

Are Scientific Research Programmes Applicable to Theology? On Philip Hefner’s Use of Lakatos.

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The way in which we understand the relationship between science and theology is continually undergoing revision. Some theologians have made the case that the two fields can be brought together by explaining theology in “scientific” terms. If it can be demonstrated that theological enquiry proceeds in a similar fashion to scientific investigation, then the credibility of theological positions arrived at through these processes is bolstered. This paper focuses on the work of Philip Hefner, who employs frameworks from the philosophy of science field in order to develop and articulate certain theological concepts. The validity of such an undertaking will be evaluated.

Hefner is perhaps best known for his theological anthropology designating humans as “created co-creators”. His understanding of the theological task illuminates his created co-creator model and associated reframing of various Christian doctrines. Hefner states his objective in the preface to *The Human Factor* as the provision of “a theological anthropology in the light of the natural sciences.”¹ He calls on theologians to “reconsider how scientific knowledge and revealed theology can interact, so that they may inform human life more wisely in an age of science and technology.”² Hefner writes in response to what he perceives to be a global crisis brought about by poor human choices, both wilful and unwitting.³ Furthermore, he identifies an intellectual dissonance, claiming that:

... although science and technology are more clearly a premise of our continued existence than ever before, signs are everywhere that people are dissatisfied with the thesis of secularization, which holds that religion and metaphysics are vestiges of our human infancy that will be supplanted by scientific knowledge. We desire a religion and metaphysics that work for us as we seek meaning in our present situation.⁴

Hefner’s created co-creator model is often abstracted from his thought in its entirety and treated as a self-sufficient concept. A real engagement with Hefner on co-creation must

1. Philip Hefner, *The Human Factor: Evolution, Culture, Religion* (Minneapolis: Fortress Press, 1993), xiii.

2. Philip Hefner, “Sociobiology, Ethics and Theology,” *Zygon* 19 (1984), 190.

3. Hefner, *The Human Factor*, 4.

4. *ibid.*, 10.

also give consideration to the means by which he arrives at his understanding of humans as created co-creators, as well as the way in which his formula reinterprets traditional doctrines of God, sin and Christology. Hefner's notion of theological anthropology will not be considered here; instead the focus will be on his adoption of scientific methodology for theological explication.

At first glance, Hefner's major work *The Human Factor* bears little resemblance to most theological monographs. Given his stated objective to integrate science and theology in his exposition of human nature, it is not surprising that his account borrows much from scientific methodology. For Hefner, scientific formulations become relevant to theology when theologians seek to articulate explanations of general human experience that transcend the religious tradition.⁵ He goes even further to say that theological statements must "observe the [scientific] canons of dealing with a wide range of data, falsifiability, and fruitfulness" in order to convey truth successfully beyond their particular religious tradition.⁶

In his own efforts to express theological concepts in a manner commensurate with scientific theory Hefner is particularly indebted to Imre Lakatos' model of scientific research programmes. A Hungarian philosopher of science and contemporary of Karl Popper and Thomas Kuhn, Lakatos' understanding of scientific knowledge acquisition attempts a corrective to both Popper and Kuhn.⁷ In place of Kuhn's understanding of scientific reasoning in terms of *successive* paradigms, Lakatos instead sees *competing* research programmes.⁸ He criticises Kuhn's subjection of scientific belief to non-rational standards of acceptance,⁹ and he seeks to improve on Popper's theory of falsification by acknowledging that counter-instances are not always decisive for the abandonment of

5. Philip Hefner, "Theology's Truth and Scientific Formulation," *Zygon* 23, no. 1 (1988), 264.

6. *ibid.*, 264.

7. While Lakatos is critical of Kuhn, we may understand his position as closer to a refinement than a critique of Popper's theories - he describes his own work as a "sophisticated falsificationist" position. He also combats the characterisation of Popper's position as "naive falsificationist", arguing that while this was true of Popper's earlier thought he eventually developed a much more sophisticated notion of falsification in the 1950s (Imre Lakatos, *The Methodology of Scientific Research Programmes*, ed. John Worrall and Gregory Currie, vol. 1 (Cambridge: Cambridge University Press, 1978), 91–93; Imre Lakatos, "Criticism and the Methodology of Scientific Research Programmes," *Proceedings of the Aristotelian Society* 69 (1968)). Lakatos states his debt to Popper in his assertion that he "[looks] at continuity in science through 'Popperian spectacles'" (Lakatos, *Methodology of Scientific Research Programmes*, 90).

8. Nancey Murphy, *Theology in an Age of Scientific Reasoning* (Ithaca, NY: Cornell University Press, 1990), 59.

9. Lakatos charges Kuhn with reducing scientific revolution to "a matter for mob psychology" and denying any role to rationality in the process (Lakatos, *Methodology of Scientific Research Programmes*, 91); c.f. Thomas Kuhn, "Logic of Discovery or Psychology of Research?," in *Criticism and the Growth of Knowledge*, ed. Imre Lakatos and Alan Musgrave (Amsterdam: North-Holland Publishing Co., 1970), 1–24).

a scientific hypothesis.¹⁰ Rather, a theory is falsified and replaced when a new theory arises that has greater explanatory power and can account for novel facts.¹¹

The Lakatosian research programme has several components. At its heart is what Lakatos terms the “hard core” - the basic idea.¹² Generally the nature of the claims in the hard core means that it cannot be directly falsified or verified - it is “‘irrefutable’ by the methodological decision of its proponents”.¹³ The veracity of such claims, however, can be indirectly upheld or impugned through the testing of associated “auxiliary hypotheses”.¹⁴ These take the form of ‘observational’ hypotheses which may change in response to observed anomalies; they can be adjusted in response to counter-instances and thus “bear the brunt of tests” in service to the hard core.¹⁵

Characteristic of the Lakatosian research programme is the articulation of a set of methodological rules: the *negative heuristic* “tell us what paths of research to avoid” while the *positive heuristic* tell us “what paths to pursue”.¹⁶ In a bona fide research programme the auxiliary hypotheses must be formulated in accordance with the positive heuristic i.e. they must represent an increase of knowledge.¹⁷ The negative heuristic forbids the application of a *modus tollens* form of argumentation to the hard core itself, instead redirecting the burden of proof to the “protective belt” of auxiliary hypotheses.¹⁸ These hypotheses can then be reformulated in response to falsifying data, while the hard core remains intact. As Murphy points out, a certain “dogmatism” is required for scientific progress - the negative heuristic allows space for a theory to be fully developed instead of prematurely discarded.¹⁹ In Lakatos’ adroit phrase, the scientist through observation may “be encouraged by Nature’s *yes*”, but not discouraged by its *no*.”²⁰

The key evaluative criteria of a scientific proposal for Lakatos is its fruitfulness in generating new insights.²¹ A research programme is eventually discarded if it is judged to be degenerative (i.e. no longer producing new ideas) and waning in influence rather

10. Lakatos, *Methodology of Scientific Research Programmes*, 4, 92.

11. *ibid.*, 31–33.

12. Hefner equates the “hard core” with Kuhn’s concept of the “paradigm” (Hefner, “Theology’s Truth”, 270).

13. Lakatos, *Methodology of Scientific Research Programmes*, 48.

14. *ibid.*, 48.

15. *ibid.*, 48.

16. *ibid.*, 47.

17. *ibid.*, 95.

18. *ibid.*, 48. A *modus tollens* argument is a particular form of propositional logic that proves a proposition via its contraposition.

19. Murphy, *Theology in an Age of Scientific Reasoning*, 60.

20. Imre Lakatos, “Falsification and the Methodology of Scientific Research Programmes,” in *Criticism and the Growth of Knowledge*, ed. Imre Lakatos and Alan Musgrave (Cambridge: Cambridge University Press, 1970), 91–195, 135n.

21. That is, its “heuristic power” (Lakatos, *Methodology of Scientific Research Programmes*, 52).

than progressive.²² According to Lakatos this renders the shift between a degenerating research programme to a progressive one a rational shift, as opposed to the irrational paradigm shift proposed by Kuhn.²³

Hefner is explicit about his borrowing from philosophies of science, and the way in which he translates these insights into the theological context. He does acknowledge that a scientific methodology is not immediately applicable to theology without some kind of transformation.²⁴ Rather than importing Popper's or Lakatos' models wholesale, he suggests

... that they be adapted heuristically rather than literally, endorsing the suggestions that theological theories should be referred to the world of possible experience, and that it is desirable to discern what a possible theory negates as well as what it affirms.²⁵

One example of modification is Hefner's extension of a research programme's production of new "facts" as a criterion for fruitfulness within the Lakatosian framework to include new interpretations of existing knowledge.²⁶

Theological statements differ from scientific statements in terms of precision of empirical content and predictive ability.²⁷ Obviously, theological statements must make some reference to God. For this reason Hefner rejects Popper's model of falsification in favour of Lakatos' refinement. The concept of "God" itself is not falsifiable. A notion of the divine may, however, reside in the "hard core" of the Lakatosian framework, shielded from direct falsification by the "protective belt" of auxiliary hypotheses yet also testable on these same grounds.²⁸

Hefner has shown a remarkable consistency throughout many decades of work when it comes to his understanding of the theological task and his chosen methodology. Early in his career he asserted that:

... if theology is to be faithful to its innate thrust to extend the significance of its originating revelation by playing an explanatory function for general human experience, then insofar as that wider experience leads into the realm of the sciences, theological statements will be used in theory-construction that conforms to the criteria of falsifiability and fruitfulness.²⁹

Hefner does acknowledge the challenges inherent in applying even a modified scientific framework to theology - particularly the lack of consensus (within or outside the theological community) concerning the falsifiability of theological ideas.³⁰ Additionally,

22. Lakatos, *Methodology of Scientific Research Programmes*, 48.

23. *ibid.*, 91–92.

24. Hefner, *The Human Factor*, 23.

25. *ibid.*, 24.

26. Hefner, "Theology's Truth", 270.

27. *ibid.*, 269.

28. *ibid.*, 269.

29. *ibid.*, 268.

30. Hefner, *The Human Factor*, 25.

the notion of fruitfulness as an evaluative measure may meet some resistance within the theological community, which has traditionally concerned itself with what is right and true.³¹ With this context established, however, Hefner sets out to construct theological proposals that conform to the structure of a scientific research programme and its requirements of falsifiability (i.e. potential falsifiers and permissible conditions can be identified with respect to the claims he places in the hard core).³² He argues that a Lakatosian framework can also be applied to Wolfhart Pannenberg's theology, and Pannenberg accepts this characterisation of his work.³³

In determining whether Hefner's adoption of a Lakatosian framework for theological explanation is a valid move, two issues must be addressed. The first concerns the acceptability of Lakatos' model itself - does it provide an adequate account of the progression of scientific knowledge? Secondly, how does the criterion of fruitfulness relate to truth, and what are the implications of this distinction for our understanding of theological knowledge?

The Validity of Lakatos' Model

Setting aside the applicability of scientific methodology to theological explication for the present time, the suitability of a Lakatosian methodology in particular must partly depend on its acceptance within its original field of philosophy of science. The scientific research programmes methodology developed by Lakatos has attracted various criticisms in this domain.

These criticisms include claims that the historical corroboration of Lakatos' thesis is inflated. Tomas Kulka, for example, argues that Lakatos does not prove that his was the only methodology capable of producing the degree of scientific progress attested in history.³⁴ Ernan McMullin contends that Lakatos relies on "reconstructed history" for the historical corroboration of his thesis and thus employs circular reasoning.³⁵ The version of history recounted by Lakatos actually excludes various episodes which may contradict his model. Kuhn similarly took issue with Lakatos' use of history also,

31. Hefner, *The Human Factor*, 26. Although a more developed account of the relationship between fruitfulness and truth may go some way to answering such resistance.

32. *ibid.*, 25.

33. Philip Hefner, "The Role of Science in Pannenberg's Theological Thinking," *Zygon* 24, no. 2 (1989), 146–148; Wolfhart Pannenberg, "Theological Appropriation of Scientific Understandings: Response to Hefner, Wicken, Eaves, and Tipler," *Zygon* 24, no. 2 (1989), 258–259.

34. Tomas Kulka, "Some Problems Concerning Rational Reconstruction: Comments on Elkana and Lakatos," *British Journal for the Philosophy of Science* 28 (1977).

35. Ernan McMullin, "The History and Philosophy of Science: A Taxonomy," in *Minnesota Studies in the Philosophy of Science*, ed. Roger Stuewer, vol. 5 (Minneapolis, MN: University of Minnesota Press, 1970), 12–67.

declaring that “what Lakatos conceives as history is not history at all but philosophy fabricating examples.”³⁶ He charges Lakatos with skirting very close to tautology in his suggestion that the historian is guided by methodology supplied by the philosopher of science in their selection and interpretation of historical data.³⁷ Many examples of historical contradictions to Lakatos’ model have been offered; Kuhn highlights the Lakatos’ attribution of the idea of the electron spin to Bohr in 1913 though the idea was clearly not supported by Bohr until much later.³⁸ The historical data required for Lakatos to mould Bohr’s work into the structure of a research programme simply does not exist.

A. F. Chalmers argues that Lakatos conflates theory choice with theory change in his account of scientific methodology.³⁹ There is confusion over whether scientists are meant to act consciously according to the prescriptions Lakatos outlines (which is problematic for scientific activity prior to the formulation of Lakatos’ methodology) or whether they may be unaware of such prescriptions (in which case the theory can hardly explain scientific change, despite apparent conformity throughout history).⁴⁰ Lakatos is apparently aware of this limitation, albeit not the resultant conflation, with his concession that his methodology “is more of a guide to the historian of science than the scientist”.⁴¹ Chalmers suggests a modification to Lakatos’ model that would avoid this criticism - the imposition of an objective “degree of fertility” that can be ascribed to a research programme regardless of whether it is recognised by individual scientists or not.⁴² This represents such a significant departure from Lakatos’ positive heuristic, however, that it is doubtful whether it could still be classed as a Lakatosian research programme.

Alan Musgrave critiques Lakatos for overestimating the power of the positive heuristic and according theoretical science an unjustified level of autonomy from experimental validation.⁴³ While pure mathematics may be empirically independent, this does not extend to all theoretical research programmes.⁴⁴ The positive heuristic of research programmes may hint at future anomalies, but Lakatos exaggerates its ability to predict

36. Kuhn, “Logic of Discovery”, 143.

37. *ibid.*, 143.

38. *ibid.*, 143.

39. A. F. Chalmers, *What Is This Thing Called Science?*, 2nd ed. (Milton Keynes: Open University Press, 1982), 125.

40. *ibid.*, 124.

41. Lakatos, *Methodology of Scientific Research Programmes*, 154.

42. Chalmers, *What Is This Thing Called Science?*, 125.

43. Alan Musgrave, “Method or Madness? Can the Methodology of Research Programmes Be Rescued from Epistemological Anarchism?,” in *Essays in Memory of Imre Lakatos*, ed. Paul Feyerabend, Robert Cohen, and Marx Wartofsky (Dordrecht: D. Reidel Publishing Company, 1976), 458–491, 457.

44. *ibid.*, 468.

anomalies - many are only discovered through experimentation.⁴⁵

The major criticism of Lakatos' methodology was raised by the "anarchistic philosophy of science" proponent Paul Feyerabend - that the methodology of scientific research programmes will effectively impede scientific progress by causing seemingly degenerating programmes to be abandoned prematurely.⁴⁶ Lakatos himself recognised this weakness in his proposal, acknowledging the difficulty of determining a terminally degenerative research programme as well as the possibility (historically attested) that a programme might "rise like a phoenix from the ashes".⁴⁷ Feyerabend expresses his criticism in scathing terms: "scientific method, as softened up by Lakatos, is but an ornament which makes us forget that a position of 'anything goes' has in fact been adopted".⁴⁸ Others have pointed out that the determination of a research programme's status and choice to abandon or persevere is as subjective as the Kuhnian paradigm shift that Lakatos was attempting to improve upon.⁴⁹

With respect to Feyerabend's critique, Musgrave contends that Lakatos drifted dangerously close to epistemological anarchism in his understanding of methodology's purpose. Musgrave suggests, however, that Lakatos' model can be rescued from this concerning move.⁵⁰ Emphasising the protection of hard core claims by methodological fiat risks the perseverance of deficient research programmes, whereas allowing refutation by "crucial" experimentation, however fallible such judgements may be, prevents research programmes from being pursued dogmatically or falling into obscurantism.⁵¹ Furthermore, Musgrave redirects the "advice" offered by Lakatos' methodology away from the individual scientist to the scientific community in its entirety, diffusing Feyerabend's critique in the process. Provided the majority of scientists are pursuing apparently progressive programmes, it is not irrational for a minority to be persisting with comparatively degenerative ones.⁵²

While Musgrave does defend Lakatos against Feyerabend's criticisms with a degree of success, he does so by modifying Lakatos' work beyond recognition. He essentially does away with Lakatos' notion of the negative heuristic, suggesting that the protection of the hard core serves neither methodological or historiographical purposes when it

45. Musgrave, "Method or Madness?", 472–473.

46. Paul Feyerabend, "Consolations for the Specialist," in *Criticism and the Growth of Knowledge*, ed. Imre Lakatos and Alan Musgrave (Cambridge: Cambridge University Press, 1970), 197–230, 125.

47. Lakatos, "Falsification", 137; Imre Lakatos, "History of Science and its Rational Reconstructions," in *Method and Appraisal in the Physical Sciences*, ed. Colin Howson (Cambridge: Cambridge University Press, 1975), 1–39, 12.

48. Feyerabend, "Consolations for the Specialist", 229.

49. David Bloor, "Review: Two Paradigms for Scientific Knowledge?," *Science Studies* 1, no. 1 (1971), 106; Josh Reeves, "After Lakatos," *Theology and Science* 9, no. 4 (2011), 400.

50. Musgrave, "Method or Madness?", 458.

51. *ibid.*, 463–465.

52. *ibid.*, 480.

comes to the development of scientific knowledge.⁵³ For Musgrave, theories survive simply because they are “good” theories - and an acceptance of this explanation does not “run the risk of allowing theories to survive by methodological fiat which do not deserve to survive”.⁵⁴ Contrast this with Lakatos’ assertion that “pigheadedness” can be a rational position in the conducting of research within a seemingly degenerative research programme.⁵⁵ Although Musgrave’s improvements on Lakatos are valuable, he does not propose a comprehensive model of scientific theory acceptance and an evaluation of his modified methodology is beyond the current scope.

Ultimately, Lakatos’ criteria for evaluating competing research programmes appears effective only when applied retrospectively. As Lakatos concedes, concerning the individual scientist faced with rival research programmes:

Whatever they *have* done, I can judge: I can say whether they have made progress or not. But I cannot advise them – and do not wish to advise them – about exactly what to worry about and in which direction they should seek progress.⁵⁶

Yet as Brendan Larvor makes clear in his critique of Lakatos, scientific methodologies are useless if they cannot be acted upon.⁵⁷

Further criticisms of Lakatos on the basis of the truth claims he makes on behalf of his methodology will be considered in a later section. Given the valid criticisms already discussed, however, we must question why Hefner selected Lakatos’ model for use in his own work. Was it simply a case of convenience, or does Hefner answer the criticisms levelled at Lakatos? If the latter, this could be achieved in one of two ways: either by responding convincingly to the criticisms themselves, or by modifying Lakatos’ model to the extent that the criticisms no longer apply.

Lakatos and Theology

The immediate difficulty we are presented with on considering whether Lakatosian methodology may be applied to theology is Lakatos’ own views on religion. The title of one of his papers: “Science: Reason or Religion?” summarises his opinion well.⁵⁸ Reeves suggests that the application of Lakatosian thinking to the subject of religion, despite Lakatos’ own assessment of religion as irrational, highlights its ambiguity.

53. Musgrave, “Method or Madness?”, 466.

54. *ibid.*, 466.

55. Lakatos, “History of Science”, 113.

56. Imre Lakatos, “Replies to Critics,” in *Boston Studies in the Philosophy of Science*, ed. R. Buck and Robert Cohen, vol. 8 (Dordrecht: D. Reidel Publishing Company, 1971), 174–182, 178.

57. Brendan Larvor, *Lakatos: An Introduction* (London: Routledge, 1998), 59.

58. Lakatos, “Falsification”, 71.

The way Lakatos' philosophy is so easily turned to defend religious belief rather than condemn it, serves to indicate that whether or not one thinks a research program is progressive may depend on which Lakatosian is applying the analysis.⁵⁹

A reading of Hefner's work in which he references Lakatos' methodology does not reveal any awareness on his part of the various criticisms associated with the framework. Although he gives a description of Lakatos' framework, he then insists that he "will not enter into sophisticated methodological discussion" when it comes to "what constitutes falsification of theological ideas".⁶⁰

Turning to the second potential defence of applying a Lakatosian framework to theology, despite his reluctance to discuss methodological problems, does Hefner in practice modify the methodology in ways that ameliorate the above-mentioned criticisms? Certainly Hefner does not seek to modify the positive heuristic in any substantial way, therefore his own methodology is likely vulnerable to the original criticism directed at Lakatos by Chalmers. There is no indication that Hefner adopted any of the amendments proposed by Musgrave, or articulated similar proposals of his own, and therefore Feyerabend's original criticism stands.

Oddly enough, though Hefner praises Lakatos, and adopts his auxiliary hypotheses and negative and positive heuristic in his exposition of the "created co-creator", he often reverts to the more simple Popperian criterion of falsifiability. Consider, for instance, his stated intention to "advance the discussion by attempting theological proposals that invite examination that satisfies Popper's two criteria – namely, to clarify what might negate the proposals and what does not contradict them".⁶¹

Apart from conflating Popper and Lakatos periodically in practice, how does Hefner adapt the scientific methodology "heuristically rather than literally"?⁶² It was suggested earlier that Hefner reinterprets Lakatos' news "facts" to include new interpretations of existing knowledge.⁶³ Nancey Murphy questions this adjustment, arguing that Hefner's "interpretations of the world of experience" are a "fuzzy" approximation of Lakatos' "novel facts" and do not improve upon the existing methodology.⁶⁴ Whether or not Hefner's modification is valid, however, it does not rescue the Lakatosian methodology from the various critiques discussed in the previous section.

If Hefner cannot offer sufficient justification for his selection of Lakatos, or sufficiently modify the model in order to render previous criticisms invalid, perhaps another the-

59. Lakatos, "Falsification", 405.

60. Hefner, *The Human Factor*, 25.

61. *ibid.*, 25.

62. Hefner, "Theology's Truth", 24.

63. *ibid.*, 270.

64. Nancey Murphy, "From Critical Realism to a Methodological Approach: Response to Robbins, Van Huyssteen, and Hefner," *Zygon* 23, no. 3 (1988), 289.

ologian might step into the breach. Other theologians have attempted a defence of Lakatosian methodology - early in her career, Murphy also adopted a Lakatosian framework in areas of her work.⁶⁵ Although she did not apply the framework to the extent that Hefner does, in his elaboration of a novel theological anthropology, she at least critically engaged with some of the criticisms of Lakatos. Despite her early endorsement, however, Murphy later rejected Lakatos' model in favour of Alasdair MacIntyre's understanding of rationality.⁶⁶ Her reasons for favouring MacIntyre's account of rationality instead are beyond the current scope, however her repudiation of Lakatos' methodology, despite extensive engagement with his thought, must call into question the validity of projects that adopt his framework for theological explication.

Her later turn away from Lakatos indicates that Murphy was not persuaded that his methodology stands up to all possible criticisms. With respect to her earlier defence of Lakatos against various criticisms, some responses were more convincing than others. As she has since undergone a change of mind it is unnecessary to rehash her arguments here as others have provided sufficient critiques.⁶⁷ One defence of Lakatos that is worth considering, however, applies specifically to its theological application rather than the original philosophy of science context. Murphy suggests that the nature of theology as opposed to science means that Feyerabend's critique of Lakatos is less applicable when the methodology is adopted for theological enquiry. She bases this on the different ways in which theories in the two fields proliferate - theologians often commit to theories as believers, and theological study does not usually require the high financial resources essential to scientific research.⁶⁸ The premature abandonment of theories in theology due to competition for funding is therefore less likely.⁶⁹ Murphy raises a good point, although she only considers one aspect of Feyerabend's criticism - while a time limit can indeed force a theory to be discarded prematurely, the absence of any time pressure can allow seemingly degenerative programmes to be pursued indefinitely.⁷⁰ The application of Lakatos' framework to theology does not bestow upon theologians the ability to discern if a programme is terminally declining that is lacking in their scientific counterparts.

Other accounts of theory change and acceptance have been offered in more recent years. Peter Lipton's *Inference to the Best Explanation*, for example, provides a more robust account of how competing theories can be evaluated, as well as a mechanism for dealing

65. Murphy, *Theology in an Age of Scientific Reasoning*.

66. Nancey Murphy, "Wind and Spirit: A Theological Autobiography," *Dialog* 46, no. 3 (2007), 306.

67. See for example Reeves, "After Lakatos".

68. Murphy, *Theology in an Age of Scientific Reasoning*, 207.

69. *ibid.*, 202.

70. Feyerabend, "Consolations for the Specialist", 229.

with contrastive evidence in the absence of a theory able to explain all of the evidence.⁷¹ Like Lakatos, Lipton accords more weight to the predictive power of a theory than its ability to accommodate already known facts.⁷² However, Lipton makes this argument from a position that acknowledges the “actual epistemic condition of the working scientist” in ways that Lakatos does not.⁷³ He critiques existing arguments for privileging prediction above accommodation on the basis that: (1) they conflate *post hoc* theory construction with *ad hoc* theory construction, (2) accommodating existing evidence does not invalidate the capacity of said evidence to refute theories, rather only theories which are not refuted by existing evidence can be proposed, or (3) there is no reason to suggest that the designing of a theory to accommodate data weakens the inference from the fitness of a theory to its truthfulness.⁷⁴ Instead, Lipton grounds his case for prioritising prediction over accommodation, even in the event that the data itself is epistemically equivalent in each scenario, on the suggestion that data obtained as a result of a theory’s predictions is more likely to have proper controls than evidence existing before a theory’s formulation.⁷⁵ More strongly, he points to the major liability inherent in accommodation of existing data - the temptation on the part of the scientist to “fudge” the theory and its auxiliary hypotheses in order to effect the accommodation.⁷⁶ It is possible that the existing data may pull the scientist away from the best possible explanation - a danger that is not present when it comes to prediction.⁷⁷ While predicted and accommodated data both provide the same objective support for a theory, and therefore the objective value of a particular theory is not dependent on the timing of data acquisition, it remains that “a scientist’s actual epistemic situation gives him only fallible access to this objective support”.⁷⁸ Lipton sums up the advantages of prediction over accommodation in his assertion that “only accommodations influence the generation of theory, and theory influences only the generation of predictions.”⁷⁹

It would seem, therefore, that while Lakatos and Lipton both favour scientific theories that can predict new information, rather than simply explain existing information, Lipton is able to offer a more satisfactory account of why this should be so. Lipton’s model of theory acceptance does not attempt to justify sustained commitment by scientists to waning research programmes, nor an arbitrary judgement as to whether a research programme is in fact degenerative or merely dormant. Rather, Lipton is happy to ad-

71. Peter Lipton, *Inference to the Best Explanation*, 2nd ed. (London: Routledge, 2004).

72. *ibid.*, 166.

73. *ibid.*, 166.

74. *ibid.*, 166–168.

75. *ibid.*, 169

76. *ibid.*, 170.

77. *ibid.*, 171.

78. *ibid.*, 174.

79. *ibid.*, 180.

mit that theory acceptance and change is not driven purely by rational factors. His notion of “methodological fiction”, though applied to a hypothetico-deductive model of reasoning, demonstrates how our inductive practice can be far removed from any theoretical framework of methodology.⁸⁰ A rational methodology, no matter how logical it appears, does not map faithfully onto scientific practice. He draws on case studies in behavioural economics to highlight “systematic unreliability in our actual inferential practices”.⁸¹ An exposition of Lipton’s proposed scientific methodology beyond this summary is outside the current scope, it will suffice to say that there are alternatives to the Lakatosian model available for the project of explicating theology in scientific frameworks.⁸²

Fruitfulness or Truth?

Another potential criticism of Lakatos concerns the relationship of fruitfulness and truth. Lakatos does not appear to consider the social construction of scientific theories. His account of the development of scientific knowledge contends that rationalism is the determinant of the direction taken by scientific enquiry. In his own words, “the methodology of scientific research programmes is better suited for approximating the truth in our actual universe than any other methodology.”⁸³ He thus subscribes to a form of epistemological realism, and appears to accord a teleological supremacy to rationalism in the development of scientific knowledge.⁸⁴ This tendency in Lakatos’ thought is perhaps summarised best by his colleagues in the festschrift occasioned by his death: “Lakatos was a man in search of rationality in all of its forms”.⁸⁵ Unlike Kuhn, Lakatos sought objective criteria for the appraisal of competing research programmes.⁸⁶

For Hefner, the criterion of fruitfulness, when applied to theology, includes the capacity of a theological proposal to effectively enter into public discussion.⁸⁷ He considers fruitfulness as a category to be distinct from correctness - “being right or wrong is

80. Lipton, *Inference to the Best Explanation*, 93.

81. *ibid.*, 145.

82. While the second edition of Lipton’s work cited here contains significant revisions, there was still promising material in the original 1991 edition that would have been available to Hefner prior to the publication of *The Human Factor*. Hefner’s neglect of contemporary developments in the philosophy of science field lends weight to the charge that he has simply selected the scientific methodology that best suits his particular purpose.

83. Lakatos, *Methodology of Scientific Research Programmes*, 165n.

84. In fact, rationalism and realism seem to be conflated here, whereas it will be demonstrated here that a rationalist approach does not necessitate the adoption of realism in any form.

85. Paul Feyerabend, Robert Cohen, and Marx Wartofsky, eds., *Essays in Memory of Imre Lakatos*, 458–491 (Dordrecht: D. Reidel Publishing Company, 1976), preface.

86. Musgrave, “Method or Madness?”, 473.

87. Hefner, *The Human Factor*, 25.

not the only value of a research program, or even the chief value.”⁸⁸ However, Hefner claims that the property of fruitfulness does have some correspondence to truth, both ontologically and epistemologically.⁸⁹ “True information is information that we can trust to be fruitful.”⁹⁰ Additionally, “fruitfulness is the closest our theories can attain to the truth.”⁹¹ Ultimately, however, he sees the category of fruitfulness as one that realists and anti-foundationalists can agree upon when testing competing claims - an important quality in Hefner’s postmodern context.⁹² The choice of a Lakatosian framework allows him to circumvent questions surrounding reality and referentiality.⁹³

While Hefner sidesteps a deeper discussion of the relationship of fruitfulness to truth in the interests of getting on with the explication of theology, an understandable move in light of the academic climate in which he developed his thought, the question bears closer examination. We certainly must take the philosophical context of the late 1970s and early 1980s into account when examining Hefner’s own epistemological claims (or lack thereof). Jerome Stone locates Hefner’s thought in neither the modern or postmodern camp, but rather a third, newer category - the “Anglo-American” approach.⁹⁴ On the one hand, Hefner “is close to a foundationalist reliance on genetics and evolutionary theory”, yet he “finally refuses to privilege any one discourse” in his interweaving of science, theology and myth.⁹⁵ For Stone, Hefner’s adoption of scientific methodology allows him to overcome what he sees as the traditional dichotomies in Western thought, namely the modern/postmodern divide. Hefner “seeks a middle position between a quest for certainty and epistemological nihilism by searching for tentative and falsifiable hypotheses.”⁹⁶

The nature of truth itself remains a contested issue among philosophers, theologians, and scientists. A grossly oversimplified narrative offered by some (though this is by no means the final word) tells of how the Enlightenment quest for epistemological certainty and universality gave way to the postmodern understanding of truth as tradition-mediated and intra-systemic. Correspondence theories of truth are replaced with the criterion of internal coherence, and if an extra-systemic reality exists we are epistemically excluded from it. There exists somewhat of a consensus among philosophers

88. Hefner, *The Human Factor*, 25.

89. *ibid.*, 26.

90. *ibid.*, 26.

91. *ibid.*, 26.

92. *ibid.*, 26.

93. *ibid.*, 26.

94. Jerome Stone, “Philip Hefner and the Modernist/Postmodernist Divide,” *Zygon* 39, no. 4 (2004), 756. Stone includes in this approach pragmatists, process thinkers and earlier 20th century Chicago School theologians (*ibid.*, 756).

95. *ibid.*, 757.

96. *ibid.*, 759.

that foundationalism has run its course and is no longer defensible on philosophical grounds.⁹⁷ Some have argued that the abandonment of epistemological foundationalism also requires that any form of realism be abandoned in favour of relativism.⁹⁸ Hefner, for example, sets anti-foundationalists in opposition to realists in his quest for an alternative that may find support with both positions.⁹⁹ Yet the jump from anti-foundationalism to anti-realism is not so easily made. A rejection of foundationalism does not require us to discard the belief that knowledge is grounded in reality.¹⁰⁰ A robust understanding of reality may incorporate both correspondence and coherentist approaches to knowledge in a single framework.¹⁰¹ Wentzel van Huyssteen makes the point that a postfoundationalist approach is what makes “a meaningful epistemological link between theology and the other sciences” possible.¹⁰²

Certainly there are parallels between the development of scientific theories and the development of Christian doctrine. McGrath makes the point that in both instances theoretical anomalies and inconsistencies are to be seen as “noetic rather than ontic”.¹⁰³ This does not mean that theology can be equated with the natural sciences as a whole in terms of their engagement with reality - some sciences (e.g. psychology) tend to draw more on socially constructed entities than others (e.g. physics).¹⁰⁴ Yet the philosopher, theologian, and scientist are working from within particular systems in their search for understanding. All three, according to McGrath, are “not in a position to lay down the conditions under which reality is encountered, but [are] obligated to engage with the world as it is presented.”¹⁰⁵

Do these similarities between scientific and theological explanation validate attempts to explain theological concepts using scientific methodologies? James Gustafson contends that “inferences from scientific data and theories to theological and ethical conclusions are often weakly warranted.”¹⁰⁶ Does this extend beyond the use of scientific theories

97. Nicholas Wolterstorff, *Reason within the Bounds of Religion* (Grand Rapids, MI: Eerdmans Publishing Co., 1984), 52; Alister McGrath, *A Scientific Theology: Reality*, vol. 2 (Grand Rapids: Eerdmans Publishing Co, 2006), 37.

98. *ibid.*, 33. See for example, Nancey Murphy, “Relating Theology and Science in a Postmodern Age,” *CTNS Bulletin* 7, no. 4 (1987).

99. Hefner, *The Human Factor*, 26.

100. McGrath, *A Scientific Theology: Reality*, 20.

101. *ibid.*, 17.

102. Wentzel van Huyssteen, *Essays in Postfoundationalist Theology* (Grand Rapids, MI: Eerdmans Publishing Co., 1997), 226.

103. Alister McGrath, *A Scientific Theology: Theory*, vol. 3 (Grand Rapids: Eerdmans Publishing Co, 2006), 209. Of course, this understanding of anomalies is related to McGrath’s commitment to critical realism.

104. McGrath, *A Scientific Theology: Reality*, 14.

105. *ibid.*, 34.

106. James Gustafson, “Theology Confronts Technology and the Life Sciences,” *Commonweal*, no. 16 June (1978), 391.

to the use of the scientific method itself for theological exposition? Nancey Murphy, in a paper decrying critical realism, singles out Hefner's use of Lakatosian research programmes for praise.¹⁰⁷ According to Murphy, Hefner convincingly demonstrates that models for the justification of scientific theories are applicable to theological theories - and does away with the unnecessary step of critical realism in the process.¹⁰⁸ The range of views toward projects such as Hefner's (and Murphy's similar project, though she has since rejected it) raise an important question concerning their evaluation. Against what criteria would we even begin to arbitrate whether these endeavours are ultimately successful - "scientific" or "theological"? Do they require a commitment to relativism or are they compatible with a critical realist position?

In contrast to Hefner, who shies away from the epistemological questions, Murphy explicitly sets a Lakatosian conception of scientific knowledge in opposition to a critical realist position.¹⁰⁹ Her main justification for omitting the "troublesome doctrine of critical realism" is that she sees it as an unnecessary intermediary in the progression from "explanatory adequacy" to "comparable epistemic status for theology and science".¹¹⁰ In sympathy with Wentzel van Huyssteen's critique of critical realism, she argues that "nothing is lost by abandoning critical realism in favor of a concentration on the *explanatory progress* of theories in theology and science."¹¹¹ As mentioned above, she holds up Hefner's own use of Lakatos as exemplary for the elimination of critical realism as the foundation for meaningful dialogue between theology and science.¹¹² Although she no longer endorses Lakatosian methodology, her comments remain useful for assessing the compatibility of the model with various epistemological positions.

Hefner's own position toward critical realism is less clear than Murphy's. He does describe himself tentatively at one point as "hopeful" toward critical realism, but believes there are no conclusive philosophical arguments to support the position.¹¹³ It could be argued that the approach he adopts in *The Human Factor* is not so much anti-realist as it is non-realist. He either resists making his own conclusions or keeps his own views close in the interests of wider engagement with his thought. He at least believes his own work to be acceptable according to realist standards,¹¹⁴ but he also admires, and aspires to, Murphy's position of conceptual pragmatism.¹¹⁵ It is correct that for

107. Murphy, "Critical Realism", 288–289.

108. *ibid.*, 288.

109. *ibid.*, 287.

110. *ibid.*, 288.

111. *ibid.*, 287; c.f. Wentzel van Huyssteen, "Experience and Explanation: The Justification of Cognitive Claims in Theology," *Zygon* (Grand Rapids, MI) 23 (1988), 258.

112. Murphy, "Critical Realism", 288.

113. Hefner, *The Human Factor*, 220.

114. *ibid.*, 26.

115. *ibid.*, 220–221.

Lakatosian research programmes truth is not necessarily a criteria - progressive research programmes are more internally coherent than degenerative programmes but this does not make them truer.¹¹⁶ While Lakatos, a rationalist through and through, certainly connected fruitfulness with truth, it has already been shown here that the Lakatosian methodology has been separated from truth by some of its supporters.

Hilary Putnam contends that a denial of at least an approximate truth to scientific theories would mean that any successful predictions they make are nothing short of miraculous.¹¹⁷ Ivan Colagè suggests, however, that we can see truth as the asymptote which scientific enquiry approaches - thus prospective fruitfulness can be understood as bringing us closer to the truth.¹¹⁸ This is a helpful clarification for Hefner's own rather vague statement that fruitfulness is the closest that a theory may come to actual truth.¹¹⁹ So although Hefner does not claim the position for himself in as many words, the possibility of a critical realist reading of his work remains. Perhaps his statement that "a Lakatosian approach rests upon the assumption that fruitfulness is the form in which truth or correctness manifests itself" can be understood as a tacit affirmation of realism in some form, despite his diffidence over epistemology.¹²⁰

While Lipton does not use the term "fruitfulness", his notion of predictive success is roughly equivalent. Lipton is slower to link predictive success with truth than many scientific realists, pointing out the susceptibility of such a move to the base rate fallacy of confusing the low rate of successful false theories among unsuccessful false theories with the even lower rate of true theories among successful false theories.¹²¹ Ultimately, Lipton relies on what he considers to be sound philosophical intuition, rather than a watertight philosophical argument, in his acceptance of some form of scientific realism.

It is not that the truth of the theory is the best explanation of its explanatory or predictive success; it is simply that the theory provides the best explanations of the phenomena that the evidence describes. We find inference compelling in such a case because we are creatures that judge likeliness on explanatory grounds.¹²²

There is insufficient space to make an extensive comparison of the various epistemological positions here. Others have argued persuasively, however, that a commitment to a

116. Ivan Colagè, "Prospective Fruitfulness as a Criterion for Theory-Change and Research-Strategy Option," *Comprendre* 16, no. 1 (2014), 72.

117. Hilary Putnam, *Mathematics, Matter and Method* (Cambridge: Cambridge University Press, 1975), 73. Lipton argues convincingly, however, that Putnam exercises circular logic here. The miracle argument is constructed in support of scientific realism, yet it is only convincing to those who already are scientific realists (Lipton, *Inference to the Best Explanation*, 186).

118. Colagè, "Prospective Fruitfulness", 74.

119. Hefner, *The Human Factor*, 26.

120. *ibid.*, 26. Certainly this would go against Nancey Murphy's interpretation of Hefner's position, as well as her own use of Lakatos discussed above.

121. Lipton, *Inference to the Best Explanation*, 197.

122. *ibid.*, 206.

form of realism does not need to be abandoned along with foundationalism. McGrath, for example, points out that observed anomalies may “arise at the level of phenomena, rather than noumena” - it is not reality itself that is inconsistent but rather the observer’s limited perspective.¹²³

Many of the problems raised here concerning Lakatos’ methodology, whether applied to science or to theology, hinge on the place afforded to rationality. Reason is only one component of cognition. The growing field of embodied cognition is revealing the extensive influence on the mind by elements of the body beyond the brain. Neuroscientist Antonio Damasio contends that:

It is not only the separation of mind and brain that is mythical; the separation between mind and body is probably just as fictional. The mind is embodied, in the full sense of the term, not just embrained.¹²⁴

The importance of the imagination for cognition, and therefore for both scientific and theological enquiry, must also be recognised. Reason and imagination are not antithetical, but operate together in cognition.¹²⁵ Scholarly approaches (scientific, theological, or otherwise) that privilege reason above other aspects of knowing cannot help but impoverish understandings of reality.

While a comprehensive exploration of epistemology is beyond the current scope, the unresolved questions concerning the validity of Lakatos’ model represent a potential vulnerability in Hefner’s work. Various insights drawn from a Lakatosian understanding of theory acceptance, including the notion of explanatory power, are potentially useful for theological enquiry, however the rational component of Lakatos’ thought must be tempered with the acknowledgement of the epistemic constraints under which scientific investigation actually occurs. Yet a rejection of any form of realism along with foundationalism is also troubling. As Hefner himself does not address these questions, and other theologians in favour of applying a Lakatosian framework to theological statements have not supplied a compelling case for doing so, we must read his theological anthropology, dependent as it is on his scientific methodology, with caution.

123. McGrath, *A Scientific Theology: Theory*, 211.

124. Antonio Damasio, *Descartes’ Error: Emotion, Reason, and the Human Brain* (New York, NY: G. P. Putnam’s Sons, 1994), 118.

125. Molly Andrews, *Narrative Imagination and Everyday Life* (Oxford: Oxford University Press, 2014), 10.

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