many new facts did they produce, how great was their capacity to explain their refutations in the course of their growth?"¹⁰⁷ Positive heuristic focuses on the theoretical capacity of a programme to explain refutations rather than on the particular refutations themselves. Neither positive nor negative heuristic are driven by logical necessity. The guiding force behind research programmes is our ability and ingenuity to move them forward.¹⁰⁸

Lakatos refers to history to support his claims but he makes a distinction between the actual history and a rational reconstruction of that history - between examining the process of discovery as it happens and the explanation of growth after the fact. For Lakatos, the latter is more significant than the former. "We stressed the objective connection and development of ideas and did not investigate the fumbling way in which they originally became conscious - or

107. Ibid., p. 52.

108. Lakatos dramatically demonstrates the development on mathematical research programmes in his book *Proofs and Refutations*. Imre Lakatos, *Proofs and Refutations : The Logic of Mathematical Discovery*, (Cambridge: Cambridge University Press, 1977). The book consists of a classroom dialogue between a teacher and a number of students. They begin with a particular mathematical theorem and a particular proof of the theorem. By successive applications of both negative and positive heuristic they build up more powerful interpretations and understandings of the theorem. The dialogue is a parody of the actual developmental process that took place with respect to the same theorem.

semiconscious - in subjective minds."¹⁰⁹ He stresses that this reconstruction, despite the stress on 'objective connections,' does not deviate from the actual history.

Lakatos' work has often been found to be problematic. Still, the main task here is to determine how well Lakatos' work meets the above stated criteria: explain how rational progress is possible, and suggest rational courses of action in the face of incommensurability. Laudan's difficulty, for instance, with Lakatos is partly that Lakatos doesn't respect the history of the practice enough. The problem is that Lakatos does not work within the actual history of the practice but within a rational reconstruction of the history, and thus not adequately grounded in what scientists actually do.¹¹⁰ If a practitioner is enterprising enough, one can make any research programme look respectable through rational reconstruction.¹¹¹ Lakatos achieves his account of theory choice at the expense of disconnecting his work from scientific practice.¹¹²

Lakatos rejects the incommensurability thesis as it is a bar to rational theory change. If two theories were consistent but not content comparable, then there are no rational grounds for theory comparison. Miner points out, though, that this is not so much an objection as it is a statement of

109. Imre Lakatos, *Mathematics, Science and Epistemology: Philosophical Papers Volume 2* (Cambridge: Cambridge University Press, 1978), p. 83.

110. "Whatever the outcome of that appraisal [after rational reconstruction], however, the historical episode itself remains untouched and unexplained" Laudan, *Progress and Its Problems*, p. 169.

111. Larry Laudan, "Demystifying Underdeterminism," in *Philosophy of Science: The Central Issues*, eds. Martin Curd and J.A. Cover, (New York: W.W. Norton & Company, 1998), p. 139.

112. Laudan also claims that Lakatos has an overly strict criteria of progress. To be a part of a research programme, Lakatos claims that a successor theory must include all of the empirical results of the prior theory. But this requirement is, according to Laudan, historically untenable. See Laudan, *Progress and Its Problems*, pp. 76-78.

difference.¹¹³ Lakatos assumes that rational progress is possible and he claims that incommensurability denies that such progress is possible. The difference is clear, but unless Lakatos can account for the problems which incommensurability presents he hasn't presented an objection to the claims of the incommensurability theorists.

Still, Lakatos argues that since theories are rationally comparable, when rationally reconstructed, there is no ground left for incommensurability. The key, as Miner points out, is that the history must be rationally reconstructed.¹¹⁴ Theories as they stand may be incommensurable but Lakatos claims that he can place such theories in proper logical relationship, allowing for rational comparability, through his alteration of the history. Also, it is worth noting that Lakatos saw nothing essentially problematic in such an alteration: "Respectable historians sometimes say that the sort of 'rational reconstruction' here attempted is a caricature of real history - of the way things actually did happen - but one might equally well say that both history and the way things actually did happen are just caricatures of the rational reconstruction."¹¹⁵ In other words, there is no priority to be given to the 'actual' history.

This dualism is not dissimilar to the account given by Matheson and Martens. They separated the task of rational theory comparison into two parts: what we need to explain looking back over the history and what we can suggest to a practitioner in the face of the problems of

113. Robert Miner, "Lakatos and MacIntyre on Incommensurability and the Rationality of Theory-Change," <<http://www.bu.edu/scp/Papers/Scie/ScieMine.htm>>, p. 3.

114. Ibid..

115. Lakatos, *Mathematics, Science and Epistemology: Philosophical Papers Volume 2*, p. 4.

incommensurability. Lakatos, in effect, makes the same move. Rationally reconstructed history attempts to explain how rational progress in science occurs but only in retrospect (we cannot reconstruct history before it occurs). While Lakatos is aware of the other task, he denies its importance. "... History can only be rationally understood in the light of such reconstructions."¹¹⁶ Lakatos denies incommensurability by avoiding the problem scientists face in theory choice in the moment.¹¹⁷

A further concern is whether Lakatos, even granting rational reconstruction, has the resources to grant rational theory choice. Lugg claims that Lakatos' work is problematic on exactly this point. Lakatos can sort out progressive programmes from degenerating ones but according to his terms one can rationally hold to a degenerative programme even after it has been overtaken by its rival.¹¹⁸ Thus, on his own terms, Lakatos has not dealt sufficiently with the incommensurability problem. This is, of course, Feyerabend's objection as well. He claims that Lakatos, while he can label programmes 'progressive' or 'degenerating,' cannot rationally bar a degenerating programme since *it may recover* (Lakatos acknowledges this as a possibility). But since a degenerating programme may eventually become progressive, Feyerabend denies that one can bar degenerating research programmes from rational status. Lakatos has both revised the actual history and overstated his case: his arguments for the existence of progressive programmes, and

116. Ibid., p. 87.

117. In fact Lakatos abandons scientists to 'Feyerabendian' freedom in the moment in the face of theory choice. His difference with Feyerabend with respect to such choice is to claim that scientists must be prepared to have their choices judged, after the fact. see Ibid., p. 110.

118. Andrew Lugg, "Feyerabend's Rationalism," *Canadian Journal of Philosophy* 7 (1977): 757.

the determination of them, could potentially serve as a pragmatic indication of a helpful research direction. But as a normative ground for rational theory choice, Lakatos falls short.

Lakatos then fails to fulfill the stated requirements of a rejuvenated approach to rational theory choice. First, there are doubts since he works not within 'actual' history but within a reconstructed version of history.¹¹⁹ Any account of rational theory change should at least attempt fidelity to the historical record, both since that is the object requiring explanation and to avoid the immediate suspicion that the history can be reconstructed (caricatured?) in any fashion one chooses.¹²⁰ Second, there are doubts as to Lakatos' success at explaining scientific progress since, even granting his reconstruction, he cannot provide grounds to conclusively bar pursuit of degenerating programmes.¹²¹ Finally, he purposely neglects to offer advice to the theorist facing the issues of incommensurability. Recall that rational reconstruction can only take place after the fact so Lakatos is, in effect, offering only backwards looking justification. He can claim that theories can be judged on the progressiveness of the programmes of which they are a part but since the test of such progressiveness depends on the future confirmation of

119. Notwithstanding Lakatos' rebuttals to this objection (since he was well aware of it). Lakatos can, for instance, claim that the object requiring explanation is the rational reconstruction (since the various accidents of history may not have much to do with the logical connections between the theory parts and its evidence). But it appears to be an *ad hoc* choice to reconstruct the history in such a way that demonstrates connection since it assumes, rather than shows, that such connections exist. Furthermore, in divorcing his account from the various accounts of history the practical value of his work for scientists is questionable.

120. This is not to claim that an attempt to work with actual history is unproblematic (there may be all sorts of barriers which hide real history from us) but the problem here is that Lakatos doesn't see any value in the attempt.

121. This criticism is connected to the first. Feyerabend's critique of Lakatos here is clearly intended to advance his own claim that any caricature of history works (Lakatos hasn't rationally explained anything).

novel fact predictions, one can only make such judgements in retrospect.¹²²

Laudan

Laudan's work is intended to show how rational debate and consensus can arise in science. He claims that his work is a fresh approach to philosophy of science.¹²³ Rather than try to make a minor revision to the traditional analysis, or to abandon the possibility of rationality in science, he will 'begin afresh' and hope to avoid the problematic assumptions made by traditional analysis.¹²⁴ He claims that the plausibility of Kuhn's and Feyerabend's work on incommensurability arises out of the false dogma that for science to progress, successor theories must (at least) be able to explain *all* of the empirical content of their predecessors.¹²⁵ Kuhn and Feyerabend have 'support' in that science often fails to display this sort of progress.¹²⁶ But the grounds for this support, and the plausibility of their work, falls away once we re-examine what progress is.

Previous attempts to explain rational theory choice have been problematic. Hierarchical models of scientific justification, such as Popper's and Hempel's, don't allow for debate of the goals of science themselves since goals are at the top of the hierarchy.¹²⁷ Laudan claims that such goals

122. This criticism is notwithstanding further concerns regarding the integrity and demarcation of programmes themselves.

123. Laudan, *Progress and Its Problems*, p. 3.

124. For instance, he notes that Lakatos is problematic since he calls for but a minimum change to Popper's claims. *Ibid.*, p. 4.

125. Larry Laudan, "Two Dogmas of Methodology," *Philosophy of Science* 43 (1976): 585-597.

126. *Ibid.*, pp. 587-591.

127. David Resnik, "Repairing the Reticulated Model of Scientific Rationality," *Erkenntnis* 40 (1994): 344.

must be revisable. Conventionalists, like Kuhn, cannot hold rational theory debate unless there are pre-existing conventional agreements. Thus, Kuhn is essentially relativistic: in the absence of such agreements there is no ground for rational theory debate. Hierarchical conventionalists, like Popper and Kuhn, attempt to ground rational theory debate through goals, even though these goals cannot themselves be justified. According to Laudan this does not sufficiently ground rational debate in that scientists can agree about methods even when they disagree on goals.¹²⁸ If shared goals were the sole ground for such debate, rational agreement about methods would be impossible.

Consequently, Laudan claims that Kuhn's position needs to be modified in two important ways: first, there needs to be an acknowledgement of the back and forth justification between methods and goals, that is, of the reticulated model against the hierarchical. Second, there must be acknowledgement that paradigms are not rigid entities;¹²⁹ the values of a particular paradigm can be revised and its elements can be replaced without the wholesale rejection of the paradigm itself. The second modification deals with what Laudan calls 'uncompromising' holism. Laudan contends, contra Kuhn, that when one analyses the historical record, one finds that shifts in values and in theories do not always go together.¹³⁰ "[Laudan] argues that meeting the relativist challenge requires a naturalist metamethodology that grounds normative methodology in

128. Ibid., p. 345. Though he here appears to argue that this is a theoretical possibility rather than point to historical exemplars.

129. Larry Laudan, "Dissecting the Holist Picture of Scientific Change," p. 144.

130. Ibid., p. 150.

empirical facts about means to epistemic ends."¹³¹ Kuhn's conditions for scientific revolutions do not obtain. Laudan is, in effect, a scientific optimist: the difficulties to which Kuhn refers are but a chimera.

Laudan suggests that progress is better understood as movement towards the cognitive goals of the activity. Consequently, theories can be rationally compared even if their content is mutually untranslatable (incommensurable). He suggests that we can simply count the number of solved problems within each theory.¹³² The importance of problems is to be weighted solely by their epistemic significance to the theory; the social value of problem solving is of no concern.¹³³ The theory with the higher number of solved problems, appropriately weighted, is the more rational theory to pursue.

Central to Laudan's work is the claim that progress and rationality are not distinct terms. "My basic strategy in what follows will involve the blurring, and perhaps the obliteration, of the classical distinction between scientific *progress* and scientific *rationality*."¹³⁴ For Laudan, rationality is dependent on progress and not vice versa. We can measure progress in science and therefore also rationality by means of the number of weighted solved problems. Thus the goal of science is to solve as many problems as possible. Rationality and progressiveness are linked by

131. Howard Sankey, "Incommensurability - An Overview," <http://www.hps.unimelb.edu.au/staff/staff_papers/howard/Incommensurability.PDF>, p. 12.

132. Larry Laudan, "Two Dogmas of Methodology," *Philosophy of Science* 43 (1976): 595.

133. Larry Laudan, "Dissecting the Holistist Picture of Scientific Change," p. 164.

134. Laudan, *Progress and Its Problems*, p. 5.

problem solving effectiveness. Like Feyerabend and Kuhn, he accepts the presence of non-scientific, non-empirical factors in science; unlike them, he claims that these factors play a role in rational progress in science.

Laudan attacks the incommensurability problem by accepting its negative claims, that theories can be such that their contents are not mutually translatable into each other or into a third neutral language, but denying that this implies the theories are not rationally comparable.¹³⁵ Theories can still be compared: by their problem solving ability in cases where the problems can be characterized independently of the theories, and by their progressiveness which is determined internally to each theory.

Hintikka implicitly supports Laudan. He defines the commensurability of two theories as the ratio of shared answers to the total answers of the theories combined, and as a result incommensurability does not imply untranslatability.¹³⁶ His claim is that the claim that incommensurability entails untranslatability is a simple tautology. Given a case in which rival theories are translatable, they can still be incommensurable in terms of their ability to solve problems. Theories are incommensurable if they solve different problems, that is, if they have different deductive consequences. He acknowledges that there will be little historical evidence of this consequential incommensurability since most theories are designed to solve the problems of

135. Ibid., p. 142.

136. Jaakko Hintikka, "On the Incommensurability of Theories," *Philosophy of Science* 55 (1988): 25-38.

their predecessors.¹³⁷ So he claims, in a way similar to Laudan, that incommensurable theories can be compared on the basis of their problem solving ability.

Laudan's work has been criticized for a number of different reasons. Butts takes issue with Laudan on his refusal to give scientific activity a privileged place.¹³⁸ Laudan is prepared to discuss the problem solving ability of any sort of activity but Butts believes this to be problematic: he can't accept a description of rational activity which doesn't discriminate between types of activity. Other types of criticisms are possible but the issue here is how well Laudan's account fits with the requirements named earlier for a different account of theory comparison: rational progress, and pragmatism in the face of incommensurability.

For Laudan, the measure of progress, and thus of theory comparison, is problem solving ability. Giere argues that this approach neglects the real method by which we judge theories.¹³⁹ Theories are accepted if they are judged to be true, and problem solving ability is a consequence of the truth value of a theory and not the other way around. Furthermore, Laudan claims that justification flows back and forth between methods and goals. Goals are justified through their realizability. Laudan criticizes the realist since we can't know if their goals have been achieved.¹⁴⁰

137. He does make his connection to Laudan explicit. See Jaakko Hintikka, "On the Incommensurability of Theories," *Philosophy of Science* 55 (1988): 30-31.

138. Robert E. Butts, "Scientific Progress: the Laudan Manifesto," *Philosophy of the Social Sciences* 9 (1979): 478.

139. Ronald N. Giere, "Philosophy of Science Naturalized," *Philosophy of Science* 52 (1985): 338.

140. Larry Laudan, *Progress and Its Problems*, p. 127.

Resnik points out, however, that it is consistent to pursue epistemically utopian goals.¹⁴¹ For example, the Darwinian goal of using natural mechanisms to explain biological adaptation was utopian at the time. Also, the goal to find a single general theory in physics and quantum mechanics can be considered utopian yet it is still rational. Furthermore, one can never achieve perfect health but this does not mean that the goal is irrational to pursue. Utopian goals are naturally hard to measure progress against. Without knowing what perfect health is, or what the unified theory is, it is difficult to know if we are on the right track. But the pursuit of utopian goals is essentially connected to realism and truth in enquiry. In contrast, Laudan abandons truth altogether and makes progress the singular virtue of enquiry.¹⁴² Success is then simpler to measure, since progress is the sole criterion.

Another way to put the issue is whether Laudan has the resources to provide forward looking justification - the purported strength of his account - in that we don't have a sense of which program will end up being the best problem solver. The success of his pragmatic account depends on the connection of problem solving ability of a theory at a particular time to the eventual judgements of the problem solving ability of a theory. A realist account could

141. David Resnik, "Repairing the Reticulated Model of Scientific Rationality," *Erkenntnis* 40 (1994): 349.

142. Laudan's criticism of realism with respect to goals is confusing given his parallel defence of engaging in a practice when its rules are only partially understood. Criticism of such activity "rests on the mistaken assumption that one can effectively engage in a practice (like doing empirical research) only when the rules codifying that practice have already been made fully explicit." Larry Laudan, *Science and Relativism* (Chicago: The University of Chicago Press, 1990), p. 96. One wonders then why it is problematic to pursue goals in an enquiry if they haven't been made fully explicit.

potentially solve this problem since the eventual problem solving success of a theory would follow from the truth of the theory. However, the debate with respect to realism lies beyond the scope of this paper.

Conclusion

This chapter has made a number of key claims. First, the moves and counter moves made with respect to the 'standard' presentation of the incommensurability thesis are problematic. Strong versions of the incommensurability thesis are problematic in that they entail implausible essential problems in meaning translation between theories and they are historically undersupported. Strong denials of incommensurability are also problematic in that the thesis does point to particular problems in theory comparison. The moves and counter moves highlighted in chapter one do nothing but highlight both the plausibility and implausibility of the incommensurability thesis without bringing the debate to any form of resolution.

Second, incommensurability should be recognized not as an essential problem but rather as a problem of theory comparison at a particular point in time. Theories may lack the resources for rational theory comparison at one point but this does not mean that the required resources cannot be developed in the future. Consequently, incommensurability is primarily a problem when one wants to pick a future direction and not as significant a problem with respect to justification after the fact.

Third, a well grounded account of theory comparison explains how progress is possible (justifies

theories in retrospect), and can make pragmatic suggestions with respect to future research directions in the face of the problems of incommensurability (justifies theories in advance). In other words, a robust account of theory comparison needs to provide forward looking and backward looking standards of theory comparison.

Finally, Laudan and Lakatos' work has been briefly examined to show how they fail to live up to the above mentioned standards. Both see incommensurability as a problem and attempt to dissolve it. Laudan's pragmatism addresses forward looking justification in the face in incommensurability but he fails to distinguish, or he doesn't notice the difference, between this type and retrospective justification of theories. Lakatos addresses rational retrospective justification, but he has little to offer in cases where forward looking explanation is required. Both Laudan and Lakatos make no distinction between the different types of justification and for both of them, what they do address is incomplete.

Incommensurability and Theology

In this chapter we will be exploring the refined look at incommensurability through an examination of a case study. And while a case study within the field of science would perhaps be the most natural choice, we will use an example from the discipline of theology. The contention here is that theory comparison is an issue not only within science but also in other disciplines; a particular theology is judged on standards of accountability not unlike those in science. Consequently an examination of a theological debate can serve to illustrate the themes developed in the last chapter.

Still, there are difficulties inherent in using a theological debate to illustrate a debate in philosophy of science. Three of these such difficulties are pro-scientific (or anti-theological) epistemological bias, the characterization of theological progress, and the structure of the discipline of theology.

First, there is a presumption among scientists and philosophers that scientific theories (however one characterizes them) are epistemologically privileged. As a result of this, it is (pragmatically) problematic to use a theological case study in that its claims are, by their theological character, difficult for scientists and philosophers to accept. The issue is that theological claims seem to be on more shaky epistemological grounds than the scientific ones. We will represent the claims that theologians make as accurately as possible and recognize a parallelism in the reasoning used in both science and theology. If a parallel approach to reasoning exists between the disciplines

then the use of a theological case study can inform a philosophy of science discussion without the basic truth claims of theology becoming an issue. Furthermore, by focusing on textual interpretations and accounting for history, we will develop a sense of what the observables are and a sense of what would count as a good theory about these observables in theology. Consequently, we will examine theological debate structurally, exploiting the similarity in reasoning to illuminate the criteria for theory comparison developed in the last chapter.

Second, especially within the incommensurability debate, any precise account of what scientific progress amounts to is perhaps contentious. Still, there is a basic intuition that science progresses (whatever we mean by progress in the end). Even for a skeptic such as Feyerabend, the issue is not so much whether science progresses as whether we can characterize such progress as adhering to set standards. The intuition that science today is more successful than it was in the past (at least in the broad stroke of history) is strong.

Progress in theology, however, is much more controversial. This is partly due to the lack of much basic agreement in the field regarding what constitutes a successful theology.¹⁴³ As a result, despite the difficulties presented in the philosophy of science, progress in theology is even harder to characterize. Difficult, but not impossible. An initial suggestion (which is consistent with the works to be presented below) is that theology has as its goal the accurate representation

143. The trend in theology has arguably been to abandon empirical claims to science. It is difficult to say whether this was the cause or consequence of the fracturing of the disciplines. The claim here is that, whatever the cause, the separation of science and theology has made it difficult to characterize theological progress.

of God and God's will for us. Such representations are to have their adequacy measured both against the biblical record and in the context of the history of the interpreting community. In the course of working with these measures, problems both practical and theoretical will develop. New information can be found which causes previous biblical interpretations to be revised (Dead Sea Scrolls for instance). Contemporary social challenges and issues (abortion, war, etc.) present practical problems which a theology should address. A test of the progressiveness of a particular theology will involve the solutions to both types of problems.¹⁴⁴

While the existence of God will no doubt be a problem for many philosophers and scientists, the discussion below will focus more closely on the tests for adequacy than on the existence of God. An example of such a test would be whether a theology provides an accurate interpretation of the biblical record. These tests function within theology in a way similar to how tests of empirical adequacy function in science. In other words, progress in theology is functionally similar to progress in science and can be discussed absent considerations of the existence of God.¹⁴⁵

One final issue in the use of theology in a discussion of philosophy of science has to do with how

144. It is not suggested here that this is the only way that theology can be (or has been) characterized. This formulation of the goals of the discipline are consistent with the theologies to be presented and it is helpful in establishing the existence of parallel reasoning in science and theology.

145. It may appear that I am here making idealist claims myself, since I am 'avoiding' the central realist claims that theology makes. (It doesn't matter if God exists. As long as theology and science use parallel reasoning, the cross disciplinary use of a theological case study is justified). However, the claim here is but that cross evaluation of the realist claims in theology and science (ex regarding the existence of God) are important but beyond the scope of what I am attempting. The issue at present is not the status of competing realist claims but rather how such claims function within the respective disciplines but this does not imply that the status of such claims is not itself an important issue.

theology understands itself. The language of incommensurability is couched in terms of 'theory.' The issue of what a theory is (and what it contains) in science is again contentious in the details but in broad strokes it is relatively straightforward. Theology is harder to compartmentalize in terms of theories. While a 'theology' does function like a theory in science, the similarity is not exact. Science and philosophy of science are themselves understood to be separate disciplines with separate roles (one is a practical discipline where the other is concerned with reflection on practice). In theology, the roles of the practical and the reflective are combined more directly than they are in the scientific world.¹⁴⁶ This is not to say that a theology is not similar to a theory in science but rather that the connection, or parallel, may not be immediately apparent.

In general, rough, preliminary terms then, the parallels between scientific and theological enquiry are as follows: first, God's will in theology functions as unobservables do in science. Second, the entire revelation of God to humanity, primarily the biblical record, functions as observables do in science.¹⁴⁷ The data requiring explanation is then not simply the biblical record but also includes contemporary issues arising in the Christian church. In each discipline then, theories or theologies are developed to make the best sense of the observables.

146. It is not suggested here that practice and reflection are completely separate in scientific enquiry. Rather, the claim is that they are more connected in theology than they typically are in science.

147. While it may seem problematic to speak of God's revelation as an observable, the Christian contention is that the biblical record, while the primary record of such revelation, is not the exclusive such record. To speak then of God's revelation is to say that God is an active agent in human history. This in no way diminishes the associated Christian claim that the biblical record is the clearest and most direct account of God's revelation. It is also true that it is difficult to determine or properly characterize God's revelation - whether expressed in the Bible or elsewhere. But this is not structurally a worse problem for theology than the proper characterization of observables is in scientific enquiry.

Theological and Historical Background

In this chapter we will be examining a theological debate between James Reimer and Denny Weaver, two contemporary Mennonite theologians. But in order to make the discussion clear, we will first briefly go over some of the important theological and historical background to this debate. This background would be acknowledged by both as generally accurate, so it forms both an introduction to further discussion and an indication of where the common grounds between the two lie. The four important areas of theological and historical background are the early church, the role of the Emperor, the church council at Nicea, and the history of the Anabaptist movement.

Early Church

By the early church, we mean the Christian church as it existed soon after the time of Jesus and before the church became accepted in Rome (roughly 33-311 A.D.). The church in this period existed independently of the Roman power structure. The church began with a largely Jewish organizational structure and while this slowly changed in this period - as more and more Gentiles became Christians - the vision of the church as a rival to the pagan Roman society remained constant. Much of this Christian distinctiveness was enforced as Christians had to fear persecution and were barred from places of influence in Roman society. Still, this separateness from the state was understood to be part of what Jesus had called the church to be.¹⁴⁸

148. See Christopher Rowland, *Christian Origins* (London: Cambridge University Press, 1985).

Constantine/Constantinian Shift

Constantine seized power as emperor in a decisive battle by the Milvian bridge in 311. Prior to the battle he had a vision of the cross with the words "by this sign you will conquer." He took this to be an endorsement of his bid for power by the Christian god. One of his first acts, then, after his victory was to legalize Christianity, end persecution, and return property that had been seized. He went on to fund building projects in Christian holy places (his mother travelled to Jerusalem and established the now traditional sites of Jesus' birth, death, and resurrection).

Constantine's actions turned the understanding of the church prevalent before his time on its head. The church had understood itself as a competing social vision to the rest of society, but after Constantine the church made itself subservient to the interests of the state.¹⁴⁹ So the issue after Constantine is whether the church can function as a critic of the state if its interests are tied in now with the success of the state (in ways absent in the first centuries of the church). The tie between church and state which began with Constantine continued in the middle ages as the church again and again understood itself in a socially conservative role.¹⁵⁰

Nicea

Once Christianity was legalized the church began to sort out doctrinal differences which had previously been less significant. The council at Nicea was called in an effort to sort out,

149. It is clear from a brief examination of the history that this analysis is somewhat simplistic - Constantine himself was not solely responsible for all the changes here attributed to him - suffice it to say that he was the foremost person in a process that took much longer.

150. See John Howard Yoder, *The Royal Priesthood* (Scottsdale: Herald Press, 1998). See also Henry Chadwick, *The Early Church* (London: Penguin Books, 1967).

systematically, what Christian belief entailed. As a previously persecuted movement there had grown a wide variety in belief (much greater than exists today) as there were no resources in place to resolve differences. Also, in their exposure to the Roman world, many Christians saw the need to express basic beliefs in categories and terms which the wider neo-Hellenistic world could understand. This led to various disagreements over who Jesus was. Some groups saw Jesus as a human, endorsed by God but of a different ontological order. Others saw Jesus as God and denied his humanity (including the veracity of the various Gospel narratives). The council of church leaders at Nicea settled on a description of Jesus as fully human and fully divine and developed an orthodox Trinitarian ontology (one God with three 'parts') which has been foundational for Christians through most of their history.¹⁵¹

Anabaptism

Anabaptism was an offshoot of the Reformation movement in the 16th Century. Anabaptists (re-baptizers) are difficult to characterize simply but generally saw themselves as enacting the principles of the Reformation more fully than the mainline reformers (they are sometimes called the radical reformation). They understood themselves as recovering a vision of the Christianity of the early church (freed from state control). Anabaptists were persecuted by the mainline churches from their beginning and have migrated to find places where they can practice their beliefs without interference. Pacifism and the baptizing of adults have been two distinctive marks of Anabaptism throughout their history.¹⁵²

151. See Henry Chadwick, *The Early Church*.

152. See Cornelius Dyck, ed., *An Introduction to Mennonite History* (Scottsdale: Herald Press, 1981) and C. Arnold Snyder *Anabaptist History and Theology: An Introduction* (Kitchener: Pandora Press, 1995).

The Debate

The debate between Reimer and Weaver begins in 1983 with an article Reimer published in 1983 titled "The Nature and Possibility of a Mennonite Theology."¹⁵³ In this article he argues that modern Mennonite theology has uncritically accepted modern assumptions regarding historicism.¹⁵⁴ Such theology has understood Christian claims in the context of the Mennonite and larger Christian story but Reimer questions whether a historical theology is sufficient to articulate God's will. He asserts that the focus of the Mennonites on history has cost them a meaningful ground from which to make claims about Christianity. Mennonites need to work at systematic theology based on universal truth in order to both ground their particular claims about the Christian life and in order to have productive ecumenical conversation. "Systematic theology, much like traditional philosophy, is by definition concerned with questions concerning the whole, with a compulsion to bring some kind of order into all of human experience."¹⁵⁵ Consequently, a key concern for Reimer is theological scope which is needed to both explain where Mennonites have been successful in the past and allow for future progress.

What would such a systematic theology include? Throughout his work, Reimer has consistently called for Mennonites to ground their work in the trinitarian, orthodox theology of the Catholic

153. A. James Reimer, "The Nature and Possibility of a Mennonite Theology," *The Conrad Grebel Review* 1:1 (1983): 33-56.

154. It should be noted here that Reimer's undercuts his critique of historicism with his other claims. There is thus a question of consistency which will not be directly addressed here.

155. A. James Reimer, *Mennonites and Classical Theology: Dogmatic Foundations for Christian Ethics* (Kitchener: Pandora Press, 2001), p. 193.

church rather than in the historical particularity of Mennonite history. It is important to note that the continuity he claims with orthodoxy (somewhat surprising for a Mennonite theologian) comes not from any desire to set aside areas of standard Mennonite interest (pacifism etc.) but rather from the desire to place the 'Mennonite distinctives' on a sound ideological foundation. Mennonites have displayed a problematic anti-doctrinal bias in their theological thinking but the existence of many Mennonite confessions of faith gives Reimer cause to hope in that he sees it as time that Mennonites move beyond their sectarian past.¹⁵⁶ Reimer recognizes that a theology which focuses on the universal categories of truth faces the danger of devaluing particular ethical concerns, but he maintains that a recognition of the universal character of the orthodox tradition properly grounds all theological work (from any historical perspective). Right belief is, for Reimer, the ground for right action.

Trinitarian orthodoxy arose out of the confrontation of the Hebraic biblical tradition with the philosophical understanding of the Greek world. The early Christian tradition needed to adapt to meet the challenge of Greek universal thought.¹⁵⁷ For Reimer, Mennonites should not understand themselves as historically distinct; "We are first and foremost Christians engaged in Christian theological reflection."¹⁵⁸ This means that there isn't a radical discontinuity with the orthodox

156. See A. James Reimer, "The Theological Framework for the Authority of the Scriptures," *The Conrad Grebel Review* 4:2 (1986): 132 and A. James Reimer, "Toward Christian Theology from a Diversity of Mennonite Perspectives," *The Conrad Grebel Review* 6:2 (1988): 147-160 and A. James Reimer, "How Modern Should Theology Be? The Nature and Agenda of Contemporary Theology," in *The Church as Theological Community: Essays in Honour of David Schroeder*, ed. Harry Huebner (Winnipeg: CMBC Publications, 1989), pp. 171-198.

157. A. James Reimer, "Doctrines: What are They, How do They Function, and Why do We Need Them?" *The Conrad Grebel Review* 11:1 (1993): 28.

158. Reimer, "Toward Christian Theology from a Diversity of Mennonite Perspectives," p. 147. In a later

tradition in that they are engaged in the same task or project.

I propose that Christian theology might most fruitfully perceive its role in the University apologetically - that is reflecting critically upon itself, seeking to determine the truth about itself and its responsibilities in the contemporary world, and giving rational account of itself in the public arena of intellectual debate, that is, a post-modern apologetic.¹⁵⁹

This engagement in the public arena is what led to the orthodox trinitarian account of Christianity. In response to growth within the Greek/Roman world the orthodox doctrines were developed which connect the life of Jesus to universal truths about reality. This development began in the early church, and was understood to be necessary, even before the New Testament was canonized (long before the time of Constantine).¹⁶⁰ In fact, Reimer claims that the language of the trinitarian doctrines naturally follows from the Christian texts.¹⁶¹ "What occurred was not a corruption of the original message, but an unfolding and development of the ontological implications of that message."¹⁶²

The significance of the doctrines lies in their ability to ground theological discussion. Reimer considers the modern intractability of theological debate to be due to the loss of a transcendent

article he also states that he is a Christian first and a Mennonite second. See A. James Reimer, "Christian Theology and the University: Methodological Issues Reconsidered," *The Conrad Grebel Review* 9:3 (1991): 223.

159. A. James Reimer, "Christian Theology and the University: Methodological Issues Reconsidered," *The Conrad Grebel Review* 9:3 (1991): 238.

160. A. James Reimer, "Doctrines: What are They, How do They Function, and Why do We Need Them?" *The Conrad Grebel Review* 11:1 (1993): 22.

161. See Reimer, "Toward Christian Theology from a Diversity of Mennonite Perspectives," p. 155 and Reimer, "Doctrines: What are They, How do They Function, and Why do We Need Them?" p. 22.

162. A. James Reimer, *Mennonites and Classical Theology: Dogmatic Foundations for Christian Ethics*, (Kitchener: Pandora Press, 2001), p. 264.

foundation for truth. Historicist theologies essentially relativize theological claims. What the early orthodox creeds, such as the one developed at Nicea, do is ground theological claims in the ontological nature of God. This allows for both appropriate grounding of particular theological claims and the means by which productive theological discussion can obtain.

One dare not take these specific creeds with their particular formulations as normative in any absolute sense, or as superseding the authority of the "scripture principle"; nevertheless, there is a genre of theological thinking inherent in this creedal tradition which takes "sound doctrine" and "right thinking (orthodoxy)" with utmost seriousness. Intrinsic to this dogmatic tradition is a trinitarian hermeneutical scheme which places emphasis on God's threefold being and work: God as transcendent creator, God as historic redeemer, and God as dynamic immanent spirit, which in my view takes on a normative quality in the task of hermeneutics.¹⁶³

Doctrines in general contain what the church believes and teaches to be true. They are then not truth themselves but rather models for expressing truth.¹⁶⁴ Reimer's concern is that if one denies the validity of doctrines in general, and the early church doctrines in particular, then one will be left with insufficient resources to express basic Christian unity; without a ground for theological discussion we cannot expect to resolve theological debate.¹⁶⁵ The doctrinal tradition can be, and has been at times, legalistic but Reimer denies that this has to be the case: doctrines form but the context (and not content) of theological reflection.

Weaver first responds to Reimer in 1984 in an article entitled "Perspectives on a Mennonite

163. A. James Reimer, "The Theological Framework for the Authority of the Scriptures," *The Conrad Grebel Review*, 4:2 (1986): 139.

164. Reimer, "Doctrines: What are They, How do They Function, and Why do We Need Them?" p. 24.

165. *Ibid.*, p. 32.

Theology."¹⁶⁶ In this article Weaver acknowledges that Reimer is committed to traditional Mennonite distinctive emphases but he denies that the moves Reimer makes are necessary. For Weaver, the Jesus narratives in the gospels clearly enough identify who he was and indicate a way of life which Christians should follow. Understanding Christianity as a way of life is more important than clarifying concerns raised by Greek thought.¹⁶⁷ Trinitarian thinking does not tell us enough about who Jesus was in that it ignores what Jesus did between his birth and death/resurrection.

Weaver then is clearly far more suspicious of the influence of Greek thinking than is Reimer. He denies that we need the orthodox tradition at all. Weaver proposes an alternative theological stance to the orthodox account which has the following characteristics: first, the most clear representation of God's will is in the story of Jesus. Second, Jesus' resurrection is the final act - nothing can come later which is more significant. Third, the church is the community which seeks to enact the teachings of Jesus. Finally, beginning theology with story means recognizing that Christians are called to represent an alternative social order to the dominant non-Christian social structure. The commitment to pacifism is central to this representation since it plays such a large role in Jesus' teachings and it calls us to a different way to interact with the world.¹⁶⁸

166. J. Denny Weaver, "Perspectives on a Mennonite Theology," *The Conrad Grebel Review*, 2:3 (1984): 189-210.

167. *Ibid.*, p. 194.

168. J. Denny Weaver, "Mennonites: Theology, Peace, and Identity," *The Conrad Grebel Review* 6:2 (1988): 126-138.

Consequently, Weaver understands that the essence of Christianity was lost in the fourth century when its leaders abandoned Christian distinctiveness in favour of subordinating themselves to imperial Rome. This sell out or corrupted Christian church continued until the reformation when the Anabaptist/Mennonite tradition was able to recover the distinctiveness of the early pre-Constantinian church. Thus, for Weaver there are two competing Christian stories: the orthodox tradition which begins with Constantine and continues through the orthodox churches, and the early church vision which was lost after Constantine and only recovered by the radical reformation. The difference between them is precisely in how they understand the life of Jesus, "One [story] assumes that Jesus is normative for the Christian life, the other does not."¹⁶⁹ The difference involves an essentially different way of understanding both Jesus and the biblical record. Weaver agrees with Reimer in that theology should be grounded but he disagrees with respect to the nature of the ground.

The changes brought about by Constantine and his successors are a stark challenge to Reimer's understanding of theology. Constantine's legalization of Christianity brought about, in time, a union between the church and the state. When Christianity was a persecuted religion it was naturally straightforward for Christians to understand themselves (in terms of both their interests and their ideology) as distinct from the state. After the legalization, there was both a natural gratitude towards the emperor which left him less vulnerable to criticism and a general increasing stake of Christianity in the success and stability of the empire. Constantine called the

169. Ibid., p. 139.

council at Nicea and participated in it. Thus, one can question whether the creed arising from the council expresses clear and distinct biblically based theology or whether it was essentially clouded by imperial interests.¹⁷⁰ According to Weaver, this clouding meant that the church could no longer witness to society as an alternative.¹⁷¹

This clouding is perhaps made apparent by the lack of ethical content in the creed at Nicea (and subsequent formulations). The creeds assert ontological claims about the nature of God, Jesus and the Holy Spirit but say nothing about the life of Jesus and how his teachings and ethical example are relevant for Christians. "It was the different ecclesiology of the Constantinian church, for which Jesus was no longer normative, which allowed the church's statements about Jesus to shift from the narratives of the gospels to the generic, philosophical categories of the fourth and fifth centuries."¹⁷² One can assert that the lack of ethical content in the creeds is indicative of an accommodation to imperial powers. In any event, Weaver wonders how the doctrines can form a basis for ethics when they themselves have no ethical content.¹⁷³

But Reimer denies that the creeds are essentially problematic: first, creeds are the beginning

170. See J. Denny Weaver, "Theology in the Mirror of the Oppressed: Reflections on the Intersections of Yoder and Cone," in *The Wisdom of the Cross - Essays in Honor of John Howard Yoder*, ed. Stanley Hauerwas et. al., (Grand Rapids: Eerdmans Publishing Co., 1999), pp. 409 - 429.

171. The loss of pacifism in the mainstream Christian church after Constantine is taken by Weaver as a sign that the church now served to sustain society rather than be an alternative to it. See J. Denny Weaver, "Narrative Theology in an Anabaptist-Mennonite Context," *The Conrad Grebel Review* 12:2 (1994): 175.

172. J. Denny Weaver, "Responses - J. Denny Weaver to A. James Reimer and Thomas Finger," *The Conrad Grebel Review* 7:1 (1989): 76.

173. J. Denny Weaver, "The General versus the Particular: Exploring Assumptions in 20th Century Mennonite Theologizing," *The Conrad Grebel Review* 17:2 (1999): 37.

point for ethics, the structure required for them. Since creedal formations are basic statements of what a church believes and show the relationship of ethical claims to other key theological claims, the ethical content of a theology should be expressed in creedal terms. Weaver is thus mistaken in his ethical content requirement since Reimer's call is to the structure, and not content, of theology: the lack of ethical content in any particular creed does not show that all creeds must lack such content. Absent such a structure Reimer's concern is that ethical claims have no force. Furthermore, the influence of Greek thought was not negative.¹⁷⁴ In the encounter between Jewish and Greek culture "a distinctive Christian doctrine of God emerged that is foundational for later Christian thought and ethics."¹⁷⁵

Second, Reimer questions the connection between the imperialization of the church and the events at the early church councils. Yes, there are problems in the time period but it would be a mistake to demonize the whole era on this account.¹⁷⁶ It is questionable how close the tie was since the position which Constantine had backed at Nicea was defeated.¹⁷⁷ The council opted for the account which was more biblical than the alternatives. Thus, Reimer claims that orthodoxy

174. A. James Reimer, "Mennonites, Christ, and Culture: The Yoder Legacy," *The Conrad Grebel Review* 16:2 (1998): 9.

175. A. James Reimer, "Theological Orthodoxy and Jewish Christianity: A Personal Tribute to John Howard Yoder," in *The Wisdom of the Cross - Essays in Honor of John Howard Yoder*, ed. Stanley Hauerwas et. al., (Grand Rapids: Eerdmans Publishing Co., 1999), p. 436.

176. A. James Reimer, *Mennonites and Classical Theology: Dogmatic Foundations for Christian Ethics* (Kitchener: Pandora Press, 2001), p. 284. See also A. James Reimer, "Mennonites, Christ, and Culture: The Yoder Legacy," *The Conrad Grebel Review* 16:2 (1998): 9-13.

177. Reimer, *Mennonites and Classical Theology: Dogmatic Foundations for Christian Ethics*, pp. 264-268. In the same section Reimer argues that Constantine had a more minor role at the councils than is popularly assumed.

can serve to effectively criticize the connection of state and church.¹⁷⁸

Both Reimer and Weaver call for changes in Mennonite theology.¹⁷⁹ But whereas Reimer wants Mennonites to ground their theological understanding wholly within the orthodox tradition, Weaver wants Mennonites to explicitly recognize that they constitute an alternative society. For Weaver, Mennonite distinctiveness is essential.¹⁸⁰ "In my judgement, Reimer has still not recognized the way in which his suggestion of an approach to theology for Mennonites undercuts the very tradition he wants to strengthen by calling for a renewed theology."¹⁸¹ Historical contingency has defined Mennonites as culturally distinctive but Weaver wants to make this cultural distinctiveness theologically central.

The heart of the issue for modern, Anabaptist, believers churches is contained in the question, do the modern descendants of Anabaptism want to be a distinct church that poses an alternative social order to the structures and systems of the world, or a church that blends into and expresses itself through the systems and structures of the world?¹⁸²

When Mennonite people or Mennonite groups have lost their identity as Mennonites, it has been not primarily because they adopted a new view of the Bible or reversed their position on baptism of adults, but rather because they have abandoned the idea that the church is an alternative to, rather than, an integral part of the majority society.¹⁸³

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178. Reimer, "Theological Orthodoxy and Jewish Christianity," p. 438. In fact he suggests that one of the reasons the orthodox tradition asserted itself in the time of Constantine was to function as a such a critique.
 179. "First, I want to express my strong agreement with Reimer's general concern that Mennonites need to give more attention to doctrine, that is to correct thinking about theology." J. Denny Weaver, "Responses - J. Denny Weaver to A. James Reimer and Thomas Finger," *The Conrad Grebel Review* 7:1 (1989): 74.
 180. He argues that Mennonites have always implicitly understood this to be true. See J. Denny Weaver, "Mennonites: Theology, Peace, and Identity," *The Conrad Grebel Review* 6:2 (1988): 119-146.
 181. Weaver, "Responses - J. Denny Weaver to A. James Reimer and Thomas Finger," p. 75.
 182. J. Denny Weaver, "The Anabaptist Vision: a historical or a Theological Future?" *The Conrad Grebel Review* 13:1 (1995): 84.
 183. J. Denny Weaver, *Becoming Anabaptist* (Scottsdale: Herald Press, 1987), p. 23.

Rather than Reimer's systematic theology, Weaver uses narrative since it better preserves Mennonite distinctiveness. The gospel narratives mark the connections of Jesus with God the creator and the Holy Spirit (better than do the doctrines) in such a way that the emphasis on following Jesus' teachings is not lost. To accept Jesus is to place oneself into the narrative.¹⁸⁴ Furthermore, Weaver calls us to use the Jesus narratives, and not the orthodox doctrines, to compare the worth of rival theologies. The truth of Christianity comes out in the particularity of the story and not in any abstract formulation - he proposes that general systematic theology be abandoned.¹⁸⁵ In other words, Reimer's project to ground theology in the Greek thought derivative doctrines cannot be successful - there are no *a priori* starting points. "The first point to make is that there is no neutral point from which to observe and compare the various traditions and the religious claims about that reality."¹⁸⁶ Seeking commonality with other religious traditions would entail an inevitable watering down of essential beliefs.¹⁸⁷

184. J. Denny Weaver, "Narrative Theology in an Anabaptist-Mennonite Context," *The Conrad Grebel Review* 12:2 (1994): 175.

185. J. Denny Weaver, "The General versus the Particular: Exploring Assumptions in 20th Century Mennonite Theologizing," *The Conrad Grebel Review* 17:2 (1999): 28-51.

186. Weaver, "Narrative Theology in an Anabaptist-Mennonite Context," p. 185.

187. An interesting side issue is with respect to Mennonite history. The prevalent historical understanding of Anabaptists had been that they were united under a common theology. Recent scholarship by historians has challenged that claim and shown that early Anabaptists were more theologically diverse (even with respect to pacifism) than had previously been assumed (see C. Arnold Snyder, *Anabaptist History and Theology: An Introduction* (Kitchener: Pandora Press, 1995)). Weaver accuses Snyder, one such historian, of undermining Mennonite/Anabaptist distinctiveness by failing to define Anabaptists exclusively through their theological commitments. Weaver wants the historians to focus on what makes Mennonites different and not on what they share with others (see J. Denny Weaver, "Sixteenth-Century Anabaptism: A Vision Valid for the Twentieth Century?" *The Conrad Grebel Review* 8:1 (1990): 77-81). Snyder points out, however, that there were Anabaptists who denied pacifism: Weaver is on historically problematic grounds (see C. Arnold Snyder, "A response by Arnold Snyder," *The Conrad Grebel Review* 13:1 (1995): 210-215). Pacifism in early Anabaptism was an undecided issue so one can't include it in an account of early Anabaptist distinctiveness (see C. Arnold Snyder, "History or Heresy?" *The Conrad Grebel Review* 16:1 (1998):

However, Reimer claims that Mennonites risk irrelevancy if they lapse into a relativistic-historical stance on Christian theology. Mennonites do not have an inherently privileged interpretation of what proper Christian theology is. Mennonites stand not as an alternative to, but at the centre of the classical Christian tradition. The theological stress for Mennonites has always been on ethics, but Reimer claims that an ungrounded account of ethics is tenuous.

Weaver disagrees: "Accepting Jesus as defined by story does not reduce the gospel and Christian commitment to ethics, but it does make clear that ethics is intrinsic to the gospel and an inherent dimension of what it means to accept Jesus as Lord."¹⁸⁸ But Reimer is concerned that Weaver's narrative approach reduces the gospel to ethics and leaves the church unable to comment on other issues.

... there is a sense in which a theology that begins and ends with a Jesus-ethic of nonviolent love cannot fully account for the irrational depths of evil and suffering in the world which are also mysteriously in the hands of God and can be used for divine purposes.¹⁸⁹

The Jesus narratives do not clarify enough of the important issues. "An autonomous, self-

53-59). Again, what drives Weaver's criticism is that Snyder's version of historical explanation seeks commonality among the cultural community at the expense of watering down the normative narrative which lay behind it (see J. Denny Weaver, "Reading Sixteenth-Century Anabaptism Theologically: Implications for Modern Mennonites as a Peace Church," *The Conrad Grebel Review* 16:1 (1998): 37-53).

188. J. Denny Weaver, "Narrative Theology in an Anabaptist-Mennonite Context," *The Conrad Grebel Review* 12:2 (1994): 175. See also J. Denny Weaver, "Responses - J. Denny Weaver to A. James Reimer and Thomas Finger," *The Conrad Grebel Review* 7:1 (1989): 78.

189. A. James Reimer, "Mennonites, Christ, and Culture: The Yoder Legacy," *The Conrad Grebel Review* 16:2 (1998): 14. See also A. James Reimer, *Mennonites and Classical Theology: Dogmatic Foundations for Christian Ethics* (Kitchener: Pandora Press, 2001), pp. 247-250.

grounded ethic is capricious and ultimately vulnerable to the vagaries of human convention, political correctness and false anthropologies."¹⁹⁰ If the Jesus narrative is the sole normative account then we lack the resources to explain how Jesus is connected to God the creator (especially with respect to the Old Testament where God frequently acts violently) and how Jesus is connected to how we experience God today through the Holy Spirit.¹⁹¹ Reimer is a committed pacifist but he wants our pacifist convictions to be grounded in an appropriate doctrine of God in order that it has both explanatory scope and justification.

There has been no acknowledged resolution in the literature to this debate; the discussion occurred primarily in the *Conrad Grebel Review* from 1983 off and on until 1999 after which no further articles on the topic by Reimer or Weaver can be found there.

Commentary

Many issues arise in this debate, both major and minor: first, both Reimer and Weaver disagree on the historical events regarding the early church councils. Specifically, Reimer claims that the councils were not essentially connected to the imperialization of the church and Weaver claims that they were. Second, while they agree on the importance of the Jesus narratives to Christian theology, Reimer claims that these narratives lack the required comprehensiveness to function as the sole guide to Christian theology (for Reimer the Jesus narratives are a 'necessary condition'

190. A. James Reimer, *Mennonites and Classical Theology: Dogmatic Foundations for Christian Ethics* (Kitchener: Pandora Press, 2001), p. 15.

191. A. James Reimer, "Toward Christian Theology from a Diversity of Mennonite Perspectives," *The Conrad Grebel Review* 6:2 (1988): 155.

for theology but for Weaver they are a 'sufficient condition'). Finally, and most significantly, they differ on their understandings of how theological progress obtains. For Weaver, there is no way to understand, appreciate, or comprehend what Christian theology should contain apart from placing oneself inside the Jesus' narratives.¹⁹² For Reimer, doctrinal theology, which though influenced by historical particularities is largely independent of them, is the best guide to theological progress.

In the language of the last chapter, Reimer and Weaver both see the need for backward looking justification (of where previous theologies have gone wrong in terms of what we now understand and how the current claims are an improvement) and forward looking justification (how suited theological claims are to meet future challenges). They differ in their respective accounts of these explanations but they both would accept the need for such explanations as central.

How could such a debate be resolved?¹⁹³ A detailed historical examination of the events at Nicea, for instance, could likely establish how involved Constantine was in its outcome and the extent to which church leaders compromised to accommodate the empire. But such a study

192. He does not use explicit Wittgensteinian language but it appears clear that he would be comfortable with the 'ways of life' or 'language game' categories. And of course Weaver's claims are implicitly connected to Kuhn's 'paradigms' or MacIntyre's 'traditions' (the connection to MacIntyre is likely the most direct of the three).

193. It is important to put the question this way since neither Reimer nor Weaver show any sign of modifying their claims and the abandonment of the discussion likely demonstrates a weariness on both sides of repeating the same arguments.

would be difficult in that the imperialization to which Weaver refers was a process that simply began with Constantine - he could always argue that even if Nicea was not the prime example, it began a process of imperialization that culminated in the Middle Ages. If such a study showed that Constantine was essentially involved with the outcome at Nicea, Reimer will likely be able to find a representative minority who opposed Constantine and the imperialization of the church while still upholding the fidelity of the creeds.

The debate would be difficult to resolve through historical study, but it would still be worth investigating, since it may cause one or the other to substantially revise their views. Both Reimer and Weaver claim to have told the history accurately, and both implicitly claim that accurate historical analysis is a crucial test for theology, and thus neither can afford to be indifferent to it. Still, as claimed above, there are reasons to doubt whether historical study would bring substantial resolution to the debate. Both acknowledge that the imperialization of the church was problematic but they disagree regarding the complicity of the doctrines in it. But the implications of their disagreement have more to do with the future direction of theology than with the accurate representation of history. In other words, no matter which account a detailed historical study would support, the claims of the other would remain (though perhaps revised). This is not to say that the history is irrelevant but rather that it is a secondary issue.¹⁹⁴

194. It would be interesting to explore how the assumptions of both Weaver and Reimer colour their historical claims - whether there is any sense in speaking of a true history - but this lies outside the scope of this work. Suffice it to say here that the issue that separates them isn't primarily historical.

The question of the comprehensiveness of the Jesus narratives would also be difficult to resolve but a useful test to apply to both Reimer's and Weaver's work. Reimer's implicit challenge to Weaver is to find a way to account for a breadth of theological topics from the Jesus narratives alone. There has certainly been theological conversation which has not been explicitly based on the Jesus narratives, including not only Christian interpretations of the character of God in the Old Testament but also the relationship of Christianity to Judaism and Greek philosophy. Weaver's account should be able to explain the connections and the lack of connections between the Jesus narratives and these other factors.

Weaver could attempt to maintain consistency here by denying relevance to anything his account can't explain. For instance, if the Jesus narratives don't explain the God of the Old Testament, then the Old Testament is irrelevant. But this would be a problematic *ad hoc* move. He would then be on shaky textual grounds (the New Testament is full of expressions of continuity with the Old), but notwithstanding this concern he would be saving consistency at the price of explanatory power. He could attempt to show that the Old Testament is irrelevant but to define any factor he can't explain as irrelevant is an inherently problematic move.

Fortunately he does neither. Weaver believes that the Jesus narratives lived out in the community of believers (the church) are sufficient to meet all theological challenges and that there is no need to go beyond. He denies, for instance, that we need to resort to ontology to

maintain the reality of God in the world (one of Reimer's concerns).¹⁹⁵ The question then is whether Weaver's claim here is successful.

What is at stake here is the scope of theological relevance. If Reimer can explain the connection of his theology to other branches, and even to Judaism, then his account has a wide scope.

Weaver's theological interests are effectively narrow and this limits his theology. He is quick to dismiss the influence of Greek thought and the entire orthodox tradition but whereas he claims this is due to the corresponding loss of the original narrative vision of Christianity, it appears also possible that Weaver's account lacks the resources to comment on these factors in anything more than a perfunctory way. Furthermore, the dismissal wholesale of the mainline Christian church between the 4th and 16th centuries is implausible.¹⁹⁶ There must be links and continuities, as well as points of disagreement, between that church and the narrative to which Weaver calls Mennonites since despite the differences between them they are ostensibly involved in the same general project (they share common primary texts and share a largely common history). Lacking the resources to explain these links - he denies that there are any particular points of continuity between the Mennonites and Orthodoxy - Weaver's account is vulnerable.

There are of course important differences in how the two have interpreted and understood what

195. J. Denny Weaver, "Perspectives on a Mennonite Theology," *The Conrad Grebel Review* 2:3 (1984): 194.

196. It is worth noting here that Reimer's expressions of continuity with the mainline tradition actually make him more of a historicist than Weaver (despite his disavowals of the term).

Christians should accept and what the church should be like. But Reimer's account can say more about the nature of both the disagreements and the similarities. Weaver, in his dismissal of the orthodox tradition, cannot explain either the points of disagreement or agreement since he effectively denies that the orthodox tradition is engaged in the same task as are the Anabaptists. The only suggestion that Weaver can make to a member of the Orthodox tradition is to join the Mennonite church since the mark of Christian faithfulness is for him solely determined by membership in the community represented by the Anabaptists, a community which embodies the Jesus narratives.¹⁹⁷ In other words, the only criticism Weaver can make of other Christian traditions is to dismiss them wholesale since the various Christian branches have a holistic nature which needs to be respected (one can't reject simply a part).

Weaver could claim this lack of explanatory power as a victory rather than a loss, but this would be a problematic view in that it is implausible to suppose that the various Christian groups are engaged in separate enterprises since again they claim common primary texts and a common history. If Weaver is to be accepted here then Mennonite/Catholic dialogue is of the same type as Mennonite/Buddhist dialogue.

The points raised so far are parallel to the call for backwards looking explanation in the last chapter. Both historical analysis and the ability to explain continuities and the lack of

197. He resists ultimate principles in the sense that it binds the church to the Greek tradition (which he sees as a problematic compromise) - he doesn't have a problem with them if they come from the biblical record. The disagreement with respect to principles is with respect to the Greek/Roman influence on the church.

continuities with other theologies are key tasks which a theology should perform in order to account for rational progress in theology. Likewise in scientific practice one needs to be able to explain where other attempts have been both successful and unsuccessful, rooted in an accurate historical account, in order to justify a particular theory as progress.

Reimer's theology has a much greater ability to explain continuities with other Christian theologies both today and in the past. Whether he is successful is one question but he is attempting, and has the resources to explain more than Weaver can. The concern is whether Reimer can hold to a true account, as his suggestions are primarily structural. He proposed a return to doctrines simply because that structure is superior to others, but Weaver would see that structure as essentially conservative (maintaining status quo) rather than truth seeking. While Reimer's approach has the greater ability to explain points both of continuity and discontinuity between Mennonite theology and other theologies, it is unclear whether Reimer's approach can result in more than a conservative response to issues. The concern here, though not expressed directly by Weaver, is that Reimer is overly focused on backwards looking explanation at the cost of an impoverished account of future directions.

The primary issue which divides Reimer and Weaver is the nature of theological progress. Weaver claims that the truth of the faithful Christian life lies in the living of it and that such lives are sufficient to meet theological challenges. Doctrinal theologies are abstractions from the narratives they (implicitly or explicitly) represent and there is no non-question begging way of

resolving disputes between them. All one can do is join one story or the other. Reimer, on the other hand, denies that we are essentially barred from resolving theological differences even between groups of differing historical backgrounds. Theological progress is not, for Reimer, mediated through narrative but through claims regarding the nature of God and God's creation. While careful not to fall into a naively optimistic epistemology, Reimer believes that theological progress is not essentially limited by historical particularities. Both acknowledge the need for theology to meet future problems but they disagree on the appropriate path to meet them. The question is which theology has the resources to meet these problems successfully.

For example, both Reimer and Weaver agree that a key aspect of Christianity is pacifism. Reimer believes that the Mennonite focus on pacifism can only be rationally maintained if it can be expressed through the categories of doctrinal orthodoxy. Weaver sees this move as essentially compromising; it diminishes the centrality of pacifism since it is not a shared position with the orthodox tradition. Weaver believes that the commitment to pacifism needs a community, and not doctrines, to sustain it. Reimer understands this move as essentially sectarian and entailing the irrelevancy of pacifism to Christianity beyond the Mennonite tradition.

As Kuhn has shown, paradigms have an integrity which goes beyond the claims of their particular theories. For instance, claims of rival paradigms can be rejected on coherence or holistic grounds. Whether one accepts Kuhn's (and Feyerabend's) more radical claims regarding

semantic holism, it is clear that coherence issues play a role in and make forward looking theory comparison difficult.¹⁹⁸ There is often resistance to claims of rival paradigms since they don't 'fit' well with other existing claims. For instance, there was resistance to Einstein's work initially since his claims didn't fit well with the existing Newtonian system. Kuhn has shown that progress sometimes requires radical breaks which may appear to lack coherence (under the old paradigm). If one (mistakenly) denies that radical breaks in coherence are at least sometimes required, then this limits the account of forward looking justification that one can provide (since one is bound to the old paradigm, progress will be conservative).

Weaver accepts the difficulties of issues of coherence and worries that Reimer's account entails the unjustified loss of the key claims, such as the requirement of pacifism, he is trying to protect. Both Reimer and Weaver accept that the imperialization of the church is problematic but Weaver sees Reimer's moves as accommodation to the existing problematic paradigm. To force Mennonite claims into orthodox language entails the devaluing (or eventual elimination) of claims that don't fit well. Pacifism, for instance, loses significance since it is not a central claim of the orthodox tradition. In fact, Weaver believes that this accommodation to orthodoxy will force Reimer to abandon pacifism.

Reimer's move to express Mennonite claims in the language of orthodoxy is then effectively

198. The reference here is to how well claims of a particular theory cohere with its rival and not the internal coherence of a theory itself. Also, lack of coherence, in this sense, is not a determinative factor in theory comparison since other values, such as simplicity or explanatory power, also play a role.

similar to trying to present the theory of relativity solely under Newtonian assumptions of space and time. Clearly, the difference between Einstein's and Newton's work meant that basic Newtonian assumptions had to be abandoned. So, as the requirement to work under the assumptions of Newton would limit the development of physics, Weaver believes that the requirement to work under the assumptions of orthodoxy limits theological development. Weaver then appears to have a greater awareness of the difficulties of comparison and the at times radical differences between paradigms and theologies.¹⁹⁹

Reimer's and Weaver's work is certainly not incommensurable in the strong semantic sense. There does not appear to be any difficulty on either part in understanding the respective positions. In fact, each can summarize the other's position effectively in his own work. The two may be incommensurable in Kuhn's second (partial) sense in that the issue between them appears to involve competing values, but as we claimed earlier the significance or relevance of the incommensurability debate is to highlight the difficulties involved in theory (theology) comparison in any particular moment (incommensurability points to no essential problem in such comparisons). So, while it may be difficult to establish which theology is superior, the immediate issue is to make preliminary suggestions to Reimer and Weaver, and to those who read them, which approach to theology will turn out to be superior.

199. Reimer does at times, in his calls for universal truth and foundations for theology, sound overly epistemologically optimistic.

We have already performed this task in part. Both Reimer and Weaver agree on two tests of a theology: historical accuracy and theological scope. While the test of historical accuracy with respect to the key issue of the events of Nicea and the accommodation of the early church to the empire may be indeterminate, it appears clear that Reimer's account has greater scope. Key issues of Christian theology, those not directly addressed by the Jesus narratives, and points of continuity between various Christian traditions can be explained by Reimer with greater ease than they can by Weaver. This is not to say that it is impossible for Weaver to develop a theology of equal breadth, but simply that it is a more difficult task given the limited resources he accepts.

On the final issue of the nature of theological progress there is of course little agreement between the two. But their differences could be addressed on the basis of their shared commitment to the ethic of Jesus (pacifism and non-violent love). The challenge of Reimer to Weaver is to explain how the Mennonite claims regarding the essentialness of pacifism to the Christian life can be relevant to those outside the Mennonite tradition (the Mennonite historical story). Surely if pacifism is what Jesus demands from Mennonites it is an equal claim on all Christians. In other words, Reimer challenges Weaver on relativist grounds - if theology is essentially relative then Mennonites have no points of contact with other Christians and are thus limited to an essential sectarianism.

Weaver's challenge to Reimer is to maintain a commitment to the ethic of Jesus in the face of

pressures to accommodate and compromise. Reimer is committed to both Mennonite values and to continuity with other Christian traditions. Weaver's concern is that in expressing the continuity, the centrality of the Jesus ethic will be lost (breadth at the cost of depth). To avoid this problem Reimer needs to be able to explain in greater detail not only the points of contact between Mennonites and other Christian traditions but also the points of discontinuity. If the early church pacifism was not lost due to accommodation to the empire by church leaders at Nicea, we need to know how then it was lost. This task would perhaps be difficult to perform but there is nothing in the structure of Reimer's account that bars its conceivability.²⁰⁰ The problem with the tasks facing Weaver is that there is little he can do to move towards accomplishing them without abandoning the relativism which is so central to his account.

In this chapter we have used a theological case study to illustrate the claims made in the previous chapter. The debate between Reimer and Weaver can be divided along the grounds of backwards looking and forward looking justification. While they differ on their accounts of the history, the essential difference is with respect to the appropriate future direction of theology. This difference is grounded in separate accounts of how theology needs to be structured in order to meet challenges: Weaver claims that Mennonite theology needs to be understood as a distinct paradigm and Reimer grounds his work in ecumenical conversation with other Christian traditions. With respect to this point the two are presently incommensurable.

200. Reimer would no doubt claim also that if the Mennonite claims to Christian pacifism turn out to be ungrounded, then pacifism should then be abandoned by Mennonites.

Bibliography

- Agazzi, Evandro. "Commensurability, Incommensurability and Cumulativity in Scientific Knowledge," *Erkenntnis* 22 (1985): 57-61.
- Ayer, A.J.. *Language, Truth & Logic* (New York: Dover Publications Inc., 1952).
- Berriman, W.A.. "Alternative Conceptual Schemes," *Metaphilosophy* 9 (1978): 226-232.
- Berti, Enrico. "Aristotle's Renaissance As an Example of the Essential Tension between Tradition and Innovation," *Philosophical Inquiry* 16 (1994): 26-37.
- Biesecker-Mast, Gerald. "Responses - Gerald Biesecker-Mast responds to J. Denny Weaver," *The Conrad Grebel Review* 12:2 (1994): 330-334.
- Bishop, Michael A.. "Why The Semantic Incommensurability Thesis is Self Defeating," *Philosophical Studies* 63 (1991): 343-356.
- Bombardi, Ron. "Davidson in Flatland," *Australasian Journal of Philosophy* 66 (1988): 67-74.
- Broccard, Nicolas. "Going on with Systematology," *Metaphilosophy* 13 (1982): 263-266.
- Brown, Harold I.. "Incommensurability," *Inquiry* 26 (1983): 3-29.
- Brubacher, Glenn. "Responses - Glenn Brubacher to A. James Reimer," *The Conrad Grebel Review* 4:3 (1986): 241-243.
- Bryant, Darrol. "Responses - Darrol Bryant to J. Denny Weaver," *The Conrad Grebel Review* 3:1 (1985): 95-99.
- Butts, Robert E.. "Scientific Progress: the Laudan Manifesto," *Philosophy of the Social Sciences* 9 (1979): 478.
- Caneva, Kenneth. "Possible Kuhns in the History of Science: Anomalies of Incommensurable Paradigms," *Studies in History and Philosophy of Science* 31A (2000): 87-123.

Carnap, Rudolf. *Philosophical Foundations of Physics* (New York: Basic Books Inc, 1966).

Chadwick, Henry. *The Early Church* (London: Penguin Books, 1967).

Chen, Xiang. "Thomas Kuhn's Latest Notion of Incommensurability," *Journal for General Philosophy of Science* 28 (1997): 257-273.

Curd, Martin and J. A. Cover eds.. "Commentary" *Philosophy of Science* (New York, W.W. Norton and Company, 1998), p. 355-40.

Davidson, Donald. "On the Very Idea of a Conceptual Scheme," *Proceedings and Addresses of the American Philosophical Association* 47 (1973): 5-20.

Devitt, Michael. "Against Incommensurability," *Australasian Journal of Philosophy* 57 (1979): 29-50.

Duhem, Pierre. *The Aim and Structure of Physical Theory*, trans. Philip P. Wiener (Princeton, N.J.: Princeton University Press, 1954), 180-95, 208-18.

Farrell, Robert P.. "Rival Theories and Empirical Content Revisited," *Studies in History and Philosophy of Science* 31A (2000): 137-149.

Feyerabend, P.K.. "Explanation, Reduction and Empiricism," *Minnesota Studies in the Philosophy of Science* (1962): 1-20.

_____. *Farewell To Reason* (London: Verso, 1987).

_____. *Against Method* (London: Verso, 1975).

_____. "Putnam on Incommensurability: Comments on 'Reason, Truth and History,'" *British Journal for the Philosophy of Science* 38 (1987): 75-81.

_____. "Problems of Empiricism" in *Beyond the Edge of Certainty: Essays in Contemporary Science and Philosophy*, ed. Colodny, R. G. (Englewood Cliffs: Prentice Hall Inc., 1965), pp. 145-260.

Forster, Michael N.. "On the Very Idea of Denying the Existence of Radically Different Conceptual Schemes," *Inquiry* 41 (1998): 133-185.

- Franklin, Allan. "Are Paradigms Incommensurable?" *British Journal for the Philosophy of Science* 35 (1984): 57-60.
- Friedman, Michael. "Kant, Kuhn, and the Rationality of Science," *Philosophy of Science* 69 (2002): 171-190.
- Giere, Ronald N.. "Philosophy of Science Naturalized," *Philosophy of Science* 52 (1985): 332.
- Gupta, Chhanda. "Putnam's resolution of the Popper-Kuhn Controversy," *The Philosophical Quarterly* 43 (1993): 319-334.
- Hacker, P.M.S.. "On Davidson's Idea of a Conceptual Scheme," *Philosophical Quarterly* 46 (1996): 289-307.
- Hales, Steven D.. "A Consistent Relativism," *Mind* 106 (1997): 33-52.
- Hernandez-Iglesias, Manuel. "Incommensurability without Dogmas," *Dialectica* 48 (1994): 29-45.
- Hintikka, Jaakko. "On the Incommensurability of Theories," *Philosophy of Science* 55 (1988): 25-38.
- Holcomb, Harmon R.. "Circularity and Inconsistency in Kuhn's Defence of Relativism," *Southern Journal of Philosophy* 25 (1987): 467-480.
- Hoyningen-Huene, Paul. "Kuhn's Conception of Incommensurability," *Studies in the History and Philosophy of Science* 21 (1990): 481-492.
- Irzik, Gürol and Teo Grünberg. "Carnap and Kuhn: Arch Enemies or Close Allies?" *British Journal for the Philosophy of Science* 46 (1995): 285-307.
- Johansson, Ingvar. "Levels of Intension and theories of reference," *Theoria* 52 (1986): 1-15.
- Kindi, Vasso P.. "Kuhn's 'The Structure of Scientific Revolutions' Revisited," *Journal for General Philosophy of Science* 26 (1995): 75-92.
- Kuhn, Thomas. "Reflections on my Critics," in *Criticism and the Growth of Knowledge*, eds. Lakatos, Imre and A. Musgrave (Cambridge, Cambridge University Press, 1970).

- _____. *Structures of Scientific Revolutions* (Chicago: The University of Chicago Press, 1970).
- _____. *The Essential Tension* (Chicago: The University of Chicago Press, 1977).
- _____. "Reflections on My Critics" in *The Road Since Structure* (Chicago: The University of Chicago Press, 2000), pp. 123-175.
- _____. *The Copernican Revolution* (Cambridge: Harvard University Press, 1957).
- Lakatos, Imre. *The Methodology of Scientific Research Programmes* (London: Cambridge University Press, 1978).
- _____. *Proofs and Refutations : The Logic of Mathematical Discovery* (Cambridge: Cambridge University Press, 1977).
- _____. *Mathematics, Science and Epistemology: Philosophical Papers Volume 2* (Cambridge: Cambridge University Press, 1978).
- Lashchyk, Eugene. "Incommensurability and Incompatibility of Paradigm-Theories," in *Scientific Revolutions*, <<http://www.ditext.com/lashchyk/kuhn2c.html>>.
- Laudan, Larry. "Dissecting the Holistist Picture of Scientific Change" in *Philosophy of Science: The Central Issues*, eds. Curd, Martin and J.A. Cover (New York: W.W. Norton & Company, 1998), pp. 139-169.
- _____. "Demystifying Underdeterminism," in *Philosophy of Science: The Central Issues*, eds. Curd, Martin and J.A. Cover (New York: W.W. Norton & Company, 1998), pp. 320-353.
- _____. *Progress and Its Problems* (Berkeley: University of California Press, 1977).
- _____. *Science and Relativism* (Chicago: The University of Chicago Press, 1990).
- _____. "Two Dogmas of Methodology," *Philosophy of Science* 43 (1976): 585-597.
- Leplin, Jarrett. "Is Essentialism Unscientific?" *Philosophy of Science* 55 (1988): 493-510.
- Lugg, Andrew. "Feyerabend's Rationalism," *Canadian Journal of Philosophy* 7 (1977): 755-775.

- Martens, Rhonda and Carl Matheson. "Incommensurability Pragmatized" unpublished essay.
- Matheson, Carl. "Critical Notice of James Robert Brown's 'The Rational and the Social'," *Canadian Journal of Philosophy* 23 (1993): 125-150.
- Matheson, Carl A. and A. David Kline. "Rejection Without Acceptance," *Australasian Journal of Philosophy* 69 (1991): 167-179.
- Matteo, Anthony M.. "Grounding the Human Conversation," *The Thomist* 53 (1989): 235-258.
- McGinn, Marie. "The Third Dogma of Empiricism" *Proceedings of the Aristotelian Society* 82 (1981): 89-101.
- Miner, Robert. "Lakatos and MacIntyre on Incommensurability and the Rationality of Theory-Change," <<http://www.bu.edu/scp/Papers/Scie/ScieMine.htm>>.
- Moulines, C. Ulises. "On How the Distinction Between History and Philosophy of Science Should Not Be Drawn," *Erkenntnis* 19 (1983): 285-296.
- Murphy, Nancey. *Reconciling Theology and Science* (Kitchener: Pandora Press, 1997).
- Nola, Robert. "'Paradigms Lost, or the World Regained' -- An Excursion into Realism and Idealism in Science," *Synthese* 45 (1980): 317-350.
- Polikarov, A.. "Is There an Incommensurability between Superseding Theories?: On the Validity of the Incommensurability Thesis," *Journal for General Philosophy of Science* 24 (1993): 129-139.
- Putnam, Hilary. *Reason Truth and History* (Cambridge: Cambridge University Press, 1981).
- Quine, W.V.O.. "Two Dogmas of Empiricism," *Philosophical Review* 60 (1951): 20-43.
- Rasmussen, Stig Alstrup. "Sense, Reference, and Meaning-Incommensurability," *Analysis* 47 (1987): 170-173.
- Read, Rupert. "Thomas Kuhn's misunderstood relation to Kripke-Putnam essentialism," <<http://www.uea.ac.uk/~j339/Kuhnnatkinds.htm>>.

- _____. "Is there another kind of incommensurability: Kuhn and 'incommensurability of values,'" <<http://www.uea.ac.uk/~j339/Incommensvalues.htm>>
- Reich, George A.. "Did Kuhn Kill Logical Empiricism?" *Philosophy of Science* 58 (1991): 264-277.
- Reimer, A. James. "Christian Theology and the University: Methodological Issues Reconsidered," *The Conrad Grebel Review* 9:3 (1991): 223-241.
- _____. "Discourse as Future-Oriented Remembrance: The Nature and Role of Religion in the Post-Enlightenment Paradigm," *The Conrad Grebel Review* 3:1 (1985): 1-18.
- _____. "Doctrines: What are They, How do They Function, and Why do We Need Them?" *The Conrad Grebel Review* 11:1 (1993): 21-36.
- _____. "How Modern Should Theology Be? The Nature and Agenda of Contemporary Theology" in *The Church as Theological Community: Essays in Honour of David Schroeder*, ed. Harry Huebner (Winnipeg: CMBC Publications, 1989), pp. 171-198.
- _____. *Mennonites and Classical Theology: Dogmatic Foundations for Christian Ethics* (Kitchener: Pandora Press, 2001).
- _____. "Mennonites, Christ, and Culture: The Yoder Legacy," *The Conrad Grebel Review* 16:2 (1998): 5-14.
- _____. "The Nature and Possibility of a Mennonite Theology," *The Conrad Grebel Review* 1:1 (1983): 33-56.
- _____. "Responses - A. James Reimer to Glenn Brubacher," *The Conrad Grebel Review* 5:1 (1987): 71-74.
- _____. "The Theological Framework for the Authority of the Scriptures," *The Conrad Grebel Review* 4:2 (1986): 125-140.
- _____. "Theological Orthodoxy and Jewish Christianity: A Personal Tribute to John Howard Yoder," in *The Wisdom of the Cross - Essays in Honor of John Howard Yoder*, eds. Hauerwas, Stanley et. al. (Grand Rapids: Eerdmans Publishing Co., 1999), pp. 430-448.
- _____. "Toward Christian Theology from a Diversity of Mennonite Perspectives," *The*

Conrad Grebel Review 6:2 (1988): 147-160.

Resnik, David. "Repairing the Reticulated Model of Scientific Rationality," *Erkenntnis* 40 (1994): 343-355.

Rowland, Christopher. *Christian Origins* (London: Cambridge University Press, 1985).

Sankey, Howard. "Feyerabend and the Description Theory of Reference," *Journal of Philosophical Research* 16 (1991): 223-232.

_____. "In Defence of Untranslatability," *Australasian Journal of Philosophy* 68 (1990): 1-21.

_____. "Kuhn's Changing Concept of Incommensurability," *British Journal for the Philosophy of Science* 44 (1993): 759-774.

_____. "Incommensurability - An Overview," <http://www.hps.unimelb.edu.au/staff/staff_papers/howard/Incommensurability.PDF>.

Shand, John. "Grayling, Feyerabend and the Consistency of Sense," *Analysis* 46 (1986): 211-212.

Sheffler, Israel. *Science and Subjectivity* (New York: Hackett Publishing Company, 1967).

Shapere, Dudley. "Evolution and Continuity in Scientific Change," *Philosophy of Science* 56 (1989): 419-437.

Stone, Mark A.. "A Kuhnian Model of Falsifiability," *British Journal for the Philosophy of Science* (1991): 177-185.

Snyder, C. Arnold. "A Response by Arnold Synder," *The Conrad Grebel Review* 13:1 (1995): 210-215.

_____. "History or Heresy?" *The Conrad Grebel Review* 16:1 (1998): 53-59.

Szumilewicz, Irena. "Incommensurability and the Rationality of the Development of Science," *British Journal for the Philosophy of Science* 28 (1977): 343-350.

Van Fraassen, Bas C.. *The Scientific Image* (Oxford: Oxford University Press, 1980).

Watanabe, Santosi. "Needed: A Historico-Dynamical View of Theory Change," *Synthese* 32 (1975): 113-134.

Weaver, J. Denny. "The Anabaptist Vision: a historical or a Theological Future?" *The Conrad Grebel Review* 13:1 (1995): 69-86.

_____. *Becoming Anabaptist* (Scottsdale: Herald Press, 1987).

_____. "The General Versus the Particular: Exploring Assumptions in 20th Century Mennonite Theologizing," *The Conrad Grebel Review* 17:2 (1999): 28-51.

_____. "Mennonites: Theology, Peace, and Identity," *The Conrad Grebel Review* 6:2 (1988): 119-146.

_____. "Narrative Theology in an Anabaptist-Mennonite Context," *The Conrad Grebel Review* 12:2 (1994): 171-188.

_____. "Perspectives on a Mennonite Theology," *The Conrad Grebel Review* 2:3 (1984): 189-210.

_____. "Reading Sixteenth-Century Anabaptism Theologically: Implications for Modern Mennonites as a Peace Church," *The Conrad Grebel Review* 16:1 (1998): 37-53.

_____. "Responses - By J. Denny Weaver to Darrol Bryant," *The Conrad Grebel Review* 3:2 (1985): 189-193.

_____. "Responses - J. Denny Weaver to A. James Reimer and Thomas Finger," *The Conrad Grebel Review* 7:1 (1989): 74-80.

_____. "Sixteenth-Century Anabaptism: A Vision Valid for the Twentieth Century?" *The Conrad Grebel Review* 8:1 (1990): 77-81.

_____. "Theology in the Mirror of the Oppressed: Reflections on the Intersections of Yoder and Cone in The Wisdom of the Cross" in *Essays in Honor of John Howard Yoder*, eds. Hauerwas, Stanley et. al. (Grand Rapids: Eerdmans Publishing Co., 1999), pp. 409-429.

Yoder, John Howard. *The Royal Priesthood* (Scottsdale: Herald Press, 1998).

Zheng, Lan. "Incommensurability and Scientific Rationality," *International Studies in the Philosophy of Science* 2 (1988): 227-236.