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Protology and Eschatology in the Writings of John C. Polkinghorne: a Study of Contrastive Roles of Scripture

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ABSTRACT

PROTOLOGY AND ESCHATOLOGY IN THE WRITINGS OF JOHN C. POLKINGHORNE: A STUDY OF CONTRASTIVE ROLES OF SCRIPTURE

by

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ABSTRACT OF GRADUATE STUDENT RESEARCH

Thesis

Andrews University

Seventh-day Adventist Theological Seminary

Title: PROTOLOGY AND ESCHATOLOGY IN THE WRITINGS OF JOHN C. POLKINGHORNE: A STUDY OF CONTRASTIVE ROLES OF SCRIPTURE

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Problem

The focus of this thesis is to address the problem of the contrastive roles of Scripture in protology and eschatology in the writings of John C. Polkinghorne. On the one hand, Polkinghorne rejects a univocal understanding of Gen 1-2, by invoking symbolic/analogical language for Gen 1-2, so that he can accept scientific protology. On the other hand, Polkinghorne introduces an apparent, relative univocity of biblical language in order to obtain his eschatology, contrary to the claims of pure scientific eschatology. This seems to suggest a dimension of internal methodological and theological incoherence in his system.

Methodology

This thesis provides a descriptive systematic and evaluative analysis of the contrastive usage of Scripture in Polkinghorne's protology and eschatology.

Chapter 1 provides a brief introduction, outlines the objective and describes the research methodology and delimitations of the study. In chapter 2, Polkinghorne's scientific and theological methodology is analytically described. Chapters 3 and 4 present two case studies: protology and eschatology. Chapter 5 critically compares and contrasts the two case studies and presents the conclusion to this thesis and recommendations for further study.

Conclusions

The thesis concludes that Polkinghorne's symbolic interpretation of biblical protology and his relatively univocal interpretation of biblical eschatology suggests a problem in his hermeneutics, which affects his theological understanding of protology and eschatology. Polkinghorne does not clearly state his criteria for maintaining this distinction between his theological understanding of protology and eschatology. If theological language in protology is interpreted as symbolical rather than univocal, then eschatological language could be interpreted as symbolic as well in order to maintain consistency.

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In loving memory of Adelaide

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CHAPTER I

INTRODUCTION

Introduction

Physicist and theologian, John Polkinghorne, is one of the leading and respected voices[1] in the ongoing debate about the complementary relation between science and theology. He has attained his reputation through his prolific writing, authoring over thirty books while writing extensively in academic journals and contributing chapters in various books. Polkinghorne believes that both disciplines can inform one another, and he proposes doing theology in the context of science. Employing a *bottom-up* approach,[2] Polkinghorne describes his method with reference to how a scientist works, "We look to evidence for what we are asked to believe. Bottom-up thinkers proceed from the basement of phenomena to the superstructure of theory."[3] He wants a theology that is evidence-based, which would render it credible because it attempts to attain rational justification for its motivated beliefs.

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[1]Alister E. McGrath, *Science & Religion: A New Introduction*, 2nd ed. (Chichester, West Sussex, U.K.: Wiley-Blackwell, 2010). McGrath writes, "One of Polkinghorne's most significant achievements is to establish a firm place for natural theology in apologetics and theology. Natural theology is, in Polkinghorne's view, perhaps the most important bridge between the worlds of science and religion" (217).

[2]John C. Polkinghorne, *Traffic in Truth: Exchanges between Science and Theology* (Minneapolis, MN: Fortress, 2002), 49. Polkinghorne writes, "It is both possible and fruitful to conduct theology in the context of science, not because these two forms of the search for truthful understanding are without significant differences from each other, but because underlying their surface distinctions there is a common sharing in openness to reality which makes them intellectual cousins under the skin. Theology and science are partners in the human quest for truth and understanding, gained through the search for motivated belief" (John C. Polkinghorne, *Theology in the Context of Science* (New Haven, CT: Yale University Press, 2009), 40).

[3]John C. Polkinghorne, *Belief in God in an Age of Science* (New Haven, CT: Yale University Press, 1998), 84.

While the dialogue between science and theology may take place primarily in the areas of cosmology and protology, the relationship has extended into other fields such as eschatology.[4] Can a modern cosmology respond to the question of what will be the final destiny of this planet and all of its inhabitants and how the end will take place? Scientific eschatology presents a pessimistic viewpoint concluding that all life will be annihilated as a result of cosmic catastrophes. There are two general scientific hypotheses concerning how the earth will be terminated, either by way of a cosmic collapse or perpetual expansion. Because of the scientific nature of its methodology, this paradigm is designated as being factual[5] and does not offer any optimism for a better and meaningful future.

Polkinghorne, who is cutting new paths in eschatology, claims that scientific eschatology should be taken seriously, but he acknowledges that theology provides the answer to the final destiny of this planet and its tenants. Scientific eschatology does not provide any hope, but a theological eschatology provides a hopeful future, and this hope is anchored on the eternal faithfulness of God, the Creator and Redeemer of history.

The role of cosmological presuppositions cannot be overstated. Polkinghorne rejects a univocal reading of the biblical account of the origin of the universe while endorsing a symbolic

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[4]John C. Polkinghorne, "From Physicist to Priest," *Dialog* 35 (1996): 138.

[5]On the one hand, science, according to Polkinghorne, "cannot claim the achievement of final truth. It must always remain open to possibility of a radical revision of parts of its story" (John C. Polkinghorne, *Science and Theology: An Introduction* (London: SPCK, 1998), 11). He adds, "Science is not perceived as dealing with clear and indubitable facts, while other disciplines have to be content with cloudy opinions. On the contrary, all human knowledge is personal knowledge, though science's power to manipulate the object of its investigation and to put it to the experimental test gives it a technique of confirmation not available in other realms of experience, such as personal encounter, where the integrity of the other demands a greater degree of restrained respect" (ibid., 17). On the other hand, Polkinghorne views scientific achievements to have a "tightening grasp of an actual reality" (John C. Polkinghorne, *One World: The Interaction of Science and Theology* (Princeton, NJ: Princeton University Press, 1986), 24).

interpretation of the biblical text.[6] As an evolutionary scientist and a theistic evolutionist,[7] Polkinghorne accepts scientific protology and claims to be a *creationist*[8] in the sense that "the mind of God lies behind its [creation's] marvelous order and the will of God behind its fruitful history."[9] At creation, God, out of kenotic love,[10] allowed his creation to develop and create itself

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[6]Three traditional approaches to theological language are the *equivocal*, *univocal*, and *analogical* sense. An *equivocal* understanding implies that the same word is used twice with unrelated meaning: the "bark" of a dog and the "bark" of a tree. *Analogy* is between univocity and equivocity. Words share similar meanings when applied to the finite world and to divine reality. "Similarity is by way of analogy rather than by way of equality. Thus, God's love is like the love that a father or mother has . . . but it is so different that, though we can posit analogy, w cannot posit *equality* between the two concepts." Understanding a word *univocally* implies that the meaning is the same in two different settings even though there may be degrees of difference: "the pole is tall," and the "tree is tall." The idea "tall" is understood exactly the same in the two cases. The same is true when a word is applied to finite reality or to divine reality: "God is holy," is the same as "St. Peter is holy," with the only difference being degree. (For a more complete overview of all three approaches, see H. Wayne House and Kyle A. Roberts, *Charts on Systematic Theology* (Grand Rapids, MI: Kregel, 2006), 67-72). Carl Henry argues in favor of a univocal approach by writing, "Only univocal assertions protect us from equivocacy; only univocal knowledge is, therefore, genuine and authentic knowledge. . . . Unless we have some literal truth about God, no similarity between man and God can in fact be predicated" (Carl F. H. Henry, *God, Revelation, and Authority*, vol. 3 (Waco, TX: Word Books, 1979), 364). Works on theological discourse include David K. Clark, *To Know and Love God: Method for Theology* (Wheaton, IL: Crossway Books, 2003); Frederick Ferré, *Language, Logic and God* (New York: Harper & Row, 1961); Langdon Gilkey, "Cosmology, Ontology, and the Travail of Biblical Thinking," *The Journal of Religion* 41 (1961): 194-205; Langdon Gilkey, *Religion and the Scientific Future* (New York: Harper & Row, 1970); Ronald Nash, *The Word of God and the Mind of Man* (Phillipsburg, NJ: P&R, 1982); Dan R. Stiver, *The Philosophy of Religious Language: Sign, Symbol & Story* (Cambridge, MA: Blackwell, 1996).

[7]John C. Polkinghorne, "The Universe as Creation," in *Intelligent Design: William A. Dembski & Michael Ruse in Dialogue*, ed. Robert B. Stewart (Minneapolis, MN: Fortress, 2007), 173. According to Polkinghorne, creation is a collaborative process between God and his creatures. This is made possible because of the Creator's kenotic love that allows creation to create itself and be itself. This understanding is also an attempt to assist theology with the challenges and difficulties of theodicy. He comments, "The thought of creaturely self-making . . . is the theological way to interpret evolution. . . . It can be claimed that a world of that kind of evolving fruitfulness is a greater good than a ready-made creation would have been. Yet that goodness has a necessary cost. . . . In an evolving world, the death of one generation is the necessary cost of the new life of the next." For a biblical and theological repudiation of the necessity of death and soteriological implications, see John T. Baldwin, "The Geological Column and Calvary: The Rainbow Connection—Implications for an Evangelical Understanding of the Atonement," in *Creation, Catastrophe and Calvary*, ed. John T. Baldwin (Hagerstown, MD: Review and Herald, 2000).

[8]Polkinghorne, "The Universe as Creation," 178. He comments, "Like other theists, I am a creationist in the true sense of believing that the divine will is the source of the universe's being and the divine purpose is expressed in its history, but I am certainly not a 'creationist' in the curious North American sense of believing in a flat-footed literal interpretation of the first two chapters of Genesis" (ibid.).

[9]Ibid., 172.

[10]Ibid., 173. Kenotic love comes from the Greek word (κενωσίς) for emptiness. In this sense, it is

through gradual evolvement, not "instantaneous magic."[11] As a result of this idea of becoming, death became a necessary cause for the development of life.[12]

Although Polkinghorne accepts scientific protology, as a theologian, he is cognizant of the problems a scientific eschatology presents and therefore rejects it because the ultimate future lies in the hands of a faithful God, not in scientific extrapolation.[13] In biblical or apocalyptic eschatology, not in a realized eschatology,[14] life culminates with the creation and establishment of a new heaven and new earth as revealed in sacred Scripture. All suffering will be brought to a close while creation and humanity will recover from its deterioration.[15] God takes the initiative to create from the old, *ex vetere*.[16] The hope of a new heaven and a new earth, in order to be

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used as an indication of God's self-limiting activity. "The gift of love must always include some due degree of independence granted to the objects of love. Recognizing this has led to many contemporary theologians to understand the act of creation to be an act of creatorly kenosis, involving a divine self-limitation in order to permit the created other truly to be itself and, indeed, to make itself." Theistic evolution has to answer the problem on how it correlates a loving, powerful Creator with a God who stands by and watches his creation develop through death. This leads to another question,Why would God then take a different stance in the new creation? If he is powerful and able, would it not have been easier for him to do such a thing during the first creation? Polkinghorne claims that kenotic creation is a two-part activity: First, for the purpose of freedom, beings truly being themselves, and second, God desires to draw those who will freely come (Polkinghorne, *Theology in the Context of Science*, 158).

[11]Polkinghorne, *Theology in the Context of Science*, 156.

[12]Polkinghorne, "The Universe as Creation," 173.

[13]John C. Polkinghorne, *The God of Hope and the End of the World* (New Haven, CT: Yale University Press, 2002), 12.

[14]Ibid., 99. A realized eschatology, according to Polkinghorne, is an "inadequate expression of Christian hope. This life is too hurtful and incomplete to be the whole story. . . . Without a transcendent future, many are condemned to a loss of good that no process solely within history could ever restore to them" (ibid.).

[15]Polkinghorne, *Theology in the Context of Science*, 155, 157. According to Polkinghorne, God can transform the old into the new. True human life is psychosomatic and restoration is re-embodiment through an act of resurrection. Both humanity and the entire universe will participate in God's new creation.

[16]Polkinghorne, *The God of Hope and the End of the World*, 116.

credible, should include elements of continuity and discontinuity[17] and be grounded on the love of a powerful and active God who is concerned with the well-being of his creatures.[18] There is value to Polkinghorne's eschatology and his endeavor to develop a credible eschatology from a Christian perspective in light of the hopelessness of a purely scientific eschatology is promising.

Revelation is not propositional, according to Polkinghorne; rather, it is experiential,[19] consequently needing the assistance from other domains in order to achieve a unity of knowledge.

Statement of the Problem

Polkinghorne suggests that a scientific eschatology is not consonant with the biblical notion of a new creation. Although he is committed to the scientific interpretation of protology, he diverges on his methodology when discussing eschatology, even assigning an authoritative role to Scripture. On the one hand, Polkinghorne rejects a univocal understanding of Gen 1-2 by invoking symbolic/analogical language for Gen 1-2, so that he can accept scientific protology. On the other hand, Polkinghorne introduces univocity of biblical language in order to obtain his eschatology, contrary to the claims of pure scientific eschatology. This seems to suggest a dimension of internal methodological and theological incoherence in his system.

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[17]Ibid., 12-13. Polkinghorne writes, "While it is for theology to say what it can about the 'new' that God will bring into being, if that new is to be understood as the eschatological transformation of the old, then science may have some modest role to play in clarifying what will be the necessary degree of continuity required" (ibid.).

[18]Ibid., 95. Polkinghorne adds that "to sustain true hope it must be possible to speak of a God who is powerful and active, not simply holding creation in being but also interacting with its history, the one who 'gives life to the dead and calls into existence the things that do not exist' (Romans 4.17)." For Polkinghorne, "God is the God of hope because God is the God of past, present and future" (ibid., 101).

[19]Polkinghorne, *Theology in the Context of Science*, 4. He also writes, "A misunderstanding of the nature of the Bible has led some Christians to believe that it contains all necessary truth about pretty well everything. This leads, for example, to attempt to read Genesis 1 not as a profound assertion of the theological truth that everything exists only because of the will of God ("And God said, let there be . . ."), but as a divinely dictated scientific textbook, saving us the trouble by giving us an itemized account of how the universe began. When modern scientific insight differs from this picture (as it mostly does in detail), then the science must be manipulated and made to conform. This attempt of conquest leads to creation science, falsely so-called" (Polkinghorne, *Traffic in Truth: Exchanges between Science and Theology*, 7).

On what basis does Polkinghorne reject a univocal understanding of protology while affirming univocity for a biblical understanding of eschatology? How does this apparent contradictory and faulty hermeneutic impact the theology of his protology and eschatology? This is the hermeneutical/theological problem addressed by this thesis.

Statement of Purpose

The purpose of this study is two-fold. First, the study provides a descriptive overview of Polkinghorne's protology and eschatology and his theological attempt to resolve the dissonance between pure scientific eschatology and the biblical notion of a new creation. In doing so, the study examines his hermeneutical approach in rejecting univocal language for biblical protology but employing univocity for biblical eschatology. Second, by providing two significantly different theological approaches, the study critically evaluates his theological system for possible internal consistencies or inconsistencies associated with his eschatological framework in light of his treatment of protology.

Problem Justification

Prior research on Polkinghorne has been conducted in a few dissertations and theses.[20] However, there is a lacuna in scholarly work regarding Polkinghorne's methodology in relation to protology and eschatology. This study is unique because no major work has compared or

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[20]For example, Stephen Bishop, "The Relationship of Science and Religion: A Study of the Writings of Revd Dr John Polkinghorne, FRS" (M.A. thesis, University of Bristol, 1998); Elmer W. Brewer, "The Approaches of John Polkinghorne, Arthur Peacocke, and Ian Barbour for the Integration of Natural Science and Christian Theology" (Ph.D. dissertation, Southern Baptist Theological Seminary, 1995); Edward M. Hogan, "Whether Theology is a Science?" (Ph.D. dissertation, Boston College, 2001); Robert E. Powers, "Science and Religion: Toward a Unitary View: Perspectives from Ian Barbour and John Polkinghorne" (M.Div. thesis, Emory University, 1996); David Glenn Tully, "Critical Realist Faith: John Polkinghorne's Theology for a Scientific Culture" (M.Div. thesis, Emmanuel School of Religion, Johnson City, TN, 1999). Recent published dissertations include, Astrid Dinter, *Vom Glauben Eines Physikers: John Polkinghornes Beitrag Zum Dialog Zwischen Theologie Und Naturwissenschaften* (Mainz: Matthias-Grünewald-Verlag, 1999); Saether Knut-Willy, *Traces of God: Exploring John Polkinghorne on Theology and Science* (Trondheim, Norway: Tapir Academic Press, 2011); Taede A. Smedes, *Chaos, Complexity, and God: Divine Action and Scientism* (Leuven: Peeters, 2004).

contrasted his hermeneutical approach for inner consistency between his hermeneutics in protology and his hermeneutics in eschatology.

Methodology

This thesis is a descriptive systematic and evaluative analysis of the contrastive usage of Scripture in Polkinghorne's protology and eschatology. Although this study is limited primarily to Polkinghorne's theology and his abundant amount of literature, other writings have been introduced that are relevant to this investigation, especially in the treatment of hermeneutics and protology.

When discussing his eschatology, his volume *The God of Hope and the End of the World* will be the main source because it represents his most concentrated work on eschatology.

Beginning this study is Polkinghorne's scientific and theological method, that is, his understanding of the relationship between science and theology, critical realism, a Revised Natural Theology, revelation, and Scripture are described and analyzed. Next, two case studies, his protology and eschatology, are examined in light of his interpretive presuppositions. Finally, both case studies are evaluated by comparing and contrasting.

Delimitations

The focus of this study is to explore Polkinghorne's hermeneutical approach to his protology and eschatology in his model of doing theology in the context of science. Aside from the topics under discussion, this investigation does not attempt to provide a comprehensive treatment of his entire method and theology. The nature of this thesis is theological, and scientific arguments will not be discussed unless they have a bearing on his hermeneutics and theology.

Summary

This first section has identified the problem and purpose of this thesis: the contrastive role of Scripture in Polkinghorne's hermeneutical model and its impact on the theology of his

protology and eschatology. This section has also justified the problem in terms of comparing and contrasting his hermeneutical approach for inner consistency in his protology and eschatology and the hermeneutical/theological implications. Finally, the methodology and delimitations have been described. The second section provides a brief sketch of John Polkinghorne because in order to be *au fait* with the views of another individual, it is essential to be acquainted with their past experiences and life.

John C. Polkinghorne: The Scientist and Theologian

A self-proclaimed "vegetarian butcher,"[21] Polkinghorne has been regarded as the "C. S. Lewis" of science and religion dialogues[22] and a "living icon."[23] John Charlton Polkinghorne was born October 16, 1930, in Weston-super-Mare, England, and raised in an Anglican home.[24] Polkinghorne began his mathematical and scientific education at Trinity College, Cambridge, earning a bachelor's degree in 1952.[25] As a graduate student, Polkinghorne studied theoretical

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[21]John C. Polkinghorne, *From Physicist to Priest: An Autobiography* (London: SPCK, 2007), vii.

[22]John C. Polkinghorne, "John Polkinghorne," in *The Faith of Scientists in Their Own Words*, ed. Nancy K. Frankenberry (Princeton, NJ: Princeton University Press, 2008), 340.

[23]Edward M. Hogan, "John Polkinghorne and Bernard Lonergan on the Scientific Status of Theology," *Zygon* 44 (2009): 559.

[24]Polkinghorne was raised in a modest home where religion was central to the family. He describes himself as a "cradle Christian" worshipper in the Church of England. He had two siblings, Peter, who was killed fighting in World War II, and a sister, Ann, who died as an infant. In 1955 Polkinghorne married his sweetheart Ruth and they had three children. Their relationship spanned fifty-one years, until her recent passing on March 29, 2006. For a more complete description on Polkinghorne's life, see Polkinghorne, *From Physicist to Priest: An Autobiography*. For a more concise sketch, see John C. Polkinghorne, "From Physicist to Priest," in *Science and Theology: The New Consonance* (Boulder, CO: Westview, 1998); John C. Polkinghorne, "Physicist and Priest," *Spiritual Evolution* 1998): 113-120.

[25]Polkinghorne, "From Physicist to Priest," 134. Polkinghorne writes, "My undergraduate studies at Cambridge were in mathematics. I had chosen the subject because I was good at it and liked getting things right and also because my mathematical imagination had been kindled by an outstanding master who taught me. At the university I got interested in how one could use mathematics to understand the deep structure of the physical world" (ibid.).

physics in quantum field theory under Paul Dirac[26] and acquired his PhD in physics under the guidance of Abdus Salam in 1955.[27] Polkinghorne also completed post-doctoral work under Murray Gell-Mann[28] at Caltech (California Institute of Technology).

His appointment as a Lecturer in Mathematical Physics began at the University of Edinburgh. Afterward he returned to Cambridge as a University Lecturer, and subsequently was promoted to Reader in 1965; in 1968 he was elected the initial holder of the newly established Professorship of Mathematical Physics, a position he held from 1968-1979. In 1974, he was elected as a Fellow of the Royal Society,[29] and from 1975-1979, Polkinghorne was a member of Britain's Science Research Council. His work was in theoretical elementary particle physics,[30] using mathematics to model and understand the behavior of the smallest constituents of matter.

At the height of his career as a physicist in 1979, and after much contemplation, Polkinghorne stunned the scientific community by resigning his chair of theoretical physics at the University of Cambridge, by turning his "collar round"[31] and announcing his intention to become an Anglican priest. Polkinghorne gives two reasons to explain the rationale behind his pursuit of

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[26]Paul Dirac was one of the founding fathers of quantum theory and the founder of relativistic quantum mechanics. He received the Nobel Laureate in Physics in 1933. For Polkinghorne's brief sketch on Dirac, see John C. Polkinghorne, *Beyond Science: The Wider Human Context* (Cambridge: Cambridge University Press, 1996), 39-41.

[27]Ibid., 41-42. Salam received the Nobel Laureate in 1979 in Physics.

[28]Ibid., 42-45. Gell-Mann received the Nobel Laureate in Physics in 1969. Polkinghorne comments, "In his immediate presence, Gell-Mann's strength of character and his quickness of intellect meant that his thought patterns were imposed on you and, of course, you could never out-think him. The best one could manage was to limp along breathless in his wake" (42).

[29]Polkinghorne, *From Physicist to Priest: An Autobiography*, 70. Commenting on this achievement, Polkinghorne writes "that the ambition to be an FRS was a potent and disturbing element in my scientific life for a good number of years. If you had put to me some curious scheme by which my election would have been assisted by the murder of my grandmother, I would certainly have declined, but there would have been a perceptible pause of mental struggle before I did so" (ibid.).

[30]For a brief description of his contributions to physics, see ibid., 67-69.

[31]Polkinghorne, "Physicist and Priest," 120.

another occupation. First, he remarks that he was not disillusioned with science[32] but rather his partial departure from science was due to his exploration for truth that took him beyond the boundaries and limitations of science.

> Yet its enthralling account is not sufficient by itself to quench our thirst for understanding, for science describes only one dimension of the many-layered reality within which we live, restricting itself to the impersonal and general, and bracketing out the personal and unique. Many things altered my life when I changed from being a physicist and became a priest, but one significant thing remained the same: the central importance of the search for truth. All my life I have been trying to explore reality. That exploration includes science, but it also necessarily takes me beyond it.[33]

Second, the most fundamental reason for his changing occupations was that Christianity had always been central to his life,[34] though interestingly the topic of science and religion did not play a role in his decision to enter ministry. Upon his resignation, Polkinghorne pursued his training in theological studies at Westcott House, an Anglican seminary standing in a liberal catholic tradition that is part of the Cambridge Theological Federation. During his studies, Polkinghorne began to read Jürgen Moltmann's theological works, which continue to exert a deep

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[32]Polkinghorne, "From Physicist to Priest," 134. Polkinghorne comments, "The subject was always changing in response to new ideas and new discoveries. When one was young this state of intellectual flux was exciting; it became somewhat more tiring as one grew older. In mathematical thinking, most of us lose in middle age the flexibility of mind that is a characteristic of youth. We can still do the old tricks but it becomes harder to learn or to invent new ones. I had seen many senior colleagues get somewhat miserable as the subject moved away from them. I resolved I would leave physics before physics left me. I felt I owed this, not only myself, but also to the young workers in the large research group I was privileged to lead. As my fiftieth birthday approached, and as a particular era in particle physics came to a close with the establishment of what is called the Standard Model, I realised the time had come for me to go. I was not leaving physics because I had in any way become disillusioned with it, but I had done my little bit for the subject and now it was time to do something else" (ibid.).

[33]John C. Polkinghorne, *Exploring Reality: The Intertwining of Science and Religion* (New Haven, CT: Yale University Press, 2005), ix.

[34]Polkinghorne, *From Physicist to Priest: An Autobiography*, 73. Polkinghorne describes "formative experiences" that encouraged his move to priesthood: (1) the value of silence and prayer, (2) becoming a lay reader, and (3) the influence exerted upon him through a Bible study group.

influence.[35] In 1981, he was ordained a deacon and served as Curate of St. Andrews in Chesterton, Cambridge, from 1981-1982. Ordained a priest in 1982,[36] he also served at St. Michaels and All Angels in Bristol and in Bedminster (1982-1984). Polkinghorne was Vicar of a parish in Blean, located in the Canterbury district of Kent from 1984 to 1986. It was while serving in Blean that Polkinghorne came to realize that the task of writing about science and religion was part of his vocation.[37]

Following his five-year parochial ministry, Polkinghorne returned to academia, being elected to serve as Fellow Dean and Chaplain of Chapel at Trinity Hall, Campbell, from 1986-1989. Finally in 1989, he was elected President of Queens' College, Cambridge University, and remained there until his retirement in 1997.

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[35]Ibid., 82. While a student, Polkinghorne read Moltmann's work, *The Crucified God*. The concept of God as a "fellow-sufferer has made a lasting impression in Polkinghorne's thinking. "The insight of the crucified God is at the heart of my own Christian belief, and indeed the possibility of that belief. Later I was to go on to read all of Moltmann's major writings, and he has been the contemporary theologian who has helped and influenced me the most" (ibid.).

[36]Jennifer Lee Atkin, "Revelation & Reason: As a Physicist Who Became an Anglican Priest, John C. Polkinghorne Forges Common Ground between Science and Religion," (2002). www.science-spirit.org/article_detail.php?article_id=299 (accessed January 16, 2007). During 1982, Polkinghorne faced a life-threatening illness. He suffered from a severe digestive tract disease and had three abdominal surgeries. "My whole world had closed in to my hospital bed and the drips that were keeping me alive. My attention was focused on those drips, as if they needed continual mental assistance to do their job properly. God seemed very far away and I could not manage to pray. Yet I was deeply conscious of being prayed for, by my family, by my church and by some Anglican nuns who had become friends of mine. This weight of vicarious prayer sustained me." Following his discharge from the hospital, Polkinghorne convalesced for several months. This condition enabled him to better understand others who suffer physically. For a more detailed account, see Polkinghorne, *From Physicist to Priest: An Autobiography*, 98-99.

[37]Polkinghorne, "From Physicist to Priest," 135. Reflecting on his return to Cambridge from parochial work, Polkinghorne wrote, "I had thought originally that I had left the academic world for good, but I gradually came to recognize that thinking and writing about science and religion was part of my vocation, the particular way in which I might serve the Christian community" (ibid.). Regarding his interest in theology, he wrote, "I cared for physics, and I continue to do so, but I have come to realise that theology grips me much more profoundly than science ever did. Yet the personal paradox is that I shall never be able to become a professional theologian. I do not have the time or opportunity to recapitulate that long apprenticeship and involvement with a world-wide academic community which is the indispensable requirement of becoming a fully-fledged practitioner. I do not think this means that I have nothing to contribute to theological thinking, but I am aware of my limitations. I cannot claim to be more than a scientist with serious theological interests. I have to say that I wish I met a few more theologians who have serious scientific interests" (ibid.).

John Polkinghorne is a pioneer in the interdisciplinary studies of science and theology and a passionate believer in the unity of knowledge.[38] Because of his training as a mathematician-physicist turned theologian, Polkinghorne is a hybrid,[39] and his versatility enables him to cross over[40] both fields, crystallizing his thoughts through scores of scholarly articles, essays, and books. He has earned international recognition as one of the leading thinkers relentlessly searching for truth while correlating the conundrums of science and the Christian faith to enhance and gain a deeper understanding of reality.

After an illustrious career[41] as a physicist, priest, theologian, and author, Polkinghorne continues to be active, and numerous honors, accomplishments, and awards demonstrate the significance of his contributions.

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[38]John C. Polkinghorne, *Science and Religion in Quest of Truth* (New Haven, CT; London: Yale University Press, 2011), 20.

[39]Ted Peters, "Science and Theology: Toward Consonance," in *Science and Theology: The New Consonance*, ed. Ted Peters (Boulder, CO: Westview Press, 1998), 29.

[40]Polkinghorne, *From Physicist to Priest: An Autobiography*, 134. Interdisciplinary writing requires a "degree of intellectual boldness and a degree of intellectual charity. . . . I often say to myself that I strive to be two-eyed, looking with both the eye of science and with the eye of religion, and that such binocular vision enables me to see more than would be possible with either eye on its own." His "double mission" is to persuade others of the rationally motivated credibility of Christianity by encouraging "scientists to take religion seriously and not dismiss it unreflectively without a hearing, and on the other hand to encourage religious people to take science seriously and not to fear the truth that it brings" (ibid.).

[41]Sir Reverend Dr John Polkinghorne has truly had an amazing and distinguished career. Aside from being an accomplished theoretical elementary particle physicist and theologian, his illustrious achievements include additional honors and awards such as his election as a Fellow of the Royal Society (FRS) in 1974 and his appointment in 1997 as Knight Commander of the order of the British Empire (KBE) by Queen Elizabeth II for distinguished service to science, religion, learning, and medical ethics. He is a Fellow of Queens' College, Cambridge, a Canon Theologian of Liverpool Cathedral (1994), a Six Preacher, Canterbury Cathedral (1996), and was awarded a von Humboldt Foundation Award (1999). He was the recipient of the Templeton Laureate Prize for his treatment of theology as a natural science (2002), the fourth physicist to do so, winning the £700,000 prize money. He donated the money to Cambridge University towards the funding of post-doctoral research into science and religion. He is the founding president of the International Society for Science and Religion as well as one of the founders of the Society of Ordained Scientists. Polkinghorne has chaired and participated in various committees throughout his career: the Science, Medicine and Technology Committee of the Church of England's Board of Social Responsibility, the Advisory Committee on Genetic Testing (1996-1999), the publications committee of

Summary

The first section of this chapter identified the problem and purpose of this thesis: the contrastive role of Scripture in Polkinghorne's protology and eschatology. A historical background on Polkinghorne was provided in the second section. Polkinghorne's contrastive hermeneutic in protology and eschatology will be described and evaluated in chapters 2 to 4 of this thesis.

SPCK, the joint working party on Cloning of the Human Genetics Advisory Commission (1996-1999), the Human Fertilization and Embryology Authority. He served on the General Synod (1990-2000) and the Doctrine Commission (1989-1995) of the Church of England, and on the Medical Ethics Committee of the British Medical Association (1989-1998). As a physicist, Polkinghorne's contribution to bioethics is most notable. He was Chairman of the Committee to Review the Research Use of Fetuses and Fetal Material (1988-1989). In the UK the uses of fetal tissue, from which EG cells could be derived, are subject to guidance set out in the Polkinghorne Review (also known as "Polkinghorne Report," 1989). He chaired: the Nuclear Physics Board (1978-79), the Task Force to Review Services for Drug Misusers (1994-96), and the Governors of the Perse School, Cambridge (1972-81). Polkinghorne has been a member of the BMA Medical Ethics Committee, the General Synod of the Church of England, the Doctrine Commission, and the Human Genetics Commission (1996-2002). In 2004 he chaired the Appointments Committee to appoint members to the UK Biobank Ethics and Governance Council (EGC). Several universities have bestowed honorary doctorates and fellowships on Polkinghorne. He has received an Honorary Doctor of Science (ScD) from the Universities of Cambridge (1974), Exeter (1994), Leicester (1995) and Marquette (2003); a Honorary Doctor of Divinity (DD) from Kent (1994), Durham (1999) and an Honorary Doctor of Humanities (DHum) from the University of Hong Kong Baptist (2006). In addition to the doctorates, he has also received Honorary Fellowships that include Trinity College, Cambridge (1954, 1989), Royal Society (1974), Queens College, Cambridge (1999), St. Chad's College, Durham (1999), and St. Edmund's College Cambridge (2002).

CHAPTER II

POLKINGHORNE'S SCIENTIFIC AND THEOLOGICAL METHOD

Introduction

This chapter presents an analytical description of Polkinghorne's conceptions of science and theology and his hermeneutical perspectives on Critical Realism, Natural Theology, and Revelation. These insights will be helpful when analyzing and evaluating two proposed case studies for doing theology in the context of science, specifically Polkinghorne's protology and eschatology in subsequent chapters.

Theology in the Context of Science

Science and theology[1] are two of the most powerful cultural and intellectual forces in the world today. It is usual to discuss their relation as if they are two independent activities, but there

[1]There is no uniform entity called *science*, *religion* or *theology* because each has a wide range of disciplines with its own methodological distinction. In English, an exclusive definition of *science* is usually synonymous with the natural sciences or a method of gaining knowledge of natural phenomena. However, Hodgson notes that the German usage of *wissenchaft* denotes the systematic pursuit of knowledge and learning which follows closely the Latin *scientia* (see Peter C. Hodgson, "Theology and the Philosophy of Science," *Religious Studies Review* 3 (1977): 216). Under this inclusive definition, *theology* would be included because it also has a method of gaining knowledge about *God*. The label *religion* is also vague in view of the fact that there are numerous religious movements, each with its own exclusive understanding about nature and God. The term *theology* is also complicated because it could suggest metaphysics, a system of theoretical principles, the beliefs of a particular religious tradition, and the study or science of the doctrine of God. It is necessary to qualify the terms used in this thesis: *science*, is the "elaborate interconnection of thought, conviction, and tested experience related to nature and its texture" (Michael Welker, "Science and Theology: Their Relation at the Beginning of the Third Millenium," in *The Oxford Handbook of Religion and Science*, ed. Philip Clayton and Zachary Simpson (Oxford: Oxford University Press, 2006), 554). In addition, in this study, *theology* is limited to *Christian* theology as the objective and systematic study and interpretation of Christian teachings of reality while preserving interest in the unity of theology through critical reflection. For a discussion on defining theology as a science, see V. Philips Long and others, *Foundations of Contemporary Interpretation* (Grand Rapids, MI: Zondervan, 1996), 640-644.

is an "organic connection" between them when they are viewed from a historical perspective.[2] Both attempt to capture a complete picture of reality, and exploring their correlation can generate both conflict and enrichment.[3] Polkinghorne has labored to show the compatibility of science and theology. He writes that although his impression

> is that scientists are as likely to be religious believers as any other section of the community. Nevertheless there is a feeling abroad that somehow science and religion are opposed to each other. . . . In fact science and theology seem to me to have in common that they are both exploring aspects of reality. They are capable of mutual interaction which, though at times it is puzzling, can also be fruitful.[4]

Religion exerts a profound influence on science through its beliefs and traditions, and it continues to remain the biggest challenge that science faces.[5] Religion is increasingly being viewed as an "important dialogue partner in allowing the natural sciences to engage with

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[2]Peter E. Hodgson, *Theology and Modern Physics* (Aldershot, England: Ashgate, 2005), 19.

[3]The variations of the possible relational models between science and religion are the Conflict Model (antagonist and intolerant); the Independence Model (complete separation between science and religion because each uses different languages and poses different questions); the Dialogue Model (complementarian and both disciplines exhibit a degree of compatibilty) and the Integration Model (only one God and consequently only one truth). For a more complete description of these classifications see Ian G. Barbour, "Science and Religion, Models and Relations," in *Encyclopedia of Science and Religion*, ed. J. Wentzel van Huyssteen (London: Thomson Gale, 2003), 760-764; McGrath, *Science and Religion*, 45-50. Polkinghorne redescribes the Dialogue and Integration models in terms of the Consonance and Assimilation categories. He defines Consonance as "the way in which 'science does not determine theological thought but it certainly constrains it' by conditions of mutual congruence." In the case of Assimilation, a greater merging of the two is attempted. Polkinghorne adds that he is cautious of Assimilation. He writes, "I am suspicious of this latter approach, since I believe that it tends to result in science playing too great a controlling role in the proposed convergence, with the result that there is a danger that theological concerns become subordinated to the scientific." John C. Polkinghorne, *Science and the Trinity: The Christian Encounter with Reality* (New Haven, CT: Yale University Press, 2004), 9.

[4]Polkinghorne, *One World: The Interaction of Science and Theology*, xi.

[5]Cornelius G. Hunter, *Science's Blind Spot* (Grand Rapids, MI: Brazos Press, 2007), 9. He writes, "The biggest challenge that science faces stems from religion. The problem is not, as is sometimes popularly held, that religion opposes science. The problem is that religion has joined science" (ibid.).

questions which are raised, yet not answered, by scientific research."[6] The search for truth and understanding would be incomplete without religious input.[7]

The *dialogue model* for relations between science and theology is described in the following manner:

> What is important here is that in the dialogue model one tries to respect the specific nature and significance of both faith and science. The metaphor of consonance expresses this wonderfully: when two voices or instruments are consonant (literally: sound together) it is not the case that each makes the same sound, but rather that the *different* sounds they produce make an unmistakable harmony. The harmony between faith and science that people attempt to discover in the dialogue model likewise does not so much have the character of overlap, but rather of parallels and analogies and of tendencies which point in each other's direction.[8]

In view of the fact that the modern practice of science has important roots in the Judeo-Christian faith traditions,[9] along with the principle of the unity of knowledge,[10]

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[6]McGrath, Science & Religion: A New Introduction, 4.

[7]John C. Polkinghorne, *Science and Creation: The Search for Understanding* (Boston, MA: Shambhala, 1988), xi. Polkinghorne writes, "Nevertheless the search for understanding will be incomplete if it does not include within itself the religious qeust, for otherwise it will leave fundamental questions of significance and purpose unaddressed and unanswered" (ibid.).

[8]Gijsbert van den Brink, *Philosophy of Science for Theologians: An Introduction* (Frankfurt am Main: Peter Lang, 2009), 234. The relationship between science and religion was not originally understood through the various models of interaction. Rather, the metaphor of "God's two books of scripture and nature" was the dominate theme reaching its fullest articulation in the medieval philosophy and literature of Raimundus Sabunde. A popular saying during the seventeenth century was that God had written two books: the Book of Nature and the Book of Scripture and when read correctly they would not contradict each other since they shared the same author. For an overview of the metaphor's origin and decline, see Peter M. J. Hess, "God's Two Books: Special Revelation and Natural Science in the Christian West," in *Bridging Science and Religion*, ed. Ted Peters and Gaymon Bennett (Minneapolis, MN: Fortress Press, 2003), 123-140.

[9]van den Brink, *Philosophy of Science for Theologians*, 234. Brink resolutely affirms that "in fact science *is* a Christian enterprise, deeply anchored as it is in the doctrine of creation! The fact that later generations of scientists distanced themselves from these Christian roots, just as a booster is discarded from a rocket once it has helped to launch it, is another matter. The consonance between Christian faith and the presuppositions on which science was built does not change as a result of this development" (237). Hodgson affirms that "science as we know it is based on certain difinite beliefs about the world. . . . Modern science began only when they were reinforced and extended by the religious beliefs of the Hebrews and finally brought to completion by the theology of Christian Europe" (Hodgson, *Theology and Modern Physics*, 19). Concerning the doctrine of creation as an important driving force in the development of modern science Polkinghorne comments, "Nevertheless, a significant case can be made that it was the doctrine of creation that supplied a supportive ideological setting for the development of modern science"

Polkinghorne does not simply opine that science and theology can converse with each other in a constructive and responsible manner.[11] He not only affirms mutual compatibility but he also claims that theology is a "true Theory of Everything," by commenting, "I think that this futher quest, if openly pursued, will take the enquirer in the direction of religious belief. It is a search for the *Logos*. In consequence, I believe that ultimately the cousinly relationships . . . find their most most profound understanding in terms of that true Theory of Everything which is trinitarian theology."[12]

(John C. Polkinghorne, "Christianity and Science," in *The Oxford Handbook of Religion and Science*, ed. Philip Clayton and Zachary Simpson, Oxford Handbooks [Oxford: Oxford University Press, 2006], 58). Other authors have asserted that the assessment of Christianity having fostered science is "historically inaccurate and deeply misleading." See J. Wentzel van Huyssteen and others, "Introduction," in *Encyclopedia of Science and Religion*, ed. J. Wentzel van Huyssteen (London: Thomson Gale, 2003), xi.

[10]Polkinghorne, *Belief in God in an Age of Science*, 110. This impies that theology contains cognitive content. Polkinghorne writes, "God is the ground of all that is, every kind of human rational investigation of reality must have something to contribute to theological thinking, as the latter pursues its goal of an adequate understanding of the created world, understood in the light of the belief that the mind and purposes of the Creator lie behind cosmic order and history. Every mode of rational exploration of reality will have an offering to make" (Polkinghorne, *Theology in the Context of Science*, 9).

[11]Because the experience of God as creator is pivotal for both Natural Theology and the science-theology dialogue, one can trace important cousinly connections between science and theology. Both science and theology share the common cause for truth and "both are led to belief in unseen realities" (Polkinghorne, *Traffic in Truth: Exchanges between Science and Theology*, 49-50). Polkinghorne recognizes that there are significant disanalogies as well between the two. Theology does not share the cumulative character that science exhibits. Scientific understanding "attains a stability that means that it will not require further revision or amplification unless the boundaries of that regime are crossed." When it comes to theology, Polkinghorne claims that it has "never been a purely static discipline" and that it is a diachronic discipline (Polkinghorne, *Science and the Trinity: The Christian Encounter with Reality*, 26-27). Polkinghorne recognizes that it is mainly scientist-theologians who are leading the way in these dialogues. He stresses the need of theologians to get more involved in this dialogue. He comments, "To put the matter bluntly, I believe that too many theologians fail to treat what science has to offer with appropriate degree of seriousness that would enable them to acknowledge adequately its contextual role" (Polkinghorne, *Theology in the Context of Science*, 8). In another place he writes, "The most grievous absence from the conversation is that of the theologians. Their presence, in a sustained rather than a merely occasional way, is earnestly desired as part of future developments" (Polkinghorne, *Belief in God in an Age of Science*, 80).

[12]John C. Polkinghorne, *Quantum Physics and Theology: An Unexpected Kinship* (New Haven, CT: Yale University Press, 2007), 110. Elsewhere he writes, "In other words, there is indeed a Theory of Everything, but a theory that is much grander and more comprehensive and intellectually satisfying than any Grand Unified Theory of particle physics could ever be. I have been suggesting that the name of that Theory is Theology, that the world makes total sense because it is a creation, the unified expression of the Mind and Will of its Creator. In short, I believe that the search for understanding through and through, if pursued with total openness and honesty, will in the end be found to be the search for God" (John C. Polkinghorne, *Faith, Science & Understanding* (New Haven, CT: Yale University Press, 2000), 25).

Polkinghorne designates his approach to the dialogue model as *developmental*; a continuously unfolding exploration between science and theology[13] in which theological discourse is influenced by modern discoveries and the theological progress that takes place is "evolutionary rather than revolutionary."[14]

Polkinghorne perceives science and theology as intellectual cousins[15] speaking of unobservable entities,[16] such as the reality of the quantum world and the reality of the invisible God,[17] and consequently will even borrow language from one discipline to describe the other.[18]

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[13]Polkinghorne, *Science and the Trinity: The Christian Encounter with Reality*, 28. Polkinghorne's approach should perhaps be labled as revisionary/developmental. For Polkinghorne, some topics that have been the traditional concern of Christian theology and their interpretation require revision in light of modern knowledge and as a result of scientific discovery. An example of this would be the Fall in Gen 2. See John C. Polkinghorne, *Encountering Scripture: A Scientist Explores the Bible* (London: SPCK, 2010), 28-31. Barbour comments the following, "Polkinghorne's fourth category is *Developmental*, as he calls his own position. He wants theology rather than science to shape the agenda, but he recognizes that theological ideas were developed in the Bible, and in later interpretations of it, within changing cultural contexts. I would argue that all three of us share a developmental understanding of the history of theology, but we differ in the extent to which we think *reformulations* are called for in the light of historical research and well-supported scientific theories" (Ian G. Barbour, "John Polkinghorne on Three Scientist-Theologians," *Theology and Science* 8 (2010): 252).

[14]Polkinghorne, *Science and the Trinity: The Christian Encounter with Reality*, 28.

[15]Polkinghorne, One World: The Interaction of Science and Theology, 36; Polkinghorne, Science and Religion in Quest of Truth, 13.

[16]John C. Polkinghorne, *Scientists as Theologians: A Comparison of the Writings of Ian Barbour, Arthur Peacocke and John Polkinghorne* (London: SPCK, 1996), 14. "The quarks and gluons, which are believed to be the fundamental constituents of nuclear matter, are also thought to be confined – that is to say, so tightly bound within the particles that they constitute, that they will never be observable separately in isolation. Their existence is inferred from the way in which its assumption makes sense of great swathes of physical data. God is not available for direct inspection. His unseen presence is inferred from the way that this makes sense of great swathes of spiritual experience" (ibid.). For nice summaries in regards to believing in unobservable entities, see André Kukla and Joel Walmsley, "A Theory's Predictive Success Does Not Warrant Belief in the Unobservable Entities It Postulates," in *Contemporary Debates in Philosophy of Science*, ed. Christopher Hitchcock (Oxford: Blackwell Publishing, 2004), 133-148; Jarrett Leplin, "A Theory's Predictive Success Can Warrant Belief in the Unobservable Belief in the Unobservable Entities It Postulates," in *Contemporary Debates in Philosophy of Science*, ed. Christopher Hitchcock (Oxford: Blackwell Publishing, 2004), 117-132.

[17]Polkinghorne, *Belief in God in an Age of Science*, 122. "Yet, on the basis of intelligibility as providing the grounds for ontological belief . . . I am fully persuaded of the reality of the quark structure of matter. I believe that it makes sense of physical experience precisely because it corresponds to what is the case. A similar conviction" concludes Polkinghorne, "grounds my belief in the invisible reality of God" (ibid.).

[18]Ibid. "I believe," Polkinghorne states, "that nuclear matter is made up of quarks which are not

Both are open to correction. Polkinghorne writes, "Theology, like science, is corrigible. There is nothing immutable in its pronouncements. If they are found wanting after careful investigation they are to be abandoned."[19] Both disciplines speak of unity. In science, the unity of the natural world, and in theology, the unity of God.[20]

Polkinghorne advocates there are epistemological parallels between science and theology, which makes the dialogical approach attainable because both are concerned about making sense of things through their search for truth and understanding.[21] Scientific insights provide information that are vital for theological reflection. They complement each other by focusing on different dimensions of truth.[22] Science seeks to provide *explanations* to answer the *How* questions without theological assistance. In regard to metaquestions, for example, questions that are beyond the self-qualified confines of science, this is where theology can contribute by providing a broader and deeper context of reality. Accordingly, then, theology seeks to provide

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only unseen but which are also invisible in principle. . . . The effects of these quarks can be perceived, but not the entities themselves. To borrow language from theology, we know the economic quark but not the immanent quark" (ibid.).

[19]Polkinghorne, *One World: The Interaction of Science and Theology*, 28.

[20]Polkinghorne, *Science and Religion in Quest of Truth*, 15. In another place Polkinghorne writes, "The unity of knowledge is underwritten by the unity of the one true God; the veracity of well-motivated belief is underwritten by the reliability of God" (Polkinghorne, *Belief in God in an Age of Science*, 122).

[21]Polkinghorne, *One World: The Interaction of Science and Theology*. When theology is conceived as primarily a theoretical understanding of the world, this places theology in the same category as science. Yet the cognitive dimension does not take into consideration the existential character of theology. For Niekerk, theology is primarily concerned with existential questions, and the cognitive aspect of theology is subordinated to its existential subject matter. This leads him to write, "The priorities must be reversed: theology concerns primarily existential and only secondarily theoretical questions" (Kees van Kooten Niekerk, "A Critical Realist Perspective on the Dialogue between Theology and Science," in *Rethinking Theology and Science*, ed. Niels Henrik Gregersen and J. Wentzel van Huyssteen (Grand Rapids, MI; Cambridge: Eerdmans, 1998), 72).

[22]Polkinghorne, *Quantum Physics and Theology: An Unexpected Kinship*, 1. Polkinghorne adds, "Although in both kinds of enquiry this truth will never be grasped totally and exhaustively, it can be approximated to in an intellectually satisfying manner that deserves the adjective 'verisimilitudinous,' even if it does not qualify to be described in an absolute sense as 'complete'" (ibid.). In other words, both disciplines merely provide the appearance of truth, i.e., appearing to be true and probable.

meaning to the *Why* questions.[23] Both attempt to gain knowledge of the world and, according to their own methods, they should attempt to gain an integrated and complete picture. Polkinghorne affirms, "Science cannot tell theology how to answer theological questions, and theology cannot tell science how to answer scientific questions, but the two sets of answers will have to fit in with each other if they are really describing the one world of God's creation."[24]

This can be achieved by applying the rational strategy of *bottom-up* thinking. This perspective seeks to understand reality that is evidence-based, moving from experience to the attainment of well-motivated belief and understanding.[25] Polkinghorne describes the bottom-up thinker in science or theology as living "by reasonable faith but not by certain sight."[26] This form of rationality, natural to the sciences, can also be followed in theology because "religious faith does not demand irrational submission to some unquestionable authority, but it does involve rational commitment to well-motivated belief."[27]

According to Polkinghorne, "science and theology meet in the human,"[28] suggesting that human rationality supplies the key ingredient to working out a framework for dialogue.[29]

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[23]Polkinghorne, *Traffic in Truth: Exchanges between Science and Theology*, 8. A distinction between *explanation* and *meaning* is necessary because *meaning* transcends *explanation*. Baumeister defines meaning as "shared mental representations of possible relationships among things, events, and relationships. Thus, meaning *connects* things." Roy F. Baumeister, *Meanings of Life* (New York: Guilford Press, 1991), 15.

[24]Polkinghorne, *Traffic in Truth: Exchanges between Science and Theology*, 10.

[25]Polkinghorne, *Science and Religion in Quest of Truth*, 17-18.

[26]Ibid., 19.

[27]Ibid., 13.

[28]See chapter 6 in John C. Polkinghorne, *Reason and Reality: The Relationship between Science and Theology* (London: SPCK, 1991).

[29]Ernan McMullin concurs with Polkinghorne's sentiments on the centrality of human rationality in understanding where science and theology meet. He writes, "And I am fairly sure that the two do not deal with the *same* reality. By that I do not mean that there are different levels of 'reality', different degrees to which existence itself is realized. Rather, I mean that theology and science deal for the most part with different domains of the same reality. Science has no access to God in its explanations; theology has

Science and theology approach the universe from different perspectives. On one hand, the scientific perspective of the physical world is of a purely natural phenomena. Theology, on the other hand, looks at the natural world as God's creation, implying that scientific statements and theological propositions are about the same real world.[30]

Theological cognitive claims, when reformulated in contemporary categories, also have the same status as scientific claims. This allows Polkinghorne to take scientific and theological claims seriously. He aspires a theistic metaphysic where interdisciplinary consonance is exhibited.[31] He seeks to construct a "comprehensive and unified view of reality, within which both science and theology are contained and are able to interact with each other."[32] What then should be the controlling influence between science and theology? Polkinghorne answers:

> Our goal is an integrated picture of the way the world is. In that picture science and theology, reason and revelation, all find their place. There is indeed revelation of God, in those particular events and understandings preserved in scripture and tradition, but it is not insulated from the critique of reason or from evaluation in association with other forms of insight.[33]

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nothing to say about the natural world. Where the two, however, may overlap and thus interact is in the *human* domain; each has things to say about the nature of human reality" (Ernan McMullin, "Realism in Theology and Science: Response to Arthur Peacocke," *Religion and Intellectual Life* 2 (1985): 39).

[30]Polkinghorne, *One World: The Interaction of Science and Theology*, 36. "Theology and science differ greatly in the nature of the subject of their concern. Yet each is attempting to understand aspects of the way the world is. There are, therefore, important points of kinship between the two disciplines. They are not chalk and cheese, irrational assertion compared with reasonable investigation, as the caricature account would have it" (ibid.).

[31]Polkinghorne, *Traffic in Truth: Exchanges between Science and Theology*, 11. This can be comprehended in the following statement, "Science will tell theology what the structure and the history of the physical world are like. Theology will gratefully acknowledge these gifts and seek to set them within the more profound and comprehensive setting that belief in God affords. In its turn, this will enable theology to offer gifts to science that can make more intelligible the success and character of the scientific enterprise" (ibid.).

[32]Polkinghorne, *Scientists as Theologians: A Comparison of the Writings of Ian Barbour, Arthur Peacocke and John Polkinghorne*, 11.

[33]Polkinghorne, *One World: The Interaction of Science and Theology*, 42.

This even-handed strategy embraces insights without prejudice from each discipline, while avoiding the inherent danger of a fully unified synthesis of science and theology where one discipline takes a dominating role and assimilates the other.[34]

Interdisciplinary interaction is essential and attainable through motivated belief[35] amplifying his commitment to the idea of the unity of all knowledge. He writes,

> Knowledge is of value because it is the exploration of a created reality, itself given value by the love of its Creator. Knowledge is one because God is one, so that our encounter is with a created unity. The search for understanding is fundamental to our being human, an expression, whether acknowledged as such or not, of a profound obligation to seek for and to honour the Creator.[36]

In general, Polkinghorne provides a coherent model for the use of theology in the context of science while adopting a model of inference to the best explanation.[37] He offers an open-minded, critical attitude toward science and theology that constitutes a deeply insightful case for Christian theism. For him, both science and theology testify to a form of motivated belief[38] and both operate under the rubric of critical realism.

In this section, Polkinghorne's view of the relationship between science and theology was surveyed. The next section describes Polkinghorne's endorsement of a epistemological position, that is, critical realism.

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[34]Polkinghorne, *Science and Religion in Quest of Truth*, 22.

[35]Ibid., 2.

[36]Polkinghorne, *Faith, Science & Understanding*, 26. Polkinghorne also writes, "Search for knowledge of God is the quest for the most profound and comprehensive form of understanding, a task to which contributions from all truth-seeking enterprises will be both welcome and necessary" (Polkinghorne, *Theology in the Context of Science*, 6).

[37]Polkinghorne, *Science and Religion in Quest of Truth*, 73-74.

[38]Polkinghorne, *Theology in the Context of Science*, 40.

Critical Realism

According to Andreas Losch, realism, at its core, is "a *personal belief and a commitment* to an external reality."[39] Polkinghorne qualifies scientific realism[40] as a *critical* one.[41] He interprets knowledge in science and theology through the philosophical lens of *critical realism*.[42] Critical realism is an epistemological view that claims the attainment of increasingly approximate knowledge of an objective reality independent of our reflections. However, human knowledge of reality is progressive and fallible, so it is liable to revision.[43] Special to Polkinghorne's realist and

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[39]Andreas Losch, "Our World Is More Than Physics: A Constructive—Critical Comment on the Current Science and Theology Debate," *Theology and Science* 3 (2005): 281.

[40]According to Ronald MacLennan, scientific realism means "that the world is such that reliable knowledge of the world is possible, and that the process of human knowing is such that human beings do gain such reliable knowledge of the world" (Ronald B. MacLennan, "Belief-Ful Realism and Scientifc Realism," *Zygon* 36 (2001): 312). Major sources that have partially influenced and molded Polkinghorne's critical realism are Michael Polanyi, Ian G. Barbour, and A. N. Whitehead. See Losch, "Our World Is More Than Physics: A Constructive—Critical Comment on the Current Science and Theology Debate," 276-278; Andreas Losch, "On the Origins of Critical Realism," *Theology and Science* 7 (2009): 92.

[41]Polkinghorne, *Science and Religion in Quest of Truth*, 10.

[42]"I have to say that personally I remain persuaded of the validity of a carefully nuanced critical realism in both science and theology" (Polkinghorne, *Science and the Trinity: The Christian Encounter with Reality*, 10). "Thus, I see there to be a cousinly relationship between the ways in which theology and science each pursue truth within the proper domains of their interpreted experience. Critical realism is a concept applicable to both, not because there is some kind of entailment from method in one to method in the other—for the differences in their subject material would preclude so simple a connection—but because the idea is deep enough to encompass the character of both these forms of the human search for truthful understanding" (Polkinghorne, *Quantum Physics and Theology: An Unexpected Kinship*, 15). Polkinghorne views critical realism as the mediating view between modernism and postmodernism (ibid., 5-6). Nancey Murphy describes the steps in critical realism as "arguing from explanatory adequacy, to realism, to comparable epistemic status for theology and science, to the possibility for meaningful interactions between theology and science" (Nancey Murphy, "From Critical Realism to a Methodological Approach: Response to Robbins, Van Huyssteen, and Hefner," *Zygon* 23 (1988): 288).

[43]Critical realism affirms that objects exist independently of our thoughts about them (realism) and asserts that human knowledge of reality is a progressive dialogue between knower and known (critical). It has been the dominant epistemology in the Anglo-Saxon science and theology debate for several decades. The term was introduced into the science and theology dialogue in 1966 by Ian Barbour, covering both scientific realism and a theological realism that takes seriously the cognitive claims of religion (see Ian G. Barbour, "Commentary on Theological Resources from the Physical Sciences," *Zygon* 1 (1966): 27-30). Barbour believes critical realism must "acknowledge both the creativity of man's mind, and the existence

rational theory of science is the motto "epistemology models ontology,"[44] which means intelligibility is the reliable guide to ontology, but knowledge is not derived directly from reality. As Polkinghorne describes it, "My instinct is to adopt a realist stance, that is to believe that what we know is a reliable guide to what is the case."[45] For critical realists such as Polkinghorne, science and theology provide partial views of the world that may overlap on a range of issues such as cosmic origins and human nature. Polkinghorne is committed to providing theological perspectives that are capable of being harmonized with science when he writes that critical realism is "fundamental to the entire human quest for truth."[46]

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of patterns in events that are not created by man's mind" (*Issues in Science and Religion* [London: SCM Press, 1966], 172). Peter Barrett provides the following description of *critical realism*, "Here the subject of inquiry, whether it be the natural world or the being of God, is regarded not as simply a construct of the human mind but as actually existing independently of the mind—it is a *realist* view. Furthermore, since knowledge of the subject is acquired through the use of critical faculties, acting like spectacles through which the subject is viewed and reflected upon, this view is called *critical* realism. It stands in contrast to naïve realism of earlier centuries since it does not claim exactness of fit between mental models and the realities to which they refer. It acknowledges that knowledge is provisional, corrigible, approximate—and, from a later point of view, frequently wrong" (Peter Barrett, *Science and Theology since Copernicus: The Search for Understanding* (Pretoria: University of South Africa, 2000), 135). Currently a variety of critical realisms are in circulation, thus rendering the term ambiguous. After analyzing five main types of critical realism, Andreas Losch, who has written extensively on critical realism, concludes that it is an ambiguous term. In summary he writes, "Unfortunately, facing the diverse types of critical realism, I am not able to give a more positive definition of what it is about. Maybe the clue is something like 'reality is not what it at first appears to be like'; that may not sound very sophisticated. . . . In some sense, critical realism is realism after Kant, and also the relation to the evolving scientific method is an issue. For now, we have however to conclude that 'critical realism' as such is a rather ambiguous term which needs to be determined by the epistemological considerations of a distinctive philosophical tradition. If one wants to deal with critical realism further, one has therefore to distinguish its different types and their philosophical traditions and decide which one wants to treat. In addition, the dictionary definitions initially given in some respects probably only allow for a certain type of critical realism" (Losch, "On the Origins of Critical Realism," 98).

[44]Polkinghorne, *Science and the Trinity: The Christian Encounter with Reality*, 79. According to Smede's reading of Polkinghorne's critical realism, there is not a one-to-one mapping between our knowledge and reality. This model should not be interpreted as "what we know about reality implies that reality is so. . . . Critical realism merely claims that there is a similarity between the model (knowledge) and the modeled (reality), without there being a one-to-one correspondence. And it is reality that ultimately decides which models are appropriate and which inappropriate" (Smedes, *Chaos, Complexity, and God*, 48-49).

[45]Polkinghorne, *Science and the Trinity: The Christian Encounter with Reality*, 79. See also Polkinghorne, *Science and Religion in Quest of Truth*, 5. If there were no correspondence between ideas and reality, scientific success would seem unintelligibly gratuitous.

[46]Ibid., 11.

This raises the question as to what extent scientific and theological statements are compatible and how critical realism evaluates their cognitive contents. Unlike theology, science is not interested in incorporating theological claims since non-natural explanations are excluded in advance. However, theology does have an interest in science, suggesting an asymmetrical relation between the two. Niekerk writes that theology

> has an interest in science with regard to the performance of its proper task. The reason is the critical realist assignment of theology. This assignment involves the task of subjecting the realist claims of particular versions of a Christian worldview to a critical assessment, and in order to do so theology has to take into account the compatibility of those claims with science. Not in the sense that the scientific worldview should be considered as an absolute criterion. But . . . science contains a core of accepted knowledge which in many respects must be considered to have a realist bearing. Therefore, a critical realist theology has to take science seriously. This means on the one hand, that incompatibility with uncontroversial scientific views constitutes a serious challenge to theology. When for example geology, paleontology, and biology agree that there has been life on earth for at least 3.7 billion years, theology cannot reasonably stick to the view that life was created about 6000 years ago.[47]

It is clear to Polkinghorne that if theology is to be taken as a credible discipline, at the very least when constructing its cosmology, it becomes imperative that the scientific worldview be incorporated, implying a redefining of theological terms. Even though the critical realist position is suited with what science reveals about the world, it is important to note that it is a meta-scientific and philosophical position that interprets scientific data in a particular way.[48] Some have suggested that critical realism operates under a dualistic epistemological economy,[49] and, despite its influence in the science and theology dialogue, critical realism has been the

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[47]van Kooten Niekerk, "A Critical Realist Perspective on the Dialogue between Theology and Science," 80.

[48]Smedes, *Chaos, Complexity, and God*, 49. Nancey Murphy describes critical realism as a "truism" and "problematic." She also comments that it does not solve the problem of how science and theology interact, and when comparing worldviews she writes: "One is left with two equally valid but complementary pictures of reality—a situation that comes close, after all the struggle, to falling back into a version of the two-worlds approach" (Nancey Murphy, *Theology in the Age of Scientific Reasoning* (Ithaca: Cornell University Press, 1990), 197-198).

[49]Philip J. Knight, "The Adequacy of Language as a Critique of Religious Critical Realism," *Modern Believing* 2 (1999): 45.

subject of significant criticism,[50] including Niekerk's assumption that critical realism with regard to theological propositions mainly survives within the context of the Christian tradition.[51]

Polkinghorne aims at a "coherent interpretation of experience"[52] in which critical realism accounts for the parallels between science and theology. The overarching goal is the search for truth and understanding. However, knowledge and an understanding of reality can only be tentative and approximate.[53] The predictive success of science has produced knowledge that is

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[50]Losch comments that critical realism only fits with the natural sciences, reminding us that there is a category distinction. Theology is part of the humanities and critical realism omits social and human sciences resulting "when only natural science is involved, the richness of theology is reduced to a *theology of nature only."* He calls for a *constructive-critical realism* which would include the humanities to give an account of all of the dimensions of human experience, Losch, "Our World Is More Than Physics: A Constructive—Critical Comment on the Current Science and Theology Debate," 283-287. Ernan McMullin comments on Polkinghorne's critical realism that there is no single epistemological doctrine available to handle knowledge across the interdisciplinary divide. He writes, "Again, the critical realism of natural science does not, to my mind, carry over into theology. The affinities that Polkinghorne finds between the development of Christian doctrine and the recent development of quantum mechanics do not extend to the manner in which the two sorts of development were validated. But it is upon the mode of validation that the thesis of scientific realism depends. And the arguments that are advanced on its behalf simply do not carry over into theology. That is not to say that arguments might not be found for an appropriate doctrine of critical realism in theology, but these would have to be of a kind very different from those relied on in regard to natural science" (Ernan McMullin, "Belief in God in an Age of Science," *Commonweal* 125 (1998): 23). Gregory Peterson points out that critical realism is languishing. He echoes Murphy's sentiment on the problematic issue of how scientific and religious models can be said to correspond to reality. He also adds another point: "The more one acknowledges the critical element in any theory or model, the less realist it seems to be" (Gregory R. Peterson, "Science and Religion, Methodologies," in *Encyclopedia of Science and Religion*, ed. J. Wentzel van Huyssteen (London: Thomson Gale, 2003), 758).

[51]van Kooten Niekerk, "A Critical Realist Perspective on the Dialogue between Theology and Science," 76, 78. "It presupposes a positive attitude to Christian belief. In a fundamental way it is a question of *fides quaerens intellectum* (faith seeking understanding), which remains within the context of faith." Niekerk also notes that the definition of critical realism is affected because critical realism claims to be able to acquire knowledge about the physical world but also of God.

[52]Ian G. Barbour, *Issues in Science and Religion* (London: SCM Press, 1966), 269.

[53]"The chosen initial point of view must be open to correction in light of further experience, but it cannot be dispensed with and this introduces an element of circularity into the quest for understanding. There is both a hermeneutic circularity (we must adopt a point of view in order to understand experience; experience must confirm or modify our chosen point of view) and an epistemic circularity (how we know is controlled by the nature of the object of our knowledge; and that nature is revealed through our knowledge of the object)" (Polkinghorne, *Scientists as Theologians: A Comparison of the Writings of Ian Barbour, Arthur Peacocke and John Polkinghorne*, 15). In another place, he comments, "The true goal of scientific endeavor is understanding of the structure of the physical world, an understanding which is never complete but ever capable of further improvement. The terms of that understanding are dictated by the way things are" (Polkinghorne, *One World: The Interaction of Science and Theology*, 22).

gained by a "creative interpretation of experience."[54] In science, an experiment attempts to confirm or disconfirm a theory and a theory attempts to interpret an experiment.[55] Thus, the interaction between interpretation and experimentation can yield reliable knowledge or well-motivated beliefs, but it does not warrant complete and absolute certainty.[56] Science then can only claim the attainment of increasingly verisimilitudinous knowledge of the physical world.[57]

In order to determine what is postulated as verisimilitudinous truth, personal judgment and concepts must play a part.[58] Both science and theology rest on an unexplained foundation. For science, it is the fundamental laws of nature. In theology, it is the given existence of God. Hermeneutical perspectives determine what is observed and how it is to be observed. Even though there is a considerable degree of circularity[59] between the perspectives and the data, one always starts from some initial perspective. Polkinghorne, writes, "Because we can only approach reality from some initial point of view, experience and interpretation are inevitably intertwined.

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[54]Polkinghorne, *Science and Theology: An Introduction*, 17. "It is a realist position because it claims the attainment of increasingly verisimilitudinous knowledge of that nature of the physical world. It is a critical realist position because that knowledge is not directly obtained by looking at what is going on, but it requires a subtle and creative interaction between interpretation and experiment" (ibid.). Elsewhere, he writes, "Hence the belief is usually called 'critical realism', the modifying adjective being required as a recognition that scientific understanding is not just read out of nature but it is attained through a creative itnerpretative process" (Polkinghorne, *Faith, Science & Understanding*, 79).

[55]Kees van Kooten Niekerk, "Critical Realism," in *Encyclopedia of Science and Religion*, ed. J. Wentzel van Huyssteen (London: Thomson Gale, 2003). Niekerk explains that scientific theories are undetermined by empirical data because the same data allow for different theories that explain them (192).

[56]"A critical realist cannot claim the attainment of absolute truth, but rather an increasing verisimilitude–the construction of better and better maps of physical reality" (Polkinghorne, *Scientists as Theologians: A Comparison of the Writings of Ian Barbour, Arthur Peacocke and John Polkinghorne*, 16-17; Polkinghorne, *Science and Religion in Quest of Truth*, 7).

[57]Polkinghorne, *One World: The Interaction of Science and Theology*, 22. "If realism is to prove defensible it has to be a critical, rather than a naïve, realism. Firstly, it has to recognize that at any particular moment verisimilitude is all that can be claimed as science's achievement–an adequate account of a circumscribed physical regime, a map good enough for some, but not for all, purposes" (ibid.).

[58]Smedes, Chaos, Complexity, and God, 93.

[59]Michael Polanyi, *Personal Knowledge: Towards a Post-Critical Philosophy* (Chicago, IL: The University of Chicago Press, 1974), 299. "Any enquiry into our ultimate beliefs can be consistent only if it presupposes its own conclusions. It must be intentionally circular" (ibid.).

We cannot escape from the hermeneutic circle. . . . The scientist commits himself to belief in the rationality of the world in order to discover what form that rationality takes."[60]

Redolent with Polanyi's belief that complete objectivity is a "delusion" and "false idea,"[61] Polkinghorne states, "There are no significant scientific facts that are not already interpreted facts."[62] In other words, concepts shape and condition reality. Knowledge is constructed and mediated by concepts and theories.[63] This implies that concepts and theories have a heuristic function, guiding and indicating what to look for in light of a specific framework.[64]

Polkinghorne believes theology should adopt a prior interpretive point of view, and it is here that critical realism becomes relevant to theology. He articulates his interpretive priority of knowledge as:

> Intelligibility requires the adoption of a prior interpretive point of view in the effort to make sense of what is going on. Another reason our realism must be qualified as 'critical' lies in this need to don these theoretical spectacles in the attempt to perceive pattern in the flux of

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[60]Polkinghorne, *Reason and Reality: The Relationship between Science and Theology*, 6. Cf. ibid., 15: "Observer and object are linked in a mutual relationship. The nature of the object controls what can be known about it and the way in which that knowledge must be expressed. . . . A kind of version of the hermeneutic circle is involved."

[61]Polanyi, Personal Knowledge, 18.

[62]Polkinghorne, *Belief in God in an Age of Science*, 107.

[63]Smedes, *Chaos, Complexity, and God*, 94. "Observation does not simply mean 'seeing' but rather 'seeing as.' One observes in the sense that one sees something already as something. Our observation is thus filtered through our concepts" (ibid.). Smedes points out that Polkinghorne's critical realism can be converted to subjectivism, idealism, or even skepticism.

[64]Christopher C. Knight, *Wrestling with the Divine* (Minneapolis, MN: Fortress, 2001), 76. Christopher Knight elucidates, "For just as the scientist does not simply start with random raw data, but chooses what seems to be significant from the point of view of his or her current framework and then seeks to understand the data within that framework" (ibid.). Philip Knight comments, "For critical realists, while the reality of God and the realities of the physical world are independent of us, they are nevertheless understood and shaped in language and conveyed through media that reflect the psychological, sociological and cultural conditions of an observer's general milieu, thus limiting the claims of any observer to be able to 'describe' the reality being referred to as it is in itself. There is then no possibility of a humanly neutral description of divine reality" (Knight, "The Adequacy of Language as a Critique of Religious Critical Realism," 42).

events. Neither in science nor in theology will we derive much insight from simply staring at raw data.[65]

The concept of commitment to a belief is very important to Polkinghorne. He adopts Polanyi's philosophy of a responsible commitment. Intellectual assent and a commitment to a point of view in either science or religion must have sufficient motivation for commitment[66] even though one should remain mindful that in principle it may be mistaken.[67]

As a scientific and theological realist, Polkinghorne stresses parallels between critical realism in science and theology[68] when he writes, "The scientist and the theologian both work by faith, a realist trust in the rational reliability of our understanding of experience,"[69] and this

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[65]Polkinghorne, *Scientists as Theologians: A Comparison of the Writings of Ian Barbour, Arthur Peacocke and John Polkinghorne*, 15. "The dilemma," critiques Allen on Polkinghorne's explanatory theory, "with this portrait of theological knowledge gives the impression that theology is as empirical as the other disciplines–on critical realist grounds. What is ironic is that Polkinghorne presents theology's dependence on faith as truly distinctive. The reader is left with conflicting interpretations of Polkinghorne's position" (Paul L. Allen, *Ernan McMullin and Critical Realism in the Science-Theology Dialogue* [Burlington, VT: Ashgate, 2006], 37).

[66]Polkinghorne, *Science and Religion in Quest of Truth*, 9, 12. "Religious faith does not demand irrational submission to some unquestionable authority, but it does involve rational commitment to well-motivated belief." In regard to science, "Science, by these lights, is a set of *beliefs* which scientists are motvated to accept, not a set of *truths* that can't be called into question by those motivated to be skeptical about them" (Dean Nelson and Karl Giberson, *Quantum Leap* (Monarch Books, 2011), 45-46).

[67]Janet Martin Soskice, *Metaphor and Religious Language* (Oxford: Clarendon Press, 1987), 139-140, 152. Michael Polanyi writes, "So we see that both Kepler and Einstein approached nature with intellectual passions and with beliefs inherent in these passions, which led them to their triumphs and misguided them to their errors. . . . And again, what I accept of their work as true today, I accept personally, guided by passions and beliefs similar to theirs, holding in my turn that my impulses are valid, universally, even though I must admit the possibility that they may be mistaken" (Polanyi, 145). Echoing Polanyi, Polkinghorne comments, "I have motivations for my believing in a creative God. . . . It's a reasonable position, but not a knock-down argument. But it's strong enough to bet my life on it. Just as Polanyi bet his life on his belief, knowing that it might not be true, I give my life to it, but I'm not certain. I'm as certain as I am in judging people's character. Sometimes I'm wrong. . . . I quiver with the notion that I may be mistaken. But I choose to stand with Christ" (Nelson and Giberson, *Quantum Leap*, 47-48).

[68]Polkinghorne presents six parallels between critical realism in science and in theology in his *Belief in God in an Age of Science*, 105-122. An overview of the differences between critical realism in science and theology in Polkinghorne can be found in Andreas Losch, "Critical Realism: A Sustainable Bridge between Science and Religion?," *Theology and Science* 8 (2010): 400-401.

[69]Polkinghorne, *Belief in God in an Age of Science*, 124.

understanding stems from his conviction that the pursuit of science is an aspect of the *Imago Dei*.[70]

Polkinghorne's critical realist interpretation of science then rests on a metaphysical and religious worldview[71] that provides an "economic, coherent, adequately comprehensive and intellectually satisfying understanding of the rich range of human experience of reality."[72] His metaphysical and religious position warrants extracting knowledge of the physical world because of the rationality of the cosmos.[73] For this reason, Polkinghorne believes *intelligibility* is the key to reality.[74] Grounds for ontological belief are not limited to the observable but to the intelligible which provides the explanatory adequacy.[75] Rational inquiry is

> not characterized by an unwillingness to take intellectual risks, so that we cling to what is deductively certain, but it is bold enough to venture on the construction of a metaphysical scheme whose justification will lie in its attainment of comprehensive explanatory power.

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[70]Polkinghorne, *Reason and Reality: The Relationship between Science and Theology*, 6. "One might put it in theological terms by saying that the image of God is not so defaced in humanity that we are unable to attain a verisimilitudinous grasp of reality" (ibid.).

[71]Smedes, Chaos, Complexity, and God, 95-96.

[72]Polkinghorne, *Science and Religion in Quest of Truth*, 23.

[73]Polkinghorne, *Reason and Reality: The Relationship between Science and Theology*, 11. Polkinghorne claims that "the critical realist believes the way things are will provide the necessary clue to how they are to be understood. Those who commit themselves to this trust in a rational cosmos are asserting intelligibility to be the key to reality." Smedes explains, "This *belief* in the rationality of the cosmos, and the *belief* that our understanding is tuned in with that rationality and that reality, is the warrant that our scientific knowledge is a clue to how things really are" (Smedes, *Chaos, Complexity, and God*, 95).

[74]Polkinghorne, *Scientists as Theologians: A Comparison of the Writings of Ian Barbour, Arthur Peacocke and John Polkinghorne*, 14. "I have added to my critical realism the suggestion that it is intelligibility that is the key to reality, an attitude I first adopted in the course of seeking to defend the reality of the elusive and unpicturable quantum world. Entities with explanatory power are candidates for acceptance as components of reality. What makes sense of extensive experience is to be treated with ontological seriousness. Here is a particular way of expressing the realist conviction so natural to a scientist and so necessary for a theologian" (ibid.).

[75]Polkinghorne, *Science and Religion in Quest of Truth*, 11. "The existence of quarks must be defended by appeal to the intelligibility that they offer of more directly accessible phenomena. . . . In fact I believe that critical realism is a concept that is fundamental to the entire human quest for truth and understanding and that theology can defend its belief in the unseen reality of God by a similar appeal to the intelligibility that this offers of the general nature of the world and of great swathes of well-testified spiritual experience." Barbour makes the remark that "the real is *the intelligible, not the observable*" (Barbour, *Issues in Science and Religion*, 173).

> The success of science should encourage us to take such a bet on the reasonableness of the world and commit ourselves to an openness of experience to being understood.[76]

Because of this, Polkinghorne believes there is rational motivation for religious belief. The existence of God is a necessary condition for this motivation and theological statements presuppose matters of fact. Theological propositions have as their core, propositions about God. The applicability of critical realism to theology has to do primarily with the theological propositions with reference to God.[77] When theological propositions are reformulated in contemporary categories, this allows theology to operate as a critical realist discipline as expressed in the epigram *fides quaerens intellectum*.[78] Polkinghorne develops his theological critical realism on the assumptions that theological cognitive claims are reasonable because doctrines are a distinct theological form of knowledge.[79]

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[76]Polkinghorne, *Reason and Reality: The Relationship between Science and Theology*, 11. Elsewhere he writes, "At the heart of scientific realism lies the conviction that intelligibility is the reliable guide to ontology, that concepts and entities whose postulation enables us to make deep sense of wide swathes of experience, are to be taken with the utmost seriousness as candidate descriptions of what is actually the case" (Polkinghorne, *Belief in God in an Age of Science*, 109-110).

[77]van Kooten Niekerk, "A Critical Realist Perspective on the Dialogue between Theology and Science," 73-76. Niekerk provides three basic reasons why the transfer of a critical realist understanding from scientific statements to theological cognitive claims about God is not possible without modification. First, theology differs in regard to science because its core subject matter is contested. Second, the contrast between personal and unrepeatable experience in religion and the impersonal experiment in science. Third, language in theology differs because it is metaphorical and it lacks the precise mathematical statements of science.

[78]Polkinghorne, *One World: The Interaction of Science and Theology*, 28. Niekerk notes that "critical realism is at least a logically possible view of theological propositions. . . . But since God is not accessible to sense experience and experimental control, critical realism can hardly have the same rational plausibility for theology as for science" (192). Since the 1990s, the transfer of critical realism to theology has increasingly been disputed on the ground that it is not sufficient to the nature of theology. Niekerk outlines the main arguments in favor and against the transferring of critical realism to theology. The main arguments in favor are: (1) theology makes cognitive claims as science does; (2) theology seeks to explain religious experience with reference to divine reality. Science seeks to explain sense-experience with reference to the natural world; (3) both theology and science employ the use of metaphors and models as approximate descriptions of external realities. The main arguments against this transfer are: (1) religious language has an expressive function rather than a cognitive one; (2) theology examines God, who is wholly different from the natural world, which is the subject matter of science; (3) theology does not have similar predictive success as science. Therefore, theology lacks an equivalent of the main reason for a realistic view of science (192).

[79]Allen, *Ernan McMullin and Critical Realism in the Science-Theology Dialogue*, 15. Observations concerning Polkinghorne's critical realism are largely dependent on ibid., 13-47.

Polkinghorne's critical theological faith is open to development and correction in its understanding. In addition, revision can occur and, as in science, only verisimilitudinous knowledge is obtained.[80] Polkinghorne appeals to a theological argument in support of his philosophical claim that guides theological development and revision: "The God of truth will not be a deceiver, and insights into the divine character, manifested either in the works of creation or in the events of revelation, can be relied upon not to mislead."[81]

Polkinghorne addresses "faith, redemptive categories, human historicity, or revelational theology" in his theological critical realism and he also allows "a greater role for theological tradition in defining the way in which critical realism applies within theology."[82] Though theological tradition has a greater role, revisions to theology are permitted in light of present

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[80]Polkinghorne, *Scientists as Theologians: A Comparison of the Writings of Ian Barbour, Arthur Peacocke and John Polkinghorne*, 18. "The verisimilitudinous nature of our knowledge in science, and even more so in theology whose finite discourse will never be adequate to the Infinite Reality of which it purports to speak" (Kai Man Kwan, "A Critical Faith Vs. Uncritical Suspicion: Towards Critical Realism," *Stimulus* 16 (2008): 33). Kwan Kai Man defines his faith as a critical faith. He writes, "The kind of faith I am defending is a kind of critical faith. It adheres to the framework of critical realism. . . . It is also a faith that is willing to face criticism . . . faith can have a critical dialogue with criticism, sometimes rebutting the criticism and sometimes admitting the need to revise our understanding of the faith" (ibid.).

[81]Polkinghorne, *Quantum Physics and Theology: An Unexpected Kinship*, 15.

[82]Allen, *Ernan McMullin and Critical Realism in the Science-Theology Dialogue*, 14, 36. As Allen notes, Polkinghorne is prepared to shed the timeless view of God in classical theism. Polkinghorne stresses God's temporality. Polkinghorne comments, "Classical theism has always claimed that theatemporal view does not contradict human free actions since they are not foreknown but known only as they happen in God's timeless state of universally contemporaneous knowledge. My argument has been that it is unnatural to think of a world open to agencies that act to produce the future, as being one laid out complete in space and time, since it seems to be a world of unfolding becoming rather than static being. . . . Yet, it is difficult to reconcile the atemporal view with a great deal of Christian thought. The religion of the Incarnation seems to imply a divine participation in the reality of the temporal, from a birth under Augustus to a death under Tiberius. The God of the Old and New Testaments seems to have a deep engagement with historical process, with the becomingness of the world. . . . If one is to talk of divine temporality, then one must face the question of which time is the divine time. What is God's frame of reference for the judging of simultaneity? The problem is not as acute as it might seem for, whatever solution is supposed, God is not a localized observer in the chosen frame but omnipresent within it. As its time sweeps out history, God will experience every event as, where and when it happens, and know all such events in their correct causal interrelations" (Polkinghorne, *Belief in God in an Age of Science*, 70-71).

scientific insights.[83] In theological critical realism, theology procures motivated belief rather than fideistic assertions and certainties. Polkinghorne's theological critical realism is modeled on its scientific counterpart. He describes it as "based on an analogy with science's approach to exploring the way things are. Because it is realist, theology will want to retain an evidential appeal to Scripture as ground for belief. Because it is critical realism, theology will seek to respect the nature of the Reality it encounters.[84]

How then should one understand and interpret scientific statements and theological propositions? Since science and theology can only claim verisimilitudinous knowledge, models and metaphors are used to describe reality. Models, even though they are of "recognized inadequacy,"[85] are used in science as "explanatory devices, useful in the attempt to gain some understanding of a limited aspect of physical phenomena," and "there is no reason to treat models with ontological seriousness, as if they were approximate maps of reality."[86] When used by science, metaphors are "picturesque shorthand for ideas that they can readily and more adequately convey in precise scientific language."[87]

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[83]"Perhaps rather more than my scientist-theologian colleagues, I am anxious to locate our twentieth-century understandings within that development of Christian doctrine, to stress continuity rather than discontinuity with the past, without denying the particular insights available in the present" (Polkinghorne, *Scientists as Theologians: A Comparison of the Writings of Ian Barbour, Arthur Peacocke and John Polkinghorne*, 17). A few pages later, Polkinghorne further clarifies "I wrote my own Gifford lectures to explore to what extent we can use the search for motivated understanding, so congenial to the scientific mind, as a route to being able to make the substance of Christian orthodoxy our own and my conclusion was that one could attain a Christian belief which is certainly revised in the light of our twentieth-century insights but which is recognizably contained within an envelope of understanding in continuity with the developing doctrine of the Church through the centuries" (24-25). Wegter-McNelly comments along the same line "Critical realism' . . . provides room for religious reflection and theological (re)description to exist alongside scientific accounts" (Kirk Wegter-McNelly, "Fundamental Physics and Religion," in *The Oxford Handbook of Religion and Science*, ed. Philip Clayton (Oxford: Oxford University Press, 2006), 157-158).

[84]Polkinghorne, *Reason and Reality: The Relationship between Science and Theology*, 69.

[85]Ibid., 23.

[86]Polkinghorne, *Scientists as Theologians: A Comparison of the Writings of Ian Barbour, Arthur Peacocke and John Polkinghorne*, 19.

[87]Ibid., 20.

In regard to theology, Polkinghorne believes that metaphors and models play a more fundamental role than in science. Metaphors, when representing divine reality, provide a necessary medium because they not only say and refer to something in a way that cannot be said or referred to in another manner, they are inadequate because they are not straightforward descriptions, that is, they do not offer literal descriptions of their reference.[88] For Polkinghorne, metaphors are intrinsic to theological discourse: "Metaphor, in my view is not intrinsic to scientific discourse, but it certainly is to theological discourse. The latter's need to use finite language about the uncapturable infinity of the divine nature requires the indefinite open-endedness that metaphor affords, its poetic power to grant intuitive illumination."[89]

As in science, theological models are a necessary means of offering valuable partial insight in their exploration of depicting divine reality.[90] Because they are culturally conditioned, the interpretation of models is subject to revision. When required, models should be reformulated in contemporary categories:

> The primary source of theology is the biblical tradition. Theology recognizes that this tradition is an expression of human religious experience interpreted by changing categories of different times. Therefore, it cannot assign absolute authority to the cognitive claims of this tradition. It has to judge to what extent those claims can be regarded as valid in the light of

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[88]Soskice, *Metaphor and Religious Language*, 160. "All the metaphors which we use to speak of God arise from experiences of that which cannot adequately be described, of that which Jews and Christians believe to be 'He who is'" (ibid.).

[89]Polkinghorne, *Scientists as Theologians: A Comparison of the Writings of Ian Barbour, Arthur Peacocke and John Polkinghorne*, 20. Polkinghorne further comments, "Theology must go beyond the literary device of metaphor and make use of the broader concept of symbol. Symbols exceed signs in their possessing a profound power to participate in that which they represent. They verge on the sacramental and they are an indispensable expression of the life of worship." If metaphors are in fact inadequate means of describing divine reality, then "how," asks Don Cupitt, "can religion both be sure about God and yet be sure of the inadequacy of all the representations of God with which it operates?" (Don Cupitt, *Christ and the Hiddenness of God* (Philadelphia, PA: Westminster Press, 1985), 53).

[90]Polkinghorne, *Scientists as Theologians: A Comparison of the Writings of Ian Barbour, Arthur Peacocke and John Polkinghorne*, 23. "I find it useful to restrict the term 'model' to cases of acknowledged partial description and limited adequacy. That is also, I believe, how the concept functions in theology. Theology knows that all its models of God, if pressed too far, will eventually become inadequate idols. It also knows from apophatic theology concerning the unknowable mystery of the divine nature, that its pretensions to theory-making are never going to find adequate fulfillment. However, that does not lead it to intellectual despair, but to cautious modesty about its achievements" (ibid.). See also Arthur R. Peacocke, *Theology for a Scientific Age: Being and Becoming Divine and Human* (London: SCM Press, 1993), 14.

> the knowledge of our time. Moreover, it has to reformulate them in contemporary categories in order that they can be understood by people of our time. [91]

Theological models also include an affective element, engaging the emotions as well as the mind.[92] Models in theological discussions do not offer a complete understanding of the infinite divine reality nor should they be taken as serious ontological descriptions.[93] What Polkinghorne desires is the replacement of models, which do not refer to reality, for a single integrated theory that does refer to a "verisimilitudinous description of physical reality."[94]

Revised Natural Theology and Theology of Nature

Polkinghorne frames critical realism within Natural Theology, which also serves as the bridge between science and theology. This section examines his view on Natural Theology and Theology of Nature.

The theological strands of[95] Natural Theology and Theology of Nature are present in Polkinghorne's line of thinking. According to Polkinghorne, the assertions of traditional theology

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[91]van Kooten Niekerk, "A Critical Realist Perspective on the Dialogue between Theology and Science," 71.

[92]McGrath, Science & Religion: A New Introduction, 211.

[93]Polkinghorne, *Scientists as Theologians: A Comparison of the Writings of Ian Barbour, Arthur Peacocke and John Polkinghorne*, 21. Polkinghorne writes, "The limited scope of any one model's explanatory ambition, and the fact that it is not proposed as an adequate ontological description, means that there is no perplexity about the use of a portfolio of different models, and no necessity to seek their perfect reconciliation with each other. We no more need to resolve the tension between the divine models of God as Father and as Judge than we need to do the same for the physical models of the nucleus as a cloudy crystal ball and as a liquid drop. They simply serve to shed modest light on different, mutually exclusive, aspects of our experience. As Barbour says, we need to take them 'seriously but not literally'" (ibid.).

[94]Polkinghorne, *Science and Religion in Quest of Truth*, 19. See also Losch, "On the Origins of Critical Realism," 91. The "bottom-up" approach takes the interpreted experience of reality as the starting point and moves toward a theory that accounts for it.

[95]It is important not to conflate or confuse these two expressions. According to Ian Barbour, both *Natural Theology* and *Theology of Nature* are examples of partial integrations between science and theology. Both are characterized as attempts to integrate the evolutionary paradigm into theology. *Natural Theology* is a form of reflection that attempts to learn about God as creator by applying human reason to the natural world. Its starting point is the result of scientific research, rather than through divine revelation.

can be maintained in a scientific world.[96] He achieves this by using a revised form of Natural Theology for the purpose of integrating the natural sciences with Christian theology.[97] Hence, the role of Natural Theology is to provide the framework in exploring this integration in view of the fact that it affords a "convenient setting in which to begin."[98] What is this revised Natural Theology? Polkinghorne explains that the revision "reflects a clearer understanding of the status of natural theology and of its relationship both to science and to a theology that looks to revelation for its fundamental basis."[99]

In *Theology of Nature*, the starting point is not science, but a religious tradition based on histori, and reject already established theological doctrines. The Christian doctrine of creation is where this is most clearly seen. Barbour writes that "some traditional doctrines need to be reformulated in the light of current science. . . . In particular, the doctrines of creation, providence, and human nature are affected by the findings of science. If religious beliefs are to be in harmony with scientific knowledge, some adjustments or modifications are called for. . . . Theological doctrines must be consistent with the scientific evidence even if they are not required by it." Ian G. Barbour, *Religion and Science: Historical and Contemporary Issues* (New York: HarperCollins, 1997), 100-101; Ian G. Barbour, "Science and Religion, Models and Relations," in *Encyclopedia of Science and Religion*, ed. J. Wentzel van Huyssteen (London: Thomson Gale, 2003).

[96]Though beyond the scope of this study, the resilience of Natural Theology in England deserves attention. It flourished in England on account of its distinctive character. Brooke describes a unique characteristic of British Natural Theology: "Consequently, a critical mentality and faith in progress could thrive in England *within* piety. The peculiar resilience of natural theology can then be understood as a visible, and enduring, symbol of an Enlightenment goal—the pursuit of science—thriving within piety" (John H. Brooke, *Science and Religion: Some Historical Perspectives*, The Cambridge History of Science Series (Cambridge: Cambridge University Press, 1991), 200. For a summary, see pp. 197-203).

[97]Polkinghorne, *Science and Theology: An Introduction*, 70-72. According to William Alston, the Christian may appeal to Natural Theology in order to offer "metaphysical reasons for the truth of a theism as a general world-view; and then, within the field of theistic religions, he may argue that historical evidence gives much stronger support to the claims of Christianity than to those of its theistic rivals—Judaism and Islam." William P. Alston, *Perceiving God* (Ithaca, NY: Cornell University Press, 1991), 270.

[98]Polkinghorne, *Science and Religion in Quest of Truth*, 70. Polkinghorne comments that "one should also acknowledge that natural theology helps the believer to set basic Christian belief in the context of wider human culture and knowledge, and that it can also play an apologetic role in encouraging an honest enquirer to put the issue of God onto the agenda of possibility." John C. Polkinghorne, "Where Is Natural Theology Today?," *Science and Christian Belief* 18 (2006): 172. Fergusson writes that the term Natural Theology has been "stretched to comprehend a wide variety of theological tasks" and he describes five functions of Natural Theology. One role is to display the consistency of theology in ways in which the "essential claims of revelation can coexist" with other forms of enquiry. David Fergusson, "Types of Natural Theology," in *The Evolution of Rationality*, ed. F. LeRon Shults (Grand Rapids, MI: Eerdmans, 2006), 384-389.

[99]Polkinghorne, "Where Is Natural Theology Today?," 171.

The revised form of discourse replaces the hackneyed expressions of older styles of Natural Theology, such as "proofs" of God's existence for the cogent and theistic language of the "best explanation,"[100] which serves as the "deepest and most satisfying insight into the way the world is," [101] leading to motivated belief.

The content of Natural Theology revolves around two metaquestions: *Why is science possible* and *Why is the universe so special*? [102] Polkinghorne's interpretation is rooted on a metaphysical proposal: a divine Creator and a religious worldview. These features can be recognized in his theological explanations to the metaquestions.

For Polkinghorne, God operates as a warrant and as an explanation for the rationality of the physical world. He resituates theology, allowing it to "be an interpretative framework with its own data of religious experience as a distinct data-theory level in human culture."[103]

For Polkinghorne, the universe is both rationally transparent to inquiry and rationally beautiful.[104] He utilizes three general approaches to Natural Theology: human reason, orderliness

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[100]Polkinghorne, *Science and Religion in Quest of Truth*, 71.

[101]Polkinghorne, "Where Is Natural Theology Today?," 171. "The thesis that I would defend about theistic belief is not that it is logically ineveitable, but that it gives us the deepest and most satisfying insight into the way the world is. It is not that our atheistic friends are stupid—far from it—but that atheism explains less than theism can" (ibid.).

[102]Polkinghorne, *Science and Religion in Quest of Truth*, 71-76.

[103]Allen, *Ernan McMullin and Critical Realism in the Science-Theology Dialogue* 38. John C. Polkinghorne, *The Faith of a Physicist: Reflections of a Bottom-up Thinker: The Gifford Lectures for 1993-4* (Princeton, NJ: Princeton University Press, 1994), 44. Polkinghorne further comments, "If natural theology is to flourish again, it will require more input from the theological side." Polkinghorne explains "that theism offers a persuasive and coherent response to understanding the origin of the deep rational transparency and deep rational beauty that physics has discovered at the basis of the universe. Theology sees the reason within (human thinking) and the reason without (the order of the physical world) as having a common origin in the Mind of the Creator, whose will is the ground of both our mental capacity and our physical experience. The new natural theology suggests that science is possible, and mathematics is so unreasonably effective, just because the universe is a creation and human beings are, to use an ancient and powerful phrase, creatures made in the image of their Creator" (Polkinghorne, "Where Is Natural Theology Today?," 174).

[104]Polkinghorne, *Science and Religion in Quest of Truth*, 73.

of the world, and the beauty of nature.[105] Polkinghorne explains that science is possible because of the congruity between the human mind and creation. The human mind is "fine-tuned"[106] to discern God in an "orderly cosmos"[107] that contains and constitutes evidence for the presence of a divine Mind[108] and Purpose. This is inferred from the "deep intelligibility"[109] or "rational beauty of the cosmos."[110] This rational beauty is mimicked by the fact that mathematics[111] provides the

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[105]McGrath, Science & Religion: A New Introduction, 111-115.

[106]Ibid., 111.

[107]Polkinghorne, *Science and Creation: The Search for Understanding*, 20-21. "There is a congruence between our minds and the universe, between the rationality experienced within and the rationality observed without" (ibid.).

[108]Polkinghorne, *Quantum Physics and Theology: An Unexpected Kinship*, 8. "Achieving scientific success is a specific ability possessed by humankind . . . that a full understanding of this remarkable human capacity for scientific discovery ultimately requires the insight that our power in this respect is the gift of the universe's Creator who . . . made humanity in the image of God (Genesis 1:26-27) . . . are able to discern a world of deep and beautiful order—a universe shot through with signs of mind. I believe that it is indeed the Mind of that world's Creator that is perceived in this way. Science is possible because the universe is a divine creation" (ibid.).

[109]Polkinghorne, *Theology in the Context of Science*, 12. "In addition, there is a further metascientific necessity to make comprehensible the deep intelligibility of the universe, that fundamental fact about the world which has enabled science to derive its explanatory success. This is too remarkable a cosmological feature to be treated as if it were just a brute fact or a happy accident" (ibid.).

[110]Polkinghorne, *Belief in God in an Age of Science*, 4.

[111]For a summary of Polkinghorne's beliefs on mathematics, see John C. Polkinghorne, "Mathematical Reality," in *Meaning in Mathematics*, ed. John C. Polkinghorne (Oxford: Oxford University Press, 2011), 27-34. A strong thread of interest between science and theology continues while a similar thread between mathematics and theology did not emerge. Recent articles and essays that demonstrate increased interest in this relationship are in fashion. More recent literature includes: Wolfgang Achtner, "Truth and Proof in Mathematics and (Philosophical) Theology," *Theology and Science* 9 (2011): 75-89; James E. Bradley, "Theology and Mathematics--Key Themes and Central Historical Figures," *Theology and Science* 9 (2011): 5-26; Owen Gingerich, "Kepler's Trinitarian Cosmology," *Theology and Science* 9 (2011): 45-51; Ladislav Kvasv, "The Invisible Link between Mathematics and Theology," *Perspectives on Science and Christian Faith* 56 (2004): 111-116; Albert C. Lewis, "The Divine Truths of Mathematics and the Origins of Linear Algebra," *Theology and Science* 9 (2011): 109-120; W. G. Malcolm, "Thinking About God and Infinity: Can Mathematics Contribute?," *Stimulus* 18 (2010): 35-41; Vance G. Morgan, "Mathematics and Supernatural Friendship," *Philosophy & Theology* 18 (2006): 319-335; Alvin Platinga, "Theism and Mathematics," *Theology and Science* 9 (2011): 27-33; Volker R. Remmert, "Galileo, God and Mathematics," in *Mathematics and the Divine: A Historical Study*, ed. Teun Koetsier and Luc Bergmans (Amsterdam: Elsevier, 2005); Stewart Shapiro, "Theology and the Actual Infinite: Burley and Cantor," *Theology and Science* 9 (2011): 101-108; Christian Tapp, "Infinity in Mathematics and Theology," *Theology and Science* 9 (2011): 91-100.

"key to unlock these physical secrets . . . whose equations are endowed with the unmistakable character of mathematical beauty."[112] Polkinghorne further elucidates:

> Those seeking an understanding as complete as possible must ask what it could be that links together the reason within (mathematical thinking) and the reason without (the structure of the physical world) in this remarkable way? . . . I believe that the reason within and the reason without fit together because they have a common origin in the God who is the ground both of human mental experience and of the existence of the physical world of which we are a part. The fact of an intelligible universe itself becomes intelligible when the world is seen as being a divine creation and human beings, to use an ancient and powerful phrase, as creatures made in the image of their Creator.[113]

The uniqueness of the universe can be seen through the insights of the anthropic principle.[114] This provides the epistemological basis to theological claims regarding the natural universe. The laws of nature operate in a precisely defined form, and a religious believer "will see cosmic fine-tuning as an endowment of potentiality given by the Creator to creation in order to bring about a fruitful history that fulfills the divine Purpose."[115]

It is critical to keep in mind that Polkinghorne is influenced by his high view of science. His revised Natural Theology presupposes the validity of science and does not rival scientific explanation. He explains:

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[112]Polkinghorne, *Science and the Trinity: The Christian Encounter with Reality*, 12-13. Polkinghorne explains, "There is much more to the mind of God than physics will ever disclose, but thisusage is not misleading, for I believe that the rational beauty of the cosmos indeed reflects the Mind that holds it in being. The 'unreasonable effectiveness of mathematics' in uncovering the structure of the physical world . . . is a hint of the presence of the Creator, given to us creatures who are made in the divine image. I do not present this conclusion as a logical demonstration—we are in a realm of metaphysical discourse where such certainty is not available either to believer or to unbeliever—but I do present it as a coherent and intellectually satisfying understanding" (Polkinghorne, *Belief in God in an Age of Science*, 4-5).

[113]Polkinghorne, *Science and Religion in Quest of Truth*, 73. Ratzsch explains that "This aesthetic dimension is perceived as so fundamentally infused into the structure of law that many physicists take beauty to be a pointer toward truth" (Del Ratzsch, *Nature, Design and Science* (Albany, NY: State University of New York Press, 2001), 35.

[114]The term Anthropic Principle is generally used to refer to the remarkable degree of *fine-tuning* observed within the natural order. For an overview see Michael A. Corey, "Anthropic Principle," in *Encyclopedia of Science and Religion*, ed. J. Wenztel van Huyssteen [London: Thomson Gale, 2003], 13-18.

[115]Polkinghorne, *Science and Religion in Quest of Truth*, 74.

> This new natural theology is in no way a rival to science within science's proper domain. It does not purport to provide answers to what are essentially scientific questions but it serves as a complement to science, going beyond the latter's self-limited realm of enquiry and addressing metaquestions, that arise from scientific experience but which transcend the bounds of scientific understanding alone. There is no recourse here to 'the God of the Gaps' . . . but to the God whose steadfast will is held to be expressed in the laws of nature that science discovers but does not explain.[116]

Notwithstanding that Natural Theology can elaborate a cumulative case for theism,[117] it offers limited resources for theological investigation and consequently leads to limited theological insight. Polkinghorne realizes that Natural Theology alone is insufficient for faith.[118]

Polkinghorne's approach can also be considered under the aspect of Theology of Nature whose metaphysical scheme has as its defining basis theism. He regards God's existence as having explanatory force, "as an aid for understanding why things have developed in the physical

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[116]Polkinghorne, *Science and Theology: An Introduction*, 71. He writes elsewhere: "Theology's job is not to rival science on its own ground (the How questions) but to complement science by offering its own more profound kind of understanding (the answers to Why quesitons)" (Polkinghorne, *Traffic in Truth: Exchanges between Science and Theology*, 30). Polkinghorne assumes the integrity of human capacity to reason, perceive, interpret, and evaluate the universe. The effects of sin do not appear to prevent a correct understanding and interpretation of the universe.

[117]The identity of God remains unanswered. The God prescribed by Christians is not obviously distinguished. In Christian theology, God is a personal being who cares for his creation. Natural theology cannot prove the existence of an infinite Creator from the existence of a finite universe. It can only establish through inference the existence of a powerful but perhaps limited God. Polkinghorne recognizes this when he writes: "Even if the arguments presented so far are accorded their most persuasive force, one must confess that they lead only to a rather thin idea of God, conceived as something like the Cosmic Architect or the Great Mathematician" (Polkinghorne, *Science and Theology: An Introduction*, 76). If this line of reasoning is correct and adequately presented, one would tend to think any rational person would be convinced. Yet, this is not the case and Polkinghorne is aware of this: "The claim being made is not that this insight is logically incontestable and could not be denied, but that it offers the deeply intellectually satisfying best explanation of the remarkable access that science has been able to attain to the deep structure of the universe" (Polkinghorne, *Science and Religion in Quest of Truth*, 73-74).

[118]Polkinghorne, *Reason and Reality: The Relationship between Science and Theology*, 60. "I do say, however, that considerations of natural theology and the like do not afford the fundamental basis for my own religious belief. That lies in my encounter with God in Christ, mediated through the Church, the sacraments, and, of course, the reading of Scripture" (ibid.). Elsewhere, he notes that Natural Theology, on its own, "can lead only to a generic kind of theism and it leaves unaddressed many significant questions, such as whether the Creator enters into any particular relationship with particular creatures. Resources for addressing such questions will have to come from specific acts of divine disclosure, that is to say, from what theology terms 'special revelation'" (Polkinghorne, *Science and Religion in Quest of Truth*, 110-111).

world in the manner that they have."[119] He further comments, "Theism is concerned with making total sense of the world. The force of its claims depends upon the degree to which belief in God affords the best explanation of the varieties, not just of religious experience, but of all human experience.[120]

In this strategy, the scientific account of the character of the physical world is maintained, but an "alternative metainterpretation" is given. God is the source and the understanding of the world flows from the belief in the existence of a Creator.[121] This automatically leads to the doctrine of creation, expressing further consonance between science and theology.

Scientific Methodology and Presuppositions

The object of scientific inquiry is the natural world, and the standard image of scientific knowledge is of linear progress. As knowledge increases, more gaps are filled in its understanding. The key to science is the method by which it arrives at its conclusions. This method is described by the formula "from fact to theory."[122] Scientific methodology seeks to gain

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[119]Polkinghorne, *Belief in God in an Age of Science*, 13. "The theologian's response to the biologist's unbelief must lie in proposing an alternative interpretation of the history and process of the universe. Here we are concerned . . . with metaquestions about how its historical process is to be understood. This shift of attention corresponds to a transition from natural theology to a theology of nature. We are not now looking to the physical world for hints of God's existence but to God's existence as an aid for understanding why things have developed in the physical world in the manner that they have" (ibid.).

[120]Ibid., 24. "Since God is the ground of all that is, every kind of human rational investigation of reality must have something to contribute to theological thinking, as the latter pursues its goal of an adequate understanding of the created world, understood in the light of the belief that the mind and purposes of the Creator lie behind cosmic order and history" (Polkinghorne, *Theology in the Context of Science*, 9).

[121]Polkinghorne, *Science and Theology: An Introduction*, 77. "The task is to accept the scientific story at its own level but to propose an alternative metainterpretation of that story, read out from the belief that behind it lie the creative purposes of God" (ibid.).

[122]van den Brink, *Philosophy of Science for Theologians: An Introduction*, 27. Brink succinctly explains the scientific method: "Things start with the scientist observing factual data. These data call for an explanation, or a theory. What scientists then do, on the basis of the observed facts, is to develop a theory with which to test the facts. . . . If the theory now seems to work, then it can be seen to have been proven, and another blank is filled in on the map, and the voyage of discovery in search of new facts and explanations can continue" (ibid.).

knowledge by understanding the natural processes of physical reality by addressing specific types of questions and advancing specific types of answers.

Scientific methodology has four main features,[123] which contain three key elements: the empirical, the objective, and rationality.[124] First, the scientific method is in tune with facts that consist of observing and identifying reliable and predictive patterns and structures of physical reality, that is, natural laws *empirically*. Natural causes must explain these patterns and structures *rationally*. Second, the patterns of physical reality are explained through a hypothesis that can become a theory. Only theories that produce testable predictions are regarded as scientific. Third, hypothesis and theories are tested and compared to other relevant theories and are often modified and changed in light of new evidence. Thus, science is open to revision, and the scientific method cannot claim it produces absolute truth but only partial approximations.[125] Finally, science is open to distortion because scientists view the world from a chosen perspective with multiple interpretations and prior expectations. The scientific method must exhibit some degree of *objectivity* in handling data, and this is fostered by submitting all fact-claims and theories to communal challenge.

Science also has a characteristic set of presuppositions that are not proven scientifically but rather they are philosophically assumed. First, it is postulated that nature is understandable. Second, science assumes that nature is uniform and its processes and patterns hold universally. Third, science presupposes that observable patterns in nature provide keys to unobservable patterns and processes.

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[123]Michael H. Barnes, *Understanding Religion and Science: Introducing the Debate* (New York: Continuum, 2010), 41-43.

[124]Del Ratzsch, *Science and Its Limits* (Downers Grove, IL: InterVarsity Press, 2000), 14.

[125]Polkinghorne, *Science and Religion in Quest of Truth*, 8. "While the achievement of science does not amount to absolute and exhaustive truth, it can be asserted to be what one may call 'verisimilitude', an ever tightening, but never total, grasp of physical reality" (ibid.).

The Authority and Limits of Science

Scientism,[126] or "cosmic literalism,"[127] is the biased view that scientific truth is absolute truth. It sees science possessing rational legitimacy while other sources of knowledge, including theology, are generally viewed as not holding this intellectual distinction. For example, Peter Atkins views modernist science as the only true source of knowledge when he writes that science "is the only path to understanding."[128] However, others have affirmed that there are clear limits to its authority and competence because it encounters a universe that transcends its ability to explain.[129]

Polkinghorne is a resolute opponent of scientistic claims. He refutes the notion of the absolute relevancy in science because there are other equally legitimate avenues to seeking

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[126]The epistemological form of scientism should be distinguished from ontological scientism. Epistemic scientism is any assertion that only scientific understanding yields genuine knowledge on everything there is to know about reality. Because of its monopoly on knowledge, anything outside of science is pseudo-knowledge. This sets the limit of human knowledge. Ontological scientism limits reality by reducing it to the material world (Mikael Stenmark, "Scientism," in *Encyclopedia of Science and Religion*, ed. J. Wentzel van Huyssteen (London: Thomson Gale, 2003)). Ted Peters writes, "Not only is it anti-religious, it only pretends to be scientific. Actual science as a research enterprise does not need the ideology of scientism." Ted Peters, "Contributions from Practical Theology and Ethics," in *The Oxford Handbook of Religion and Science*, ed. Philip Clayton and Zachary Simpson (Oxford: Oxford University Press, 2006), 377.

[127]John Haught has coined scientism as a "cosmic literalism," analogous to a biblical literalism (John F. Haught, *Deeper Than Darwin: The Prospect for Religion in the Age of Evolution* (Boulder, CO: Westview Press, 2003), 16).

[128]Peter Atkins, "Atheism and Science," in *The Oxford Handbook of Religion and Science*, ed. Philip Clayton and Zachary Simpson (Oxford: Oxford University Press, 2006), 124.

[129]George F. R. Ellis, "Physics, Complexity, and Religion," in *The Oxford Handbook of Religion and Science*, ed. Philip Clayton and Zachary Simpson (Oxford: Oxford University Press, 2006), 760-761. For example, ethics, aesthetics, metaphysics, and meaning are outside the ambit of science. They are beyond the competence of science because there are no scientific experiments that can determine any of them. Ellis explains why there are limits to science. "Because experimental science deals with the generic, the universal, in very restricted circumstances. It works in circumstances so tightly prescribed that effects are repeatable. Most things which are of real value in human life are not repeatable. They are individual events which may have crucial meaning for individuals and for humanity in the course of history; but each occurs only once. So repeatable science does not encompass either all that is important or all than can reasonably be called knowledge" (ibid.).

knowledge, as is the case of theology, which searches for knowledge of God.[130]

Even though Polkinghorne acknowledges there are other forms of gaining knowledge, it is evident that the advancement of scientific knowledge influences his context of thought. On the one hand, he acknowledges the dominant and normative role of science in contemporary culture by defending a view of science which asserts its achievements to have an "ever tightening, but never total, grasp of physical reality."[131] On the other hand, Polkinghorne concedes that science is limited to what it can offer.[132] First, science is concerned with exploring the *impersonal*[133] dimension of reality by its unique means of contriving the same phenomena through repeated experiments since science does not engage with the personal dimension of experience, and this implies a limited character that it can provide of reality.[134] Second, science is limited to the kinds of questions that clarify and explain the processes by which things happen.

The following section takes into consideration Polkinghorne's view on the nature and authority of sacred Scripture, and the function and language of Scripture. This investigation is a necessary step in preparation for a subsequent examination of his usage of Scripture in his model of protology and eschatology.

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[130]Polkinghorne, *Traffic in Truth: Exchanges between Science and Theology*, 1-2. "A few of my scientific colleagues think that science is the only real source of knowledge and that the only questions worth asking and answering are those that are scientific in character. . . . It is hard to exaggerate the implausibility of this view. The land of science rings with tales of great successes, but that is partly because the inhabitants of that land have set themselves a limited range of tasks to accomplish" (ibid.).

[131]Polkinghorne, *Science and Religion in Quest of Truth*, 8.

[132]Polkinghorne, *Exploring Reality: The Intertwining of Science and Religion*, 137. In the following comment, Polkinghorne specifically addresses biologists. He writes, "Second, placing an extraordinary degree of overconfidence in science's unaided power to gain understanding can lead some biologists to make grossly inflated claims that their insights are capable of explaining pretty well everything. . . . Man is more than a machine. Yet biologists today, in the wake of their stunning discoveries in molecular genetics, are all too prone to a euphoric degree of unjustified triumphalism that grossly exaggerates the explanatory power of their discipline" (ibid.).

[133]Polkinghorne, *Science and Religion in Quest of Truth*, 3.

[134]Ibid., 3-4. "A scientist, speaking as a scientist, can say no more about music than that it is vibrations in the air, but speaking as a person there would surely be much more to say about the mysterious way in which a temporal succession of sounds can give us access to a timeless realm of beauty" (ibid.).

Revelation and Sacred Scripture

The object of theological inquiry is the reality of God, and Christian theology elucidates an appropriate expression of the transcendent and incomprehensible being of God through revelation. Scripture is an indispensable and foundational source for Christian thinking.

The Nature and Authority of Sacred Scripture

Polkinghorne is concerned with the proper role of Scripture and its evidential nature since it does not play a subsidiary role in his theological thinking.[135] The interpretation of Scripture in light of modern cosmology is an important dimension of the interaction between science and religion. On the one hand, Polkinghorne does not assign a minimal role to Scripture, but on the other hand, he also does not assign it a normative enough role as the arbiter of all theological inquiry. Scripture, "despite all its cultural strangeness and scientific inadequacy,"[136] should be taken into account when integrating science and theology into a single perspective. Scripture deserves a respectful and inclusive reading into the divine reality,[137] and it should be approached "on the terms that are appropriate to its intrinsic nature."[138]

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[135]Polkinghorne, *Science and Theology: An Introduction*, 99. "Because it is realist, theology will want to retain an evidential appeal to Scripture as ground for belief. Because it is critical realism, theology will seek to respect the nature of the Reality it encounters" (Polkinghorne, *Reason and Reality: The Relationship between Science and Theology*, 69). On Polkinghorne and critical realism, see pp. 25-39.

[136]Polkinghorne, *Reason and Reality: The Relationship between Science and Theology*, 65.

[137]Polkinghorne, *Science and the Trinity: The Christian Encounter with Reality*, xiv-xv. "It seems important to establish at the start that scripture does not function in this mind-closing way. On the contrary, for though the Bible is indeed an indispensable and authoritative source for the Christian, it is one that must be approached in ways that are subtle and complex rather than literal and unproblematic. Scriptural roles include the evidential, the spiritual and the contextual. In a respectful reading of the Bible attention must be paid to genre and to historical authorial setting, together with acceptance of progressive spiritual and theological development over the many centuries of the writings' compilation. Honesty requires the acknowledgement of the presence of unedifying passages in the Bible, and hermeneutical adequacy requires recognition of the polysemous character of the texts, capable of conveying meaning at several different levels" (ibid.).

[138]Polkinghorne, *Science and Theology: An Introduction*, 35.

Polkinghorne extends to Scripture a Christological analogy in order to account for its status as both divinely inspired and humanly written.[139] Its embodied foundational stories "are not simply symbolic tales given us to stir our imaginations, but are rooted in God's actual acts of self-disclosure, mediated through particular persons and events."[140] But what does Polkinghorne mean with the expression *symbolic tales*? He elucidates: "Much of special revelation is contained in accounts of historical events and persons, but some of it is conveyed through symbolic stories. This is the real meaning of the word myth, which does not mean an incredible fairy story but a way of expressing truth too deep to be expressed in any other form than story."[141]

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[139]Polkinghorne, *Encountering Scripture: A Scientist Explores the Bible*, 1, 8-9. Polkinghorne equates Scripture with other pieces of literature. He comments, "Classic literature, whether that of the Greek tragedians or that of the Hebrew prophets, the Gospel of John or the plays of Shakespeare, has a deep power to speak across the centuries, and it is precisely this ability to break through the confines of locality and epoch which is the authentic sign of great writing." He also makes the following remark, "Not all of the Bible is great literature. Some parts are plainly pedestrian and some downright boring (for example, 1 Chronicles 1—8)" (5).

[140]Ibid., x-xi. See also Polkinghorne, *Reason and Reality: The Relationship between Science and Theology*, 63. "I am not willing to resign so easily from the cognitive quest. I cannot accept the view, described by Northrop Frye, that 'the events the Bible describes are what some scholars call "language events," brought to us only through words; and it is the words themselves that have the authority, not the events they describe.' I do not, of course, deny the presence of story in the Bible (Jonah, Daniel, and so on). But the life, death and resurrection of Jesus is not just a tale, however evocative, but a wonderful fusion of the power of myth and the power of actuality" (Polkinghorne, *Reasons and Reality,* 63). Elsewhere he writes, "I canot regard theology as merely concerned with a collection of stories which motivate an attitude to life. It must have its anchorage in the way things actually are, and the way they happen. . . . For me, the Bible is neither an inerrant account of propositional truth nor a compendium of timeless symbols, but a historically conditioned account of certain significant encounters and experiences" (Polkinghorne, *The Faith of a Physicist: Reflections of a Bottom-up Thinker: The Gifford Lectures for 1993-4*, 8).

[141]Polkinghorne, *Science and Religion in Quest of Truth*, 113. Pierre Grelot explains, "A symbol does not describe the reality that it envisions and of which it gives a glimpse beyond the limits of natural understanding; rather, it evokes certain aspects of it, leaving the spirit to construct representations that, by intuition, will grasp something of the mystery evoked" (Pierre Grelot, *The Language of Symbolism*, trans., Christopher R. Smith (Peabody, MA: Hendrickson, 2006), 18). Clark defines myth in religious language as "I don't believe it" (Gordon H. Clark, *Language and Theology* (Phillipsburg, NJ: Presbyterian and Reformed Publishing, 1980), 112).

In other words, *symbolic story* and *myth* are literary genres that construct an image and should not be understood in the ordinary sense as being untrue. Rather, they should be comprehended as dealing with the ultimate questions of human existence.[142]

Furthermore, Polkinghorne adopts a rational strategy in order to commit to what he considers to be well-motivated belief. He is aware that at times belief may need revision in light of further evidence and insight. He justifies this line of reasoning because modern science has afforded so much information on physical reality, theism should reflect the changes, in addition to the understanding in cultural and scientific perspectives when interpreting Scripture.[143] Polkinghorne affirms that *primitive* religious convictions can blend with modern scientific knowledge[144] because of the developmental nature[145] of Scripture. This suggests that parts of

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[142]David A. Haviland, *Cultural Anthropology* (New York: Harcourt Brace College Publishers, 1999), 419. "Actually, a true myth is basically religious, in that it provides a rationale for religious beliefs and practices. Its subject matter is the ultimate of human existence: where we and everything in our world came from, why we are here, and where we are going. . . . Myth has an explanatory function; it depicts and describes an orderly universe, which sets the stage for orderly behavior" (ibid.).

[143]Polkinghorne, *Encountering Scripture: A Scientist Explores the Bible*, 8.

[144]Ibid., 31. Polkinghorne comments that "Scripture is not a dead deposit of unchanging meaning, the repository of assertions that have to be accepted at face value without question, but a living spring from which new truths and insight can be expected to continue to flow" (ibid.). Polkinghorne describes the record of revelation as "one of a developing understanding of the divine will and nature, continuously growing over time but never complete and quite primitive in its earliest stages" (12).

[145]Ibid., 11-12. "How can we square this picture of a vengeful God with the one given us by Jesus, who tells us to love our enemies (Matthew 5.43-48)? The simple answer is that we cannot. I believe that response to this dilemma demands the recognition that the record of revelation contained in Scripture is one of a developing understanding of the divine will and nature" (ibid.). And he continues his argument, "This developmental perspective on Scripture also helps to explain many of the apparent contradictions present in its pages" (ibid., 14). "Thus it is clear that before the Hebrew Bible reached its final canonical form there was a long developmental process, involving reworking of much that had been inherited from the past in the light of the understanding and experience of the present. Yet the editors who assembled the final text apparently did not find it necessary to smooth out the differences present in the sources that they used. Instead, the deposit of many generations was often allowed to stand together in the formation of Scripture. The long process of development was not obliterated in order to produce the appearance of a single consistent text. The explorations of the past were not to be totally obscured from view" (ibid., 16).

Scripture are open to revision in light of modern scientific knowledge.[146] Polkinghorne claims that the unfolding process of developing theological understanding found in Scripture proceeds beyond its pages by virtue of the continuing work of the Holy Spirit.[147] "The role of development, within Scripture and after it, depends upon the fact that revelational disclosure is primarily personal rather than propositional, living not petrified."[148] Polkinghorne illustrates his approach through his interpretation of the Fall found in Gen 3:

> This approach to the Fall illustrates the continuing power of Scripture, persisting under changes of interpretation induced by changes in knowledge and experience. The ancient myth of Adam and Eve in the garden was used by Paul to illuminate the Christian experience of the saving power of Christ, and it can be reinterpreted by us for the same purpose in the light of modern scientific knowledge, in a way that I believe preserves the essential core of its meaning. There is certainly a clear difference in the details of how Paul and we understand the story, but its essential points remains the same.[149]

Polkinghorne does not take Scripture as a source of authoritative propositions.[150] For instance, he writes that divine revelation "is not the mysterious transmission of infallible

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[146]Ibid., 8. "These writings were composed in cultures very different from that of today, not least because of the great changes in our picture of the world in which we live which have been given us by modern science. . . . These changes in cultural perspective have to be taken into account in interpreting Scripture, but they by no means imply that the Bible is merely of antiquarian interest" (ibid.). See also John C. Polkinghorne, "Scripture and an Evolving Creation," *Science and Christian Belief* 21 (2009): 165. "The older creation account of Genesis 2 is very human-oriented and it leads naturally to the story of the Fall in Genesis 3. Of all the classic Christian doctrines, this is the one that demands the most careful revisionary evaluation in the light of modern knowledge" (ibid.).

[147]Polkinghorne, *Encountering Scripture: A Scientist Explores the Bible*, 18-19. See also Polkinghorne, *Theology in the Context of Science*, 2. "The biblical texts, which are often very concise in their expression of deep and challenging truths, stand in need of continuing exploratory interpretation, conducted in each succeeding Christian generation" (ibid.).

[148]Polkinghorne, *Encountering Scripture: A Scientist Explores the Bible*, 19.

[149]Ibid., 30-31.

[150]Polkinghorne, *Science and Theology: An Introduction*. Polkinghorne, describing this approach writes, "At its most fundamentalist, this could lead to the citation of 'proof texts' in ways that may pay scant attention to context, and it might lead to desperate attempts to prove the total inner consistency of a collection of writings compiled over a period of more than a thousand years and originating in many different historical and cultural settings" (98-99). Polkinghorne also comments that "Revelation itself is

propositions which are to be accepted without question."[151] However, despite his clear statement that Scripture is not propositional, he does acknowledge that Scripture contains truth that must be taken propositionally. An illustration of this is Polkinghorne's acceptance of the incarnation of Christ as a true historical event.[152] Yet how does he know that the incarnation is real and not a myth? What criteria does Polkinghorne use to determine what is historical truth and what is symbolic story? Polkinghorne does not provide an answer. As previously mentioned, Polkinghorne purports a critical realist approach to interpreting Scripture because it contains an evidential aspect, making it proper to subject it to critical analysis carefully evaluating the historical accuracy of its foundational stories while also rebuking any notion of inerrancy.[153] While evaluating its historicity, the interpreter needs to discern insights that are of revelatory character. Polkinghorne comments:

> A central task for the christian interpreter of Scripture is to discern what in the Bible has lasting truthful authority, rightly commanding the continuing respect of successive generations, and what is simply time-bound cultural expression, demanding no necessary continuing allegiance from us today. Absolutely no one is free from having to make judgements of this kind.[154]

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experiential rather than propositional." Polkinghorne, *Theology in the Context of Science*, 4. "The Bible certainly contains truth about God; it certainly has moved many people to lives of spiritual depth and to deeds of great generosity; it certainly is an indispensable symbolic resource for Christian discourse. Yet it also contains unedifying material concerned with acts of genocide portrayed as divine commands, vengeful curses upon enemies, sadistic symbols of everlasting torture" (Polkinghorne, *Science and Theology: An Introduction*, 99).

[151]Polkinghorne writes, "The nature of divine revelation is not the mysterious transmission of infallible propositions which are to be accepted without question, but the record of persons and events through which the divine will and nature have been most transparently made known" (Polkinghorne, *Encountering Scripture: A Scientist Explores the Bible*, 1).

[152]Polkinghorne affirms, "Scripture contains witness to the incarnate Word" (ibid., 3). For an excellent discussion on propositional truth, see Nash, *The Word of God and the Word of Man*, 43-54.

[153]Ibid., 7-8. Reading Scripture critically is just one mode of reading and putting it to the test. But Polkinghorne mentions an additional way of reading, one in which Scripture puts the reader to the test. "Great truths are set forth and great hopes are proclaimed. How we respond is of important significance for our lives. We are no longer questioning the Bible, but the Bible is questioning us. Or rather God is questioning us through. The manner of reading Scripture which medieval monasticism called *lectio divina*—divine reading in which a short passage is meditatively read and reread to allow it to sink into heart and mind—is a prime way in which we can submit ourselves to the power of the Bible" (ibid.).

[154]Ibid., 3-4.

Polkinghorne further asserts that Scripture is not a divinely dictated book conveying absolute and unquestionable truth.[155] The uniqueness of Scripture is not that of an "ultimate textbook" [156] to look up packaged answers. Rather Scripture's prime role is to be the record of significant encounters as revelatory disclosure through theologically foundational events with humanity.[157] Scripture's uniqueness then lies in its furnishing of indispensable accounts of God's acts and self-disclosure recorded in the history of Israel and the person of Jesus Christ.[158] Because revelation is the deposit of encounters,[159] it should not be equated with the Word of God. For Polkinghorne,

> The Word of God uttered to humanity is not a written text but a life lived, a painful and shameful death accepted, and the divine faithfulness vindicated through the great act of Christ's resurrection. Scripture contains witness to the incarnate Word, but it is not the Word

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[155]Ibid., 1.

[156]Polkinghorne, *Theology in the Context of Science*, 4. Mark Strauss comments that behind the misguided "crystal ball" approach lies two positive motivations. "The first is a reverence for the Bible as the Word of God and the belief that God is alive and active and wants to communicate his will to us. . . The second positive motivation is the belief that the Bible, though written long ago, is still relevant for our lives today" (Mark L. Strauss, *How to Read the Bible in Changing Times* (Grand Rapids, MI: BakerBooks, 2011), 15).

[157]Polkinghorne, *Science and Theology: An Introduction*, 98; Polkinghorne, *Quantum Physics and Theology: An Unexpected Kinship*, 11. Polkinghorne further comments in *Science and Theology: An Introduction*, "The continuing deposit of the record of transpersonal encounters with God is to be found in scripture and tradition" (98). "[A] better metaphor is surely that of the laboratory notebook, in which are recorded accounts of foundational encounters involving acts of divine self-disclosure, essential for techological theory-making, but leading to and needing further reflective interpretation" (Polkinghorne, *Theology in the Context of Science*, 4).

[158]Polkinghorne, *Encountering Scripture: A Scientist Explores the Bible*, 3. He also writes, "Because revelation is the encounter with a Person and not the deliverance of a set of propositions, the Bible is not our divinely-guaranteed textbook but a prime means by which we come to know God's dealings with humankind and particularly his self-utterance in Christ" (Polkinghorne, *Reason and Reality: The Relationship between Science and Theology*, 62).

[159]Polkinghorne, *Encountering Scripture: A Scientist Explores the Bible*, 3-4. Because of the 'revelatory character claimed," in Scripture, the interpreter has the "central task" of discerning between the authoritative and permanent with the temporary and culturally adventitious within these encounters. See also Polkinghorne, *Science and Theology: An Introduction*, 98.

himself. Its testimony is that 'The Word became flesh and lived among us, and we have seen his glory, the glory as of a father's only Son, full of grace and truth' (John 1.14).[160]

Polkinghorne assumes that grasping these observations is essential in order to understand the proper role of Scripture.

The Language of Sacred Scripture

The influence that science has exerted on the understanding of religious discourse has been both interesting and devastating.[161] Religious thinkers have been perplexed about how to stretch and elongate words from one context to fit what is transcendent. For Polkinghorne, the mode of language[162] employed in speaking of divine action differs from the precise language of mathematics when discussing empirical objects or events.[163] In theological discourse, a significant degree of "prosaic clarity has to give way to something more like poetic discourse."[164] Is there foundational content in religious discourse? According to Polkinghorne, theological discourse is symbolic:

Theology faces a particular difficulty in that the nature of its Object transcends us and our power to grasp him. We do not have the words and concepts with which to encapsulate God.

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[160]Polkinghorne, *Encountering Scripture: A Scientist Explores the Bible*, 3. "For the Christian the true Word of God is written, not with paper and ink, but in the flesh and blood of that life lived in Palestine long ago (John 1.14) and in the continuing life of the Risen Lord. All authorty rests with him (Matthew 28.18) and it is not located between the covers of any book" (Polkinghorne, *Reason and Reality: The Relationship between Science and Theology*, 62).

[161]Gilkey, *Religion and the Scientific Future*, 4.

[162]John C. Polkinghorne, *Quarks, Chaos & Christianity: Questions to Science and Religion*, 2d ed. (New York, NY: Crossroad, 2005), 28. "If the unpicturable world of electrons gives us some surprises, we shouldn't be too amazed if the unpicturable God has some surprises in store for us also. If, as a Christian believer, I find—as I do, and as millions have done before me—that when I talk of Jesus Christ I can't just talk about him in human terms, but I'm also driven to use divine language, then I have to accept the reality of this experience, however difficult it is to understand how the infinite God and a finite man in first-century Palestine can, in some mysterious way, be joined together" (ibid.).

[163]Polkinghorne, *Science and Religion in Quest of Truth*, 12. "The language of theology will have to be the allusive and open language of symbol rather than the precise language of mathematics that is so effective in science. To a significant degree in theology, prosaic clarity has to give way to something more like poetic discourse" (ibid.). This implies that theology can only say the unsayable through poetry, metaphor, and analogy. This will be problematic when discussing Polkinghorne's eschatology. Metaphors and symbols are meaningless if they do not have literal statements to give them meaning.

[164]Ibid.

> Inescapable we are driven to the use of analogy. No doubt words such as personal, loving, beautiful, are used of God by extension from our human experience, but they are surely used as extensions in the right direction. . . . Thus it comes about that the language of theology is the language of symbol.[165]

Because Polkinghorne claims that religious language is generally analogous, he subscribes to a polysemic nature of Scripture in order to avoid a narrow biblicism.[166] He comments:

> One of the defects of a self-confident and narrow Biblicism is to ignore this fact by attempting to insist on the single meaning of an allegedly plain text. Such an approach may suit the cookery book, but it will not do for the Bible. Of course, I am not arguing for an 'anything goes' approach to scriptural interpretation, but affirming the expectation that a multilayered over-plus of meaning will often be found in the sacred text.[167]

Summary and Conclusions

This chapter covered Polkinghorne's understanding of the relationship between science and theology and his hermeneutical perspectives on critical realism, Natural Theology, and Revelation. Polkinghorne refutes scientistic claims because there are other equally legitimate avenues to seeking knowledge as is the case of theology. Because Polkinghorne believes the

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[165]Polkinghorne, *Science and Creation: The Search for Understanding*, 94. "Symbol is not to be reduced to sign by an insistence that it carry a single univocal meaning" (Polkinghorne, *Reason and Reality: The Relationship between Science and Theology*, 67). But Polkinghorne also affirms that Scripture is also "more than a symbolic story-book" (Polkinghorne, *Encountering Scripture: A Scientist Explores the Bible*, 41). For Gilkey, theological language is a symbolic perspective on reality: "The role of symbols is crucial; the expression of what is known appears in metaphors, models, and analogies rather than in literal, univocal descriptions" (Langdon Gilkey, *Nature, Reality, and the Sacred* (Minneapolis, MN: Fortress, 1993), 31).

[166]Does Polkinghorne not fall into this very biblicist interpretation when he writes that because we live in a world greatly changed by modern science, "we no longer think that we inhabit a three-decker universe. These changes in cultural perspective have to be taken into account in interpreting Scripture" (Polkinghorne, *Encountering Scripture: A Scientist Explores the Bible*, 8). Did biblical authors really believe in a "three-decker" universe?

[167]Ibid., 5. In addition see Polkinghorne, *Reason and Reality: The Relationship between Science and Theology*, 67. "Equally the Bible is not to be tied down; it must be acknowledged as being polysemous, having multi-layered meaning, capable of mediating many messages to its readers" (ibid.). A less nuanced interpretative strategy is problematic. He writes, "Even in a period such as Reformation times . . . people were inclined to accept the idea that there is a plain meaning to be found in the scriptural text that anyone who runs may read, the fact is that this approach actually led to a wide variety of different interpretative conclusions" (Polkinghorne, *Theology in the Context of Science*, 4).

universe contains evidence of a divine Mind and Purpose, he argues that science and theology can be brought into harmony. For him, science and theology provide partial views of the world, and they may overlap on a range of issues such as cosmic origins and human nature.

Equally important is the fact that Polkinghorne is committed to providing theological perspectives that are capable of being harmonized with science. One way of achieving this is through critical realist interpretations of knowledge in science and theology.

Polkinghorne welcomes a new form of Natural Theology as a bridge between science and theology by framing critical realism in it, that is, intelligibility is a reliable guide to reality. This new Natural Theology utilizes a revised form of discourse, replacing the idea of proofs of God in the natural world with the language of the best explanation justifying his motivated belief.

Polkinghorne believes that the language of Scripture is symbolic. For him, revelation does not take the form of propositions but rather revelation is the indispensable record of significant human encounters with sacred reality. Polkinghorne may be underestimating the significance of the fact that these human encounters with sacred reality are made in propositions. He sees revelation as developing from a primitive form in need of being revised and harmonized with modern scientific interpretations of reality.

In general, Polkinghorne provides a coherent methodology in harmonizing science and theology. However, there appear to be elements of incoherence in his methodology, especially in terms of Scripture. Despite his claims that science and theology are equal avenues of knowledge, he gives methodological priority to science. This is based on his presupposition that each discipline seeks knowledge at different levels: science answers the *How* questions and theology answeres the *Why* questions. Yet, Scripture is revised in light of modern science. This suggests that the scientific interpretation of reality is more authentic than revelation found in Scripture. Authority resides in science, not in nature itself, but in the scientific interpretation of nature, and for Polkinghorne, Scripture must submit to this interpretation.

This chapter set out to describe Polkinghorne's hermeneutical perspective. The next chapter describes and evaluates his hermeneutics in interpreting Protology.

CHAPTER III

SCRIPTURE IN POLKINGHORNE'S PROTOLOGY AND THE REJECTION OF BIBLICAL UNIVOCITY

Introduction

Defining the role of Scripture in any theological reflection is critical. By situating Polkinghorne's different scriptural approaches into case studies, one is able to investigate and discover more clearly the role Scripture plays in his theological method. This chapter traces Polkinghorne's thoughts on biblical protology and how his dismissal of biblical univocity has impacted his cosmology.

Protology

Cosmology is the study of origins and development of the universe. In Christian theology, cosmology refers to the doctrine of creation[1] and the divine purpose for humanity. The universe is normally said to be a free and nonnecessitated creation of one supreme and personal God. The doctrine of creation has undergone a resurgence of interest in recent years by those

[1]Polkinghorne writes, "The doctrine of creation, properly understood, is concerned with the question of why things exist and not simply with how things began" (Polkinghorne, *Science and Religion in Quest of Truth*, 78). Keith Ward notes, "The word *creation* has usually been used to refer to the origin of the universe, but theologically it has always been clear that it more properly refers to the relationship of every time and place to God. In this sense, when and how the universe originated is not of primary importance." Keith Ward, "Creation," *Encyclopedia of Science and Religion*, ed. J. Wentzel Van Huyssteen (New York: Thomas Gale, 2003), 186. Robert Hiebert echoes this sentiment: "Therefore, the juxtaposition, by some modern interpreters, of scriptural assertions about creation with scientific evidence and theories regarding origins often results in fruitless comparisons of different, although equally relevant, bodies of knowledge. At the risk of oversimplifying the issue, one might say that Scripture deals with the who, why, and what questions . . . whereas science investigates the problems of when and how the observable universe came into existence and continues to function." Robert J. V. Hiebert, "Create, Creation," *Baker Theological Dictionary of the Bible*, ed. Walter A. Elwell (Grand Rapids, MI: Baker Books, 1996).

attempting to integrate a Christian orthodox faith of creation with the results of modern cosmological studies.[2]

The manner in which Polkinghorne bears witness to orthodox faith in regard to creation deserves consideration. He presupposes that Christian theology and modern cosmology are compatible and their interpretation of the created universe can be harmonized by placing the scientific account of origins within the deeper context of a theological framework.[3] Three implications are derived from Polkinghorne's assumption. First, God, not the universe, is the ultimate reality. In his theological concept of creation, the universe is both a beautiful and rational place[4] that is open to human and divine action, yet the created order and Creator are clearly distinguished.[5] Emanationism is excluded because the universe is a consequence of a free act of divine decision, but it is inherently contingent to him.[6] This contingency is expressed in the idea *creatio ex nihilo*.[7] For Polkinghorne, this concept is used to "express the ontological dependence

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[2]See the various essays in Stephen C. Barton and David WIlkinson, eds., *Reading Genesis after Darwin* (Oxford: Oxford University Press, 2009).

[3]John C. Polkinghorne, "Beyond the Big Bang," in *Science Meets Faith*, ed. Fraser Watts (London: SPCK, 1998), 17. "I shall suggest that to look beyond the Big Bang is to enter a realm where the doctrine of creation, in its Judaeo-Christian-Islamic articulation, has significant things to say" (ibid.).

[4]Polkinghorne, *Science and Creation: The Search for Understanding*, 22. Polkinghorne writes, "If the deep-seated congruence of the rationality present in our minds with the rationality present in the world is to find a true explanation it must surely lie in some more profound reason which is the ground of both. Such a reason would be provided by the Rationality of the Creator" (ibid.).

[5]John C. Polkinghorne, "Kenotic Creation and Divine Action," in *Work of Love: Creation as Kenosis*, ed. John C. Polkinghorne (Grand Rapids, MI: Eerdmans, 2001), 95. "Only a God who is distinct from creation can be that creation's ground of hope beyond its eventual natural decay" (ibid.).

[6]Polkinghorne, *Science and Creation: The Search for Understanding*, 51.

[7]John C. Polkinghorne, *The Polkinghorne Reader: Science, Faith, and the Search for Meaning* (West Conshohocken, PA: Templeton Foundation Press, 2010), 106-107. "The universe's inherent contingency is conventionally and vividly expressed in the idea of creation *ex nihilo*. Nothing else existed (such as the brute matter and the forms of the classical Greek scheme of things) either to prompt or to constrain the divine creative act. The divine will alone is the source of created being" (ibid.).

of all that is on the sustaining will of the Creator; it does not refer simply to the temporal initiation of cosmic history."[8]

Because the scientific perspective on the universe and life is one of evolution, Polkinghorne sees two distinct aspects of the theological concept of creation. He adds to the idea of *creatio ex nihilo*,[9] the complementary concept of *creatio continua*. The latter concept, which is "strongly encouraged by evolutionary insight,"[10] affirms a continuous creative engagement of God with the universe he holds. It is viewed as the "unfolding creative process by which potentiality is continuously being transformed into actuality."[11] Both concepts (*creatio ex nihilo* and *creatio continua*) can be understood as the transcendent and immanent poles of divine reality.

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[8]John C. Polkinghorne, "Christianity and Science," in *The Oxford Handbook of Religion and Science*, ed. Philip Clayton and Zachary Simpson, Oxford Handbooks (Oxford: Oxford University Press, 2006), 60. Elsewhere he writes, "To hold a doctrine of creation *ex nihilo* is to hold that all that is depends, now and always, on the freely exercised will of God. It is certainly not to believe that God started things off by manipulating a curious kind of stuff called 'nothing'" (Polkinghorne, *The Faith of a Physicist: Reflections of a Bottom-up Thinker: The Gifford Lectures for 1993-4*, 75). Janet Soskice writes that *creatio ex nihilo* "affirms that God, from no compulsion or necessity, created the world out of nothing—really nothing – no pre-existent matter, space or time. It is not the same thing as the 'Big Bang theory' with which it is often confused and which might roughly be defined as 'the creation of everything at the beginning of time'" (Janet Martin Soskice, "Creatio Ex Nihilo: Its Jewish and Christian Foundations," in *Creation and the God of Abraham*, ed. David B. Burrell et al. (Cambridge: Cambridge University Press, 2010), 24).

[9]Soskice asserts that *creatio ex nihilo*, as a metaphysical claim, does not dictate a particular cosmology and therefore does not rival scientific explanation. See Soskice, "Creatio Ex Nihilo: Its Jewish and Christian Foundations," 38-39. When properly applied, according to Stoeger, the concept of *creatio ex nihilo* is complementary to any scientific explanation because *creatio ex nihilo* is the framework, i.e., the ultimate ground of existence and order serving as the explanation to anything that is revealed in science. It simply complements what science has revealed and is not in competition with the natural sciences or cosmology. See William R. Stoeger, "The Big Bang, Quantum Cosmology and Creation Ex Nihilo," in *Creation and the God of Abraham*, ed. David B. Burrell et al. (Cambridge: Cambridge University Press, 2010), 169-175.

[10]Polkinghorne, *Science and Religion in Quest of Truth*, 79. The *creatio continua* concept has been explored extensively in the writings of scientist-theologians. See Barbour, *Issues in Science and Religion*; Arthur R. Peacocke, *Creation and the World of Science* (Oxford: Oxford University Press, 1979); Polkinghorne, *Science and Creation: The Search for Understanding*.

[11]Polkinghorne, *Science and Religion in Quest of Truth*, 79.

Second, Polkinghorne acknowledges that science does not provide proof that a divine Creator brought the universe into existence. However, his theological interpretation of science leads him to believe that scientific insights suggest the existence of a divine Creator.[12]

Finally, modern cosmology postulates that the periods of time in which the universe developed are significantly longer than suggested by the biblical record. Polkinghorne claims that the current estimate of the age of the universe is 13.7 billion years.[13] Polkinghorne is able to unify modern cosmology and Christian theology because any theological discourse on the doctrine of creation must be consonant with the scientific account on origins.[14] For Polkinghorne, any theological discourse on creation is "concerned with ontological origin and not with temporal beginning."[15] It is clear that Polkinghorne takes a high view of science, which influences and impacts his theology and particularly his protology, even revising or reinterpreting Scripture through scientific concepts.[16] This is evident in the fact that, for him, theology must yield and comply with conventional scientific cosmology.

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[12]Polkinghorne, *Belief in God in an Age of Science*, 10. "Once again the theistic conclusion is not logically coercive, but it can claim serious consideration as an intellectually satisfying understanding of what would otherwise be unintelligible good fortune" (ibid.).

[13]Polkinghorne, *Science and Religion in Quest of Truth*, 47.

[14]Polkinghorne, *The Faith of a Physicist: Reflections of a Bottom-up Thinker: The Gifford Lectures for 1993-4*, 73. "Such, in outline, is the story that science tells us about the history of the world. There are some speculations (particularly in the very early cosmology) and some ignorances (particularly in relation to the origin of life), but there seems to me to be every reason to take seriously the broad sweep of what we are told. Theological discourse on the doctrine of creation must be consonant with that account." Polkinghorne futher elucidates, "The doctrine of creation can make intelligible what from a purely scientific point of view has to be treated as brute fact or happy accident. Theology's role is to complement the scientific account, without pretending to replace it" (Polkinghorne, *Theology in the Context of Science*, 100).

[15]Polkinghorne, *The Faith of a Physicist: Reflections of a Bottom-up Thinker: The Gifford Lectures for 1993-4*, 73.

[16]Polkinghorne uses science as a hermeneutic. For example, when he interprets the reiteration of the goodness of creation found in Gen 1, he writes, "The goodness of creation. . . . is to be understood in terms of fruitful potentiality (the Anthropic Principle) rather than initial perfection" (Polkinghorne, *Reason and Reality: The Relationship between Science and Theology*, 99).

The next section of this chapter describes Polkinghorne's view of scientific insights that seem to suggest the existence of a divine Creator and a proposed theological model that incorporates these insights within a theological framework.

The Anthropic Principle

Twentieth-century cosmology raised questions in regard to God's providence that seemed to grow naturally out of the appearance of *finely tuned* features in the universe. In order for the evolution of life to be possible, the laws of physics had to be *finely tuned* to what they actually are in order to generate carbon-based life derived from the ashes of dead stars.[17] This metascientific *fine tuning*, named the Anthropic Principle,[18] endeavors to relate the underlying structure of the universe to the fact of the existence of life.

Polkinghorne is persuaded that the Anthropic Principle is evidence suggesting that the ontological origin of the universe lies in the will of a creator God.[19] He interprets this concept as

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[17]Polkinghorne, *Theology in the Context of Science*, 101. "Take for an example the origin of carbon itself, the element that is of central importance in the chemical structure of living beings. . . . No carbon was made during the initial aftermath of the big bang and, in fact, there is only one place in the whole universe where carbon actually can be made, in the interior nuclear furnaces of the stars. (Every atom of carbon in every living being was once inside a star—we are creatures made of stardust)" (ibid.).

[18]The most accessible introduction to the Anthropic Principle is widely recognized to be John Barrow and Frank J. Tipler, *The Anthropic Cosmological Principle* (Oxford: Oxford University Press, 1986). For a general summary on the Anthropic Principle, see William Lane Craig, "The Anthropic Principle," in *The History of Science and Religion in the Western Tradition: An Encyclopedia*, ed. Gary B. Ferngren et al. (London: Garland Publishing, 2000), 366-368. Barbour argues that the Anthropic Principle can be interpreted as a new form of design argument. He explains, "The fundamental parameters of the early universe seem to be fine-tuned for the conditions needed for the emergence of life and intelligence. Ifthe expansion rate one second after the Big Bang had been smaller by even one part in a hundred thousand million million, the universe would have recollapsed before evolution could have occurred. If the expansion had been even a tiny fraction faster it would have dispersed too rapidly for galaxies and planets to have formed. The universe seems to be balanced on a knife-edge, too improbable to be a fortunate chance occurrence" (Barbour, "Science and Religion, Models and Relations," 764).

[19]John C. Polkinghorne, *Science and Providence: God's Interaction with the World* (London: SPCK, 1989), 44-45. "This is just one of the many anthropic balances necessary in the fundamental laws of physics if creation is to have the 'goodness' which is the capacity to evolve life. A rationally coherent explanation of why this should be so is beyond science's ability to offer, since it must take the laws of nature as its given starting-point. Such an explanation would be provided by theology's assertion that the finely balanced circumstance of the world stems from the benevolent purpose of its Creator" (ibid.).

supportive of his theistic claims of a divine purpose at work behind the universe because the universe's *fine tuning* resonates with a Christian picture of the world.[20]

Polkinghorne incorporates the Anthropic Principle in his doctrine of creation[21] by claiming the universe was endowed by its Creator with *finely tuned* laws. From this created order, genuine novelty can emerge and develop from chaos.[22] Polkinghorne prefers the singular

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[20]Polkinghorne, *Theology in the Context of Science*, 100-101. "There seems to be the chance of a revised and revived argument from design—not appealing to Paley's Cosmic Craftsman working within physical process. . . . but appealing to a Cosmic Planner who has endowed his world with a potentiality implanted within the delicate balance of the laws of nature themselves (which laws science cannot explain since it assumes them as the basis for its explanation of the process). In short, the claim would be that the universe is indeed not 'any old world' but the carefully calculated construct of its Creator. . . . I therefore conclude that there is indeed a meta-question arising from Anthropic Principle considerations to which theism provides a persuasive (but not logically coercive) answer" (Polkinghorne, *Reason and Reality: The Relationship between Science and Theology*, 78, 80). Kenneth Howell writes, "If the universe displays such precision as the value of the gravitational constant or a specific amount of background microwave radiation, it not only suggests the presence of a Designer, it also calls for an explanation of the Designer's method of creation" (Kenneth J. Howell, "Theodicy," in *The History of Science and Religion in the Western Tradition: An Encyclopedia*, ed. Gary B. Ferngren et al. (London: Garland Publishing, 2000), 75). John Lennox comments, "This biblical teaching, that the earth was specifically designed as a home for human beings, fits well with what contemporary science tells us about the fine-tuning of the universe. In recent years physicists and cosmologists have discovered that the fundamental constants of nature—those special numbers on which everything depends—have to be 'just right' in order for life as we know it to be possible" (John C. Lennox, *Seven Days That Divide the World* (Grand Rapids, MI: Zondervan, 2011), 98-99).

[21]Polkinghorne, *Theology in the Context of Science*, 103-104. "A possible explanation of anthropic particularity can be offered by theology, for it asserts that the universe is indeed not 'any old world', but a creation which can be understood to have been endowed by its Creator with precisely those properties that have enabled it to have a fruitful history" (ibid.).

[22]"Evolutionary process corresponds to the general scientific insight that regimes in which truly novel possibilities can emerge are always 'at the edge of chaos', that is to say, they are situations in which contingency and regularity, Chance and Necessity, interlace in delicate balance with each other. Too far on the orderly side of this frontier and things would be too rigid for anything other than more of the same to be possible. Too far on the disorderly side of the frontier, and things woud be too haphazard for any novelties that did emerge to be able to persist. Quantum theory, order and disorder, too rigid, no change. If its [*sic*] done haphazard, then nothing persists" (Polkinghorne, *Science and Religion in Quest of Truth*, 59). "However, the more science enables us to understand the nature of evolving fertility, the more we see that it is necessarily a package deal, an integrated process in which growth and decay are inextricably interwoven as novelty emerges at the edge of chaos. The ambiguous character of genetic mutation, both the engine of evolutionary fruitfulness and the source of malignancy, illustrates the point" (Polkinghorne, *Exploring Reality: The Intertwining of Science and Religion*, 144).

universe, a *finely tuned* created order, over the multiverse explanation.[23] It has been acknowledged that the Anthropic Principle does not constitute irrefutable evidence for the existence of a creator God, but that it is consistent with a theistic worldview.[24]

Kenotic Love and Theodicy

Theology understands love to be the nature of God (1 John 4.8), yet theodicy, the reality of evil, suffering, and death, poses a serious challenge to theology. The kenosis theory[25] is a theological concept that in the life and death of Jesus, God *emptied* out the divine self-hood in

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[23]"The multiverse proposal is ontologically prodigal and it seems to serve only one explanatory purpose—to defuse the threat of theism. In constrast, metascientific belief in a divine Creator does a number of other explanatory pieces of work, such as making the deep order of the cosmos intelligible and there is a cumulative case for belief in God and a created universe, which does not seem to have a parallel in the case of the multiverse" (Polkinghorne, *Theology in the Context of Science*, 105). In contrast to the *cosmocentric* view, the *multiverse* theory explains that this universe is just one in addition to an enormous amount of other universes with different laws of nature. For comments on the multiverse and other cosmological issues and how they relate to God, see Bernard Carr, "Cosmology and Religion," in *The Oxford Handbook of Religion and Science*, ed. Philip Clayton and Zachary Simpson (Oxford: Oxford University Press, 2006). Carr explains the multiverse proposal as "we just happen to be in one of the small fraction of universes which satisfy the anthropic constraints. Of course, involving many universes is highly speculative, especially since the other universes may never be directly detectable. . . . Nevertheless, many anthropically-inclined physicists are attracted to the multiverse because it seems to dispense with God as the explanation of cosmic design" (149). On another page he writes, "The multiverse proposal certainly poses a serious challenge to the theological view and it is not surprising that atheists find it a more plausible explanation of the anthropic fine-tuning. However, the dichotomy between God and multiverse may be too simplistic. While the fine-tunings certainly do not provide unequivocal evidence for God, nor would the existence of a multiverse preclude God since there is no reason why a Creator should not act through the multiverse" (153).

[24]"The anthropic principle, whether stated in a weak or strong form, is strongly consistent with a theistic perspective. A theist (for example, a Christian) with a firm commitment to a doctrine of creation will find the "fine-tuning" of the universe to be an anticipated and pleasant confirmation of his or her religious beliefs. This would not constitute a proof of the existence of God, but would be a further element in a cumulative series of considerations which is at the very least consistent with the existence of a creator God" (McGrath, *Science & Religion: A New Introduction*, 154-155). John Leslie concludes, "My argument has been that the fine tuning is evidence, genuine evidence, of the following fact: that God is real, and/or there are many and varied universes. And it could be tempting to call the fact an observed one. Observed indirectly, but observed none the less" (John Leslie, *Universes* (London: Routledge, 1989), 198).

[25]Kenosis is translated from the Greek as *self-emptying* as it appears in the New Testament (Phil 2.7). Even though the theme of God's self-humbling has been present since the beginning of Christian tradition, it was during the nineteenth and twentieth centuries that it emerged more explicitly. Kenotic theology originated as a serious form of reflection on Christology during this time. For an analytical description and critique of kenosis, see P. Toon, "Kenosis, Kenotic Theology," *Evangelical Dictionary of Theology*, ed. Walter A. Elwell (Grand Rapids, MI: Baker Academic, 2001).

humble self-giving love to the world. Since the twentieth century, kenotic applications have been extended to other aspects of God's relationship with creation.[26] The theory attempts to correlate and bind the evolutionary theory of origins and the reality of God. This concept asserts that God is not distanced from the evolutionary processes by which life has emerged and its extinctions.[27] The emerging picture of divine kenotic love is a humble God seeking to relate intimately with his created order while renouncing any claims to coercive omnipotence.[28] It is this portrait of God

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[26]John C. Polkinghorne, "Kenotic Creation and Divine Action," in *The Altruism Reader: Selections from Writings on Love, Religion, and Science*, ed. Thomas Jay Oord (West Conshohocken, PA: Templeton Foundation Press, 2007), 179. Polkinghorne writes, "We encounter here an idea of the greatest importance, the understanding that the act of creation involves a kenosis of God, an emptying of himself and an acceptance of the self-limitation inherent in the giving of creative love" (Polkinghorne, *Science and Creation: The Search for Understanding*, 62).

[27]John Haught writes, "The seemingly aimless meandering of biological evolution may be incompatible with a divine designer, but now with a creative power that takes the form of defenseless love. If the deity were powerful only in the vulgar sense of having the capacity to overwhelm, then evolution might be theologically troubling. But a divine power that manifests itself in infinite self-giving loves does not manipulate that which it enfolds. . . . A kenotic deity would be the ultimate source of the possibilities for novel patterning made available to an evolving cosmos, but in such a way as to allow for a great measure of spontaneity in the evolution of life, mind, and freedom" (John F. Haught, "Kenosis," *Encyclopedia of Science and Religion*, ed. J. Wentzel van Huyssteen [London: Thomson Gale, 2003], 502).

[28]Polkinghorne, "Kenotic Creation and Divine Action," 106. "Kenotic theology is inevitably paradoxical theology, for it is founded on the concept of the humility of God." See also Keith Ward, "Cosmos and Kenosis," in *The Work of Love: Creation as Kenosis*, ed. John C. Polkinghorne (Grand Rapids, MI: Eerdmans, 2001), 152-166. According to Ward, kenosis does not speak of a "renunciation of ontological powers, but of a way of exercising those powers in love rather than in pride" (161-162), where the divine relation to the cosmos can take place. God can suffer new things and enjoy new things. So there is "an addition to the divine being as well as a limitation of it, and the two are essentially bound together" (160) and this *addition* is a fulfillment "in God, by which new forms of perfection are added by creatures to the divine being" (160). This relationship involves three moments. The first, which was just described, is *kenosis*, which leads to *enosis*, an "intimate uniting of divine personhood and finite personhood" (164), where God enters into the being of those who freely consent. The final step is *theosis*, which is the sharing in the divine life and God's final purpose for his creation (164). The Creator then invites, rather than commands, because "love by its very nature cannot compel" (John F. Haught, *God after Darwin: A Theology of Evolution* (Boulder, CO: Westview Press, 2008), 120).

that many "hope to connect their conversations with science, and especially with evolutionary biology."[29]

Polkinghorne is concerned with preserving creation's autonomy as a "universe of becoming"[30] while preserving the distinct emphasis on God as a God of love and qualifying God's intimate involvement with creation. Polkinghorne's goal is to articulate a model that accommodates the scientific understanding of nature and its operation[31] and led him to develop a fourfold scheme of kenosis.[32] Polkinghorne is clear that in his kenotic model, God's involvement

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[29]Haught, "Kenosis," 500. For Philip Hefner, kenosis does not permit evolutionary theory to blur the image of a loving God. He writes that despite "the twists and turns of evolution, with its gains and losses in natural selection. . . . God enters into the processes and is thus present to all creatures. One might question whether this kenosis theory is adequate . . . and whether it is elaborated fully enough. . . . Nevertheless, it is clearly supportive of the effort to forge meaning, because of its assertion that we can count on a divine presence in the evolutionary processes. It does not resolve the theodicy question, but. . . . it brings God into the dialectic between redemption and tragedy" (Philip J. Hefner, "Religion-and-Science," in *The Oxford Handbook of Religion and Science*, ed. Philip Clayton and Zachary Simpson (Oxford: Oxford University Press, 2006), 571).

[30]Polkinghorne, "Kenotic Creation and Divine Action," 103.

[31]It is critical to understand how critical the kenotic tenet is in properly grasping theistic evolution. John Haught writes, "The first step in developing a Christian theology of evolution, therefore, is to reform our thoughts about God so as to make them correspond with the incredible idea of the divine self-outpouring. Only then should we inquire into the intelligibility of evolution for Christian faith. . . . Interestingly, this theological method can also lessen the temptation to deny the results of scientific research. It will still allow room for the belief that a deep divine wisdom and power underlie everything, but will be a wisdom furled in humility and a power transformed by unquenchable love. It is my view that . . . Christianity's self-abandoning God, on the one hand, and the scientific picture of life evolving gradually by natural selection, on the other—can be mapped onto each other without much difficulty, and in such a way as to reach a satisfactory resolution for both science and theology. . . . The image of a self-emptying God . . . may even help make sense of something as enigmatic as evolution without requiring that we ignore, modify, or slant the data gathered by the fields of inquiry tributary to evolutionary theory (geology, paleontology, anthropology, geography, anatomy, genetics, etc.). At the end of our theological reflections on evolution, of course, mystery will still remain; but perhaps it will be a mystery that, even in its inaccessibility can suffuse the whole universe and the long story of life with a meaning that eludes creationism, scientism, and evolutionary naturalism" (John F. Haught, "God and Evolution," in *The Oxford Handbook of Religion and Science*, ed. Philip Clayton and Zachary Simpson (Oxford: Oxford University Press, 2006), 699-700).

[32]Polkinghorne, "Kenotic Creation and Divine Action," 102-105. These limitations should not be viewed as imperfections but rather something God does freely for the sake of creation. The four dimensions relate to the self-limitation of God's power, of God's eternity, of God's knoweldge and God's participation in the causal nexus of creation. Beginning with *kenosis of omnipotence*, God does not will moral or natural evil but he permits them to allow causal space for creatures. Second, in *kenosis of simple eternity*, God has

is deliberately self-limited, and he suggests that omnipotence, "centers on the fundamental divine allowing of the created other to be and to act, so that, while all that happens is permitted by God's special providence, not all that happens is in accordance with God's will or brought about by special providence."[33]

Divine allowance of the "created other to be and to act" permits Polkinghorne to explain and embrace the scientific claims of creation and the evolution of the cosmos and life.[34] His kenotic model emphasizes the concept of *creatio continua*; the dynamic nature of creation requires that God also be dynamic and relational, constantly interacting with his creation in balancing God's immanence with his transcendence.

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a dual nature having an eternal and temporal pole. Polkinghorne writes, "God knows things as they really are and so, if time is real and events are successive, surely God will know them temporally in their succession, and not merely that they are successive. . . . God has not set aside the timeless and eternal nature of divine Being, there has been 'added' to that (so to speak) a temporal pole of divinity that corresponds to the Creator's true engagement with created time. . . . The Eternal has freely embraced the experience of time" (103). Third, Polkinghorne explains that *kenosis of omniscience* implies that for an open future for a "world of true becoming," then God does not know the future since the future is not yet formed and does not yet exist. For Polkinghorne, the universe is not determinisitc but governed by the interplay of chance and necessity. God possesses a "current omniscience," and not an "absolute omniscience." This does not imply that God is not prepared for the future. It simply means that God does not know the unformed future in all its detail. Perhaps God can extrapolate some possible future developments but he cannot know which possibilities will become actual. This limitation has been "embraced within the divine nature and not imposed from without." Lastly, *kenosis of causal status*. This proposal was a modification of Polkinghorne's earlier thinking. This fourth kenosis means "the Creator's kenotic love includes allowing divine special providence to act as a cause among causes." The Incarnation is a prime example. "In the incarnation we see that, in first-century Palestine, God submitted in the most drastic way to becoming a cause among causes" (104). Polkinghorne mentions a final form of kenosis. One type of kenosis that Polkinghorne does not subscribe to is the *kenosis of novelty*. It is the "idea that God is self-restricted to act in the future only as God has acted in the past. . . . Yet it is perfectly coherent to believe that in new circumstances ("the fullness of time") God will do new things" (105).

[33]Ibid., 102.

[34]Polkinghorne, *Science and Religion in Quest of Truth*, 80. Polkinghorne wants to avoid two extreme profiles of God: the indifferent deitistic Spectator and the Cosmic Tyrant, which are inconsistent with the belief that God is a God of love. By allowing creation to make itself, God shows love. Polkinghorne writes, "One might dare to say that an evolving creation, in which creatures are allowed to be themselves and to make themselves, is a more fitting creation for such a God than a ready-made world would have been." Haught comments, "So if ultimate reality is essentially self-giving love, and if love in turn entails 'letting the other be,' then, theologically speaking, both the world's original coming into being and its indeterminate Darwinian transformation through time would be completely consonant with the Christian experience of God" (Haught, *God after Darwin: A Theology of Evolution*, 120).

Carefully note how Polkinghorne ties in and attempts to explain theodicy in light of kenotic love. A creation that has been allowed to *make itself* is the theological way of interpreting evolution[35] and consequentially "no longer can God be held to be totally and directly responsible for all that happens."[36] This altruistic kenosis involves a divine self-limitation that grants a measure of independence, sanctioning the created other to truly be itself and to make itself.[37] Despite evil being a consequence of kenotic omnipotence, God could not be held responsible for all that transpires including moral and natural evil.[38] If freedom is essential to the created order, does this imply that God cannot remove or override creaturely freedom completely? Because if "God is love," why should he not intervene especially against those who generate evil? For this reason, this line of theological reflection does not view the universe as a perfect, complete, and instantaneous act of creation "frozen into finished perfection,"[39] but rather sees the universe as

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[35]Haught suggests that "God is more concerned to enable the world to make itself—permitting it to experience many mistakes in the process. There is a profound respect on the part of God for the freedom of the creation, a selfless liberality. . . . So in life's diversity, it is not a matter of natural processes rather than God doing all the work, but of God creating through natural processes" (Haught, "God and Evolution," 708).

[36]Polkinghorne, "Kenotic Creation and Divine Action," 95. God is not an "indifferent deistic Spectator, who having set it all going just lets it all happen, nor as the cosmic Puppet Master pulling every string in the theatre of creation. The gift of love must always include some due degree of independence granted to the objects of love" (Polkinghorne, "The Universe as Creation," 173).

[37]Polkinghorne, "The Universe as Creation," 173. Love, among other things, consists in leaving the other to be themselves. Haught concurs when he writes, "After all, it is in the very nature of self-sacrificing, kenotic love to long for the freedom and self-determination of the beloved. We may assume, then, that an infinitely self-emptying divine love would will that the created universe become something 'other' than God. God could not be said to love unreservedly a universe that is not allowed to be distinct from the divine. Since kenotic love requires an 'other,' any conceivable creator who refused to risk allowing the world to be, at least to some degree, independent of God could not truly love it" (Haught, "Kenosis," 501).

[38]Polkinghorne writes, "Yet, while the responsibility for moral evil seems to lie with human beings, ultimately the responsibility for natural evil appears to lie at the door of the Creator" (Polkinghorne, *Exploring Reality: The Intertwining of Science and Religion*, 138).

[39]John F. Haught, "Kenosis," in *Encyclopedia of Science and Religion*, ed. J. Wentzel van Huyssteen (London: Thomson Gale, 2003), 501.

having an inherent openness to novel and unpredictable outcomes as it emerges in patterns of self-organization.[40]

The idea of a "universe of becoming" open to its future where divine providence[41] is permitted to operate is Polkinghorne's response to mitigate theology's struggles with the

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[40]"Emergent complexity, chaos, and nature's generically self-organizing tendencies fit more comfortably a universe grounded less in coercive power than nurturing love that allows the universe some degree of self-creativity" (ibid.). Polkinghorne writes, "It can be claimed that a world of that kind of evolving fruitfulness is a greater good than a ready-made creation would have been" (Polkinghorne, "The Universe as Creation," 173). Daryl Domning writes, "We are discovering that all sorts of seemingly complex patterns in the structure and activity of living organisms . . . are generated by surprisingly simple rules of cell growth and individual behavior. In these sorts of 'self-organizing' processes, order in an entire system emerges spontaneously out of purely local interactions among the system's subunits, with no central control or influence from outside, let alone any preconceived blueprint of what patterns will emerge. . . . *The only way to determine how these patterns evolve under the rules is to watch them*. . . . Perhaps not even God can know what will result, in other than the most general terms, except by watching (from a vantage point outside time and space what comes out of the processes set in motion at the creation" (Daryl P. Domning and Monika K. Hellwig, *Original Selfishness: Original Sin and Evil in the Light of Evolution* (Burlington, VT: Ashgate, 2006), 111). Scott Camazine, quoted in Domning's book, illustrates the self-organizing process the following way, "Do ants or, for that matter, termite mounds, flocks of birds, or schools of fish have leaders that all the members of the group follow? The answer is, clearly, no. Imagine the kind of oversight that would be needed to build a termite mound. The mound may be thousands or millions of times larger than an individual termite, and the construction of the edifice may take longer than dozens of individual lifetimes. It is simply inconceivable that an overseer guides all those processes. The same holds true for the flock and the school: although their movements are as elegant as the finest choreography, there is no choreographer to direct each bird or fish. The natural world, it turns out, is replete with patterns and processes that exhibit organization without an organizer, coordination without a coordinator" (Scott Camazine, "Patterns in Nature," *Natural History* 112 (2003): 35). It is along these lines that Antony Campbell makes a helpful suggestion that a distinction be made between "unguided," "guided," and "risked" evolution. In the first case, God leaves the universe open on its own. The second alternative explains that God constrains the universe according to his will, and finally, the third option advocates that "God took the risk of creating an evolutionary universe, is with it in its evolution (with joy and sorrow, happiness and pain), but without controlling the process itself" (Antony F. Campbell, *God First Loved Us: The Challenge of Accepting Unconditional Love* (Mahwah, NJ: Paulist Press, 2000), 99).

[41]Polkinghorne admits that there is a "interweaving . . . within the cloudiness of intrinsic unpredictabilities, so that unfolding history cannot be itemized. Such a picture of undisentangleability corresponds to God's loving choice to be, in the evolving history of creation, a present cause among causes" (Polkinghorne, "Kenotic Creation and Divine Action," 105). It is beyond the scope and intention of this study to thoroughly discuss Polkinghorne's theology of divine action. Recent works concentrating on

difficulties and mysteries of theodicy. Kenosis is viewed as a way of balancing divine love[42] and divine power:[43] "Love without power would correspond to a God who was a compassionate but impotent spectator of the history of the world. Power without love would correspond to a God who was the Cosmic Tyrant, holding the whole of history in an unrelenting grasp."[44]

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divine action include: George F. R. Ellis, "Ordinary and Extraordinary Divine Action: The Nexus of Interaction," in *Philosophy, Science and Divine Action*, ed. F. LeRon Shults, Nancey Murphy, and Robert J. Russell (Leiden: Brill, 2009); Jürgen Moltmann, "Reflection on Chaos and God's Interaction with the World from a Trinitarian Perspective," in *Chaos and Complexity: Scientific Perspectives on Divine Action*, ed. Robert J. Russell, Nancey Murphy, and Arthur R. Peacocke (Berkeley: Vatican Observatory Publications; The Center for Theology and the Natural Sciences, 1997); Nancey Murphy, "Science, Divine Action, and the Intelligent Design Movement: A Defense of Theistic Evolution," in *Intelligent Design: William A. Dembski & Michael Ruse in Dialogue*, ed. Robert B. Stewart (Minneapolis, MN: Fortress, 2007); Arthur R. Peacocke, "The Sound of Sheer Silence: How Does God Communicate with Humanity?," in *Philosophy, Science and Divine Action*, ed. F. LeRon Shults, Nancey Murphy, and Robert J. Russell (Leiden: Brill, 2009); Alvin Platinga, "What Is 'Intervention'?," *Theology and Science* 6 (2008); Robert J. Russell, "Does the 'God Who Acts' Really Act in Nature?," in *Science and Theology: The New Consonance*, ed. Ted Peters (Boulder, CO: Westview Press, 1998); Robert J. Russell, "Special Providence and Genetic Mutation: A New Defense of Theistic Evolution," in *Evolutionary and Molecular Biology: Scientific Perspectives on Divine Action*, ed. Robert J. Russell, William R. Stoeger, and Francisco J. Ayala (Berkeley, CA: Vatican Observatory; The Center for Theology and the Natural Sciences, 1998); Robert J. Russell, Nancey C. Murphy, and C. J. Isham, *Quantum Cosmology and the Laws of Nature: Scientific Perspectives on Divine Action*, 2nd ed. (Berkeley, CA: Center for Theology and the Natural Sciences, 1996); Robert J. Russell, Ted Peters, and Nathan Hallanger, *God's Action in Nature's World: Essays in Honour of Robert John Russell* (Burlington, VT: Ashgate, 2006); F. LeRon Shults, Nancey C. Murphy, and Robert J. Russell, *Philosophy, Science, and Divine Action*, vol. 1 (Leiden: Brill, 2009); Wesley J. Wildman, "Evaluating the Teleological Argument for Divine Action," in *Philosophy, Science and Divine Action*, ed. F. LeRon Shults, Nancey Murphy, and Robert J. Russell (Leiden: Brill, 2009).

[42]Polkinghorne, "Kenotic Creation and Divine Action," 91-92. "Emphasis on divine love seems to lie behind Process Theology's picture of a God who, in A. N. Whitehead's moving phrase, is a "fellow sufferer who understands," and who acts only through the power of persuasion. It is a noble concept, but it is open to question whether deity has not been so evacuated of power that hope in God as the ground of ultimate fulfillment has been subverted. . . . The matter can be put in the bluntest terms by asking whether Whitehead's God could be the One who raised Jesus from the dead" (ibid., 92).

[43]Ibid., 92. "Emphasis on divine power seems to lie behind Classical Theology's picture of a God who, through primary causality, is in total control and whose invulnerability is such that there is no reciprocal effect of creatures upon the divine nature, of the kind that a truly loving relationship would seemto imply . . . is open to question whether its picture of the divine nature is not so remote and insulated from creation as to put in question the fundamental Christian conviction that 'God is love' (1 John 4:8)" (ibid.).

[44]Ibid., 91.

But these two attributes are in tension in a theological understanding of the inevitable shadow side to evolution.[45] The evolutionary character[46] of the universe has serious implications for theodicy.[47] Unfavorable to any type of romanticism regarding the history of the universe as

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[45]Polkinghorne, *Traffic in Truth: Exchanges between Science and Theology*, 18. "Indeed, science's gift offers theology modest help with the greatest theological problem of all—the problem of pain and suffering. There is an unavoidable cost involved in a world allowed to make itself. The very same processes that allow cells to mutate and produce new forms of life will inevitably allow other cells to mutate and become malignant. The fact that there is cancer in creation is not due to divine callousness or incompetence; it is the inescapable dark side of the good of an evolving creation."

[46]This matter will be discussed further in the subsequent chapter but for now it is enough to mention that Polkinghorne calls on his notion of a two-stage kenotic creation to explain why God works through evolution. He writes, "Why did God bother with the old creation, this world of transience and decay? I believe that the answer lies in recognizing that kenotic creation is intrinsically a two-stage act. First must come a world in which creatures exist at a sufficient distance from the infinite reality of their Creator so that they are allowed a true freedom to be themselves. If finite creatures are not to be overwhelmed, the divine presence must initially be veiled. The process of that world will be an evolutionary process in which creatures are allowed to make themselves, as potentiality is explored and brought to birth we have seen that mortality is intrinsic to such an evolving world, which has to be poised at the edge of chaos. The old creation will fulfill some of the divine creative purposes, but not all of them. God's final intention is to draw all who will freely come, into closer contact with the divine life, so that they may live in the light of progressively unveiled divine reality to the utmost extent to which it is possible for finite beings to share in that infinite reality. True fullness of life will come through this everlasting encounter, and there will be no need for the evolutionary sequence of finite generations" (Polkinghorne, *Theology in the Context of Science*, 158).

[47]"Of all the difficulties that hold people back from religious belief, the question of evil and suffering in the world is surely the greatest. . . . How can such a world be considered to be the creation of a God who is both all-good and all-powerful? . . . Not only does it give considerable pause to the enquirer after theism, but it is also one that remains a perpetual challenge and source of perplexity for those of us who are believers. . . . The attempt to justify the ways of God in the face of the actuality of evil is called theodicy. It is a task of considerable importance and difficulty for theologians. It is clear that the perplexities that are raised are not ones that are capable of being dispelled simply by a few paragraphs of clear-thinking prose. They are as much existential as logical and they lie very deep" (Polkinghorne, *The Polkinghorne Reader: Science, Faith, and the Search for Meaning*, 138). After discussing Polkinghorne's kenosis model in a recent article, Craig Boyd and Aaron Cobb conclude that evil is the consequence of kenotic omnipotence. They write, "Individual evil acts are permitted since God chooses not to dominate the creation with divine power but allows the created beings to act in ways that may or may not be in accordance with God's desires. It is therefore possible for creatures to act against God's wishes, and evil is therefore a consequence of 'omnipotent kenosis' (Craig A. Boyd and Aaron D. Cobb, "The Causality Distinction, Kenosis, and a Middle Way: Aquinas and Polkinghorne on Divine Action," *Theology and Science* 7 (2009): 396). Ward echoes this thought when he writes, "If one asks, 'Why did God not just create the good things?' the answer is that even God could not just create the sort of morally responsible, creative beings we are in a wholly good universe, without any actual or possible conflict or suffering in it. In a way not discernible in detail by us, evil arises from the divine nature, though in an unintended way, and in a way that is always opposed by, and that ultimately can be overcome by, goodness, a goodness that God intends" (Ward, 160).

one of exclusive fruitfulness, Polkinghorne accentuates its history as also marred with mass extinctions in order to arrive at its present form. Thus, Polkinghorne seeks to placate this tension by conceding that in kenotic creation and its concept of *creatio continua*, the results of suffering and death are necessary elements.[48] Polkinghorne writes:

> Death is the necessary cost of new life; environmental change can lead to extinctions; genetic mutations sometimes produce new forms of life, oftentimes malignancies. There is an unavoidable cost attached to a world allowed to make itself. Creatures will behave in accordance with their natures: lions will kill their prey; earthquakes will happen; volcanoes will erupt and rivers flood. I have called this insight "the free-process defense" in relation to physical evil, in analogy with the familiar free-will defense in relation to moral evil. These defenses do not by any means solve all the problems of theodicy, but they temper them somewhat by removing a suspicion of divine incompetence or indifference.[49]

Because Polkinghorne and others[50] insist on identifying kenosis with divine self-limitation, the question that naturally arises is why could God not occasionally become unself-limited, that is, forsaking his self-imposed restraints in the name of love and prevent evil especially committed to innocent victims?

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[48]Polkinghorne, *Exploring Reality: The Intertwining of Science and Religion*, 143. "As the generations succeed each other in the course of evolutionary process, death is seen to be the prerequisite of the possibility of new life. The history of the shuffling exploration of potentiality will inevitably have its ragged edges, for there will be developmental blind alleys and extinctions, as well as unfolding fertility. . . . Things will often just *happen*, as a matter of fact, rather than for an indivudually identifiable purpose." Stoeger writes, "The universe is life-bearing, and even seems to be specially ordered to produce life. And yet, paradoxically, at the same time death is also a pervasive experience throughout nature. In fact, it is only through the disappearance, disintegration, and death of structure, systems, and organisms that emergence and birth of others that are new and more advanced occur" (William R. Stoeger, "Scientific Accounts of Ultimate Catastrophes in Our Life-Bearing Universe," in *The End of the World and the Ends of God: Science and Theology on Eschatology*, ed. John C. Polkinghorne and Michael Welker (Harrisburg, PA: Trinity, 2000), 20-21).

[49]Polkinghorne continues, "From this point of view, the classic confrontation between the claims of divine love and the claims of divine power is resolved by maintaining God's total benevolence but qualifying, in a kenotic way, the operation of God's power. Of course, this is a self-qualification, exercised within the divine nature and in accordance with that nature itself" (Polkinghorne, "Kenotic Creation and Divine Action," 181). "In an evolving world, the death of one generation is the necessary cost of the new life of the next. We know that biological evolution has been driven by genetic mutation, but if germ cells are to be able to mutate and produce new forms of life, then somatic cells will also, by the same process, be able to mutate and sometimes they will then become malignant. . . . The anguishing fact of cancer is not something gratuitous, as if a Creator who was a bit more competent or a bit less callous could easily have eliminated it. It is the necessary cost of creation in which creatures are allowed to make themselves" (Polkinghorne, "The Universe as Creation," 173).

[50]Refer to footnote 47.

Integrating the evolutionary theory of life with a loving God is not a simple task. Though Polkinghorne offers kenosis as a theological response to theodicy, tempering divine responsibility "by removing a suspicion of divine incompetence or indifference,"[51] it does not provide a satisfactory answer regarding the question of moral and natural evil and suffering.[52] For Polkinghorne, in the midst of a suffering creation is the suffering Creator, a fellow sufferer sharing the load while seeking its ultimate redemption.[53] After reviewing the manner in which Polkinghorne's kenotic model incorporates scientific and theological insights and the difficulty of theodicy, his belief in theistic evolution can now be described and evaluated, providing a better understanding as to why he rejects a univocal reading of biblical protology.

Theistic Evolution

The origin of the universe and of life is the classic dissension between science and theology. Nevertheless one important overlap is the fact that both the science and Scripture claim the universe had a beginning. Describing that beginning or building a cosmology is the ultimate

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[51]Polkinghorne, *Exploring Reality: The Intertwining of Science and Religion*, 144. "We tend to think that had we been in charge of creation, frankly, we would have done it better. We would have kept all the nice things . . . and got rid of all the nasty things. . . . However, the more science enables us to understand the nature of evolving fertility, the more we see that it is necessarily a package deal, an integrated process in which growth and decay are inextricably interwoven as novelty emerges at the edge of chaos" (ibid.).

[52]The challenge of theodicy is the perennial issue for a belief in theism. Haught comments that when discussing God in the context of evolution, what is at stake is the reality of a "personal, caring, compassionate, and providential God that science seems to place in question, and it is on such an understanding of God that the debate about evolution must remain focused" (Haught, "God and Evolution," 697). But the question persists. If God is truly caring and compassionate, why does he not minimize moral evil (the evil committed by humanity) and the suffering, death and extinction of species (natural evil)? This is the very question expressed eloquently by George Ellis: "Indeed the issue of evil, pain, and suffering as experienced in the present-day world, of God's acceptance and allowance of horrors of all kinds, which one might *a priori* presume he/she could and would prevent if he/she so desired. If the usual Christian view is to make sense, there has to be a cast-iron reason why a merciful and loving God does not alleviate a lot more of the suffering in the world, if he/she has indeed the power to do so" (George Ellis, "Ordinary and Extraordinary Divine Action: The Nexus of Interaction," in *Chaos and Complexity: Scientific Perspectives on Divine Action*, ed. Robert J. Russell, Nancey Murphy, and Arthur R. Peacocke (Berkeley, CA: Vatican Observatory; The Center for Theology and the Natural Sciences, 1997), 360).

[53]Polkinghorne, *Exploring Reality: The Intertwining of Science and Religion*, 146.

goal of science,[54] and it is here that Polkinghorne links the scientific theory of origins to the Christian belief of a divine creator by accommodating biblical cosmology to the modern world, thus making it an intelligble option for belief.[55]

Two concepts are critical in Polkinghorne's cosmology. The first concept, kenosis, viewed in the previous section, is an attempt to accommodate the belief in divine action within history while allowing creatures to behave in accordance with their natures. The second concept is theistic evolution.[56] Evolutionary theism teaches that evolution is God's chosen method of introducing life and creating complexity within life through natural laws. Polkinghorne claims that the doctrine of creation makes intelligible what from a purely scientific point of view has to be treated as plain fact or accident. Evolution is an event and an unfolding process whose devleopments take place over vast tracts of deep time, expressing the purpose of a good and almighty God.[57] Polkinghorne continues to take science seriously "by accepting all that science

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[54]Fernando Canale, *Creation, Evolution, and Theology: The Role of Method in Theological Accommodation* (Berrien Springs, MI: Andrews University LithoTech, 2005), 19.

[55]It is precisely with this point that Nigel Brush disagrees. He comments, "Thus, to link the current scientific thought with Christian belief is to embrace chaos. The Christian who would link religious beliefs to the latest scientific theory must be willing to constantly readjust his or her faith to fit each new scientific discovery, theory, or paradigm. Christians who adopt this approach soon find themselves adrift on a sea of subjectivism with no solid ground on which to stand. . . . To whom can the scientist turn for solid answers to life's ultimate questions if Christian beliefs are themselves constantly being adjusted to conform to the current teachings of science?" (Nigel Brush, *The Limitations of Scientific Truth: Why Science Can't Answer Life's Ultimate Questions* (Grand Rapids, MI: Kregel Publications, 2005), 269-270). Lennox is in complete agreement with Polkinghorne on this point. He writes, "I am not, of course, claiming that the Bible can inform every branch of science, but I am claiming that there are certain fundamental points of convergence of such immense significance for our understanding of the universe and ourselves that it is worth pointing them out. Such convergences between the Bible and contemporary science add to the Bible's credibility in a skeptical world—as Scripture itself would warrant us in thinking (Rom. 1:19-20)" (Lennox, *Seven Days that Divide the World*, 42).

[56]Campbell recognizes three versions of theistic evolution: Risked evolution, a Guided evolution, and an Unguided evolution. For an overview, see Campbell, *God First Loved Us: The Challenge of Accepting Unconditional Love*, 99.

[57]Polkinghorne, *Science and Creation: The Search for Understanding*, 51.

can tell us about cosmic and terrestrial history"[58] while embedding it within a theological context, without which the universe cannot be understood completely.

It is evident that Polkinghorne's scientific premises[59] influence and impact his theology and particularly his cosmology, which leads him to reject biblical univocity in regard to the origin of the cosmos and theistic evolution. According to him, any theological discourse on creation must yield and comply with the scientific account of cosmology.[60] "In considering creation,

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[58]Polkinghorne, *Science and Religion in Quest of Truth*, 83. If God has a purpose for the universe then the universe has a historial character, i.e., a story. Haught identifies the three fundamental constituents that make up the narrative character and are the main factors of the evolutionary process. They are, *contingency*, *predictability* and *deep time*. A theolgy of evolution should focus on their religious meaning and ask "Why the universe would be graced at all with such a potential for drama and adventure" (Haught, "God and Evolution," 704-706). A few pages later he concludes, "The pattern of evolution seems to fit quite comfortably into a world-view that features at its centre the idea of a humble God who loves stories, and who offers an open future in which the story of this universe and perhaps others as well, can continue to unfold" (709).

[59]On the assimilation of scientific premises see Michael Polanyi, *Science, Faith and Society* (Chicago, IL: The University of Chicago Press, 1964). He discusses how the assimilation of scientific premises shapes the perception of reality. He writes, "The scientific intuition of reality henceforth shapes his perception. He learns the methods of scientific investigation and accepts the standards of scientific value. At every stage of his progress towards this end he is urged on by the belief that certain things as yet beyond his knowledge and even understanding are on the whole true and valuable, so that it is worthspending his most intensive efforts on mastering them. This represents a recognition of the authority of that which he is going to learn and of those from whom he is going to learn it. It is the same attitude as that of the child listening to its mother's voice and absorbing the meaning of speech. . . . And so similarly no one can become a scientist unless he presumes that the scientific doctrine and method are fundamentally sound and that their ultimate premises can be unquestioningly accepted" (44-45). He also writes, "It would thus appear that when the précises of science are held in common by the scientific community each must subscribe to them by an act of devotion. These premises form not merely a guide to intuition, but also a guide to conscience; they are not merely indicative, but also normative. The tradition of science, it would seem, must be upheld as an unconditional demand if it is to be upheld at all. . . . It is a spiritual reality which stands over them and compels their allegiance" (54).

[60]Polkinghorne writes, "Theology seeks to speak of God, the One who is the source of all created being. Therefore, to some degree theology must take account of all forms of truth-seeking investigation into the nature of what is. Among such enquiries, the discoveries of science are of clear significance as they tell us about the pattern and history of the universe" (Polkinghorne, *Science and the Trinity: The Christian Encounter with Reality*, 1). Antony Campbell reiterates Polkinghorne's conclusion. He writes, "In many respects, past tradition has seen Genesis One as the definitive biblical account of creation. While evidence that this is not the case was present in multiple biblical texts, it was ignored. When modern science asserts the contrary of past tradition, the valid conclusions of science must be accepted. In the case of creation, the acceptance was often grudging, probably because science was assumed to be inimical to religious faith. In due course, bilical interpretation itself gave greater emphasis to the Bible's own contradiction of past tradition" (Antony F. Campbell, *Making Sense of the Bible* (New York: Paulist Press, 2010), 17).

theology has to take account of all that science can tell it about what exists and what the character of its history has been, for God is as much the Creator today as 13.7 billion years ago."[61]

The Authority and Role of Modern Cosmology in Protology

Polkinghorne asserts that the universe is a divine creation, yet science, not theology, describes the nature and history of the cosmos. He believes that science, not Scripture, provides the best explanation for cosmology. Polkinghorne does not treat Scripture as the hermeneutical lens through which he views all other things. This honor he has granted to science.[62] Instead of replicating the origin of the universe as portrayed by the biblical text, theology has to conform to a reality that is grounded in a scientific worldview.[63] Doing theology in a contemporary scientific context allows Polkinghorne to use scientific insights to dictate and impose an interpretation on theology[64] because theology should not rival science on its own ground but complement it by offering a more profound kind of understanding.[65] For Polkinghorne, one does not have to choose between God and modern cosmology because each explains things differently, yet they are

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[61]Polkinghorne, *Science and Religion in Quest of Truth*, 78.

[62]John Lennox thinks along the same lines when he writes that "though our interpretation relies on scientific knowledge, it does not compromise the authority of Scripture. And this is the important point. Scripture has the primary authority. Experience and science have helped decide between the possible interpretations that Scripture allows" (Lennox, *Seven Days that Divide the World*, 33). As Gilkey wrote, "Cosmology does make a difference in hermeneutics" (Gilkey, "Cosmology, Ontology, and the Travail of Biblical Thinking," 204).

[63]Polkinghorne, *Science and Religion in Quest of Truth*, 78. "While the physics of the early universe is certainly interesting, it holds no unique siginificance for theology." See also Haught, "God and Evolution," 709. "Any supposed theological alternative to an evolutionary world peppered with contingency might be one in which there is no suffering or death. But such a world would also be devoid of life, human freedom, and the possibility of surprising future outcomes. . . . It seems to me that the scientific portrait of life emerging from this narrative matrix is completely consistent with a Christian understanding of God" (ibid.).

[64]Polkinghorne, *Traffic in Truth: Exchanges between Science and Theology*, 11. Polkinghorne correctly and adamantly affirms that "science will tell theology what the structure and the history of the physical world are like. Theology will gratefully acknowledge these gifts and seek to set them within the more profound and comprehensive setting that belief in God affords" (ibid.).

[65]Ibid., 30. According to Polkinghorne, science asks the *how* questions and theology asks the *why* questions.

complementary.[66] They should be read on different levels. For example, on one level is God's creatorial agency and another level is the mechanism and the regularity of natural laws which were built by God. Reading the universe in multiple ways can be enriching, but scriptural and cosmic literalism cripples the attainment of depth in understanding.[67]

The Problem of a Biblical Protology

The book of Genesis is foundational for the rest of Scripture. The opening chapters lay down the basis of a biblical worldview claiming that the universe is derivative of God's word. These passages claim that God *acted* and *spoke*.[68] Thus, a univocal understanding of the Genesis narrative informs the reader *How* the universe came to exist. Interpretative problems arise for

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[66]Stoeger, "The Big Bang, Quantum Cosmology and Creation Ex Nihilo," 175. "Thus quantum cosmology and *creatio ex nihilo* contribute deeply complementary and consonant levels of understanding of the reality in which we are immersed. Exactly the same point can be applied to divine creation and biological evolution—they are not exclusive alternatives, but rather complementary accounts, linking the ultimate ground of being and order with their elaboration in concrete structures, dynamisms, processes and transitions" (ibid.).

[67]Haught comments, "Natural science, for the sake of its own integrity, has to leave out all appeals to divine explanation. From the point of view of science, a theological reading of nature is always out of place. The question remains, however, whether the scientific reading takes us deeper than all other readings. . . . Is it possible that the clarity given by science does not inevitably bring along with it the depth that the human quest for truth is really after?" (Haught, *Deeper Than Darwin: The Prospect for Religion in the Age of Evolution*, 17).

[68]Langdon Gilkey recognized this fact when he wrote, "The modern assumption of the world order has stripped bare our view of the biblical history of all the divine deeds observable on the surface of history. . . . The biblical and orthodox understanding of theological language was univocal. That is, when God was said to have 'acted,' it was believed that he had performed an observable act in space and time so that he functioned as does any secondary cause. . . . The words "act" and "speak" were used in the same sense of God as of men" (Gilkey, "Cosmology, Ontology, and the Travail of Biblical Thinking," 196).

Polkinghorne if the narrative is interpreted univocally.[69] First, according to him, when discussing primal creation, the language of Gen 1-2 is mythical and is incompatible with each other. Second, if the narrative is taken univocally, then the interpretative ambition is to explain the same thing that science does.[70] But interpreting the universe against the backdrop of the sacred text is problematic for Polkinghorne due to his acceptance of the modern cosmological account of origins. It is essential that a distinction be made between what Scripture actually says and what we think it means.[71]

The central issue then at stake is how should Scripture be interpreted in terms of the *How* in cosmology.[72] Scripture has an important and specific role, and Polkinghorne seeks to legitimize its usage while avoiding two fundamentalist approaches: scientific and biblicist fundamentalism.

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[69]Polkinghorne, *Encountering Scripture: A Scientist Explores the Bible*, 15. Polkinghorne provides an example. He writes, "In a literal-minded way of reading them, the two accounts are incompatible. For example, in the first the creation of humans follows the creation of the animals, while in the second the order is reversed" (ibid.). A few pages later he further comments, "We have already seen that the fact that these two stories themselves are incompatible with each other should warn us against treating them as if they were divinely dictated accounts, given to save us the trouble of scientific investigation into terrestrial and cosmic history" (22). Gordon Clark argues that if religious language is mythological, then apparent contradictions can only be true if the language is literal. Does Polkinghorne interpret Gen 1 or 2 literally to make such a claim? Whether he does or not, in the end he believes both chapters are mythological. Clark concludes that "inconsistencies never will prove that the language is mythological" (Clark, *Language and Theology*, 112).

[70]Gilkey pointed this out. It is because of modern cosmology that biblical theological categories have lost their univocal meaning. "What has happened is clear: because of our modern cosmology, we have stripped what we regard as 'the biblical point of view' of all its wonders and voices. This in turn has emptied the Bible's theological categories of divine deeds and divine revelations of all their univocal meaning" (Gilkey, "Cosmology, Ontology, and the Travail of Biblical Thinking," 202).

[71]Anthony C. Thiselton, *Hermeneutics: An Introduction* (Grand Rapids, MI: Eerdmans, 2009), 5. Thiselton writes, "Hermeneutics seeks to *establish bridges* between opposing viewpoints" (ibid.).

[72]Campbell, *Making Sense of the Bible*, 18. Campbell suggests that different references to creation and the absence of any additional sequences of six days in the Old Testament should prevent the reader from "jumping to rash conclusions." He explains, "In ancient Israel, with awareness of the breadth of Israel's traditions . . . few would have indulged the idea that Genesis One gave a picture of how God had created the world. Given the "other and different portrayals of creation or references to creation" in the biblical texts (such as Prov 8, Ps 104, Job 26 or 38, Gen 2, and more), we can conclude that Israel believed God created the world and Israel's theologians were aware that they had no idea as to *how* it might have been done" (ibid.).

The essential nature of fundamentalism is proclaiming partial truth as if it were the whole truth,[73] which explains why the unity of truth is critical for Polkinghorne. According to him, the problem of biblical cosmology is one of interpretation and harmonization with modern cosmology,[74] and in order to achieve his goal, Polkinghorne has to interpret the biblical narrative of Gen 1-2 metaphorically, not univocally.[75]

Scripture was not written in a scientific language,[76] but Polkinghorne reads and evaluates Gen 1-3 in the context of contemporary scientific cosmology.[77] Regarding Gen 3 Polkinghorne explains:

> Once again we have to recognize that we are dealing with the genre of myth. I do not believe that the chapter is the historical account of a single disastrous ancestral act, but it is a story conveying truth about the relationship between God and humanity. Read in a literal way, the story would clearly be incompatible with well-established knowledge given us by the sientific study of the past. Snakes do not speak, thorns and thistles did not arise as a result of an act of human disobedience and, most important of all, death was present in the world long before it

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[73]Ellis, "Physics, Complexity, and Religion," 762.

[74]Polkinghorne, *Encountering Scripture: A Scientist Explores the Bible*, 21. “Read in a flat-footedly literal way they are obviously incompatible with the well-founded conclusions of modern cosmology and evolutionary biology” (ibid.).

[75]Ibid., 22-23. “In fact, from the earliest Christian centuries it was recognized that Genesis is not giving a literal account. People noted that light was created on the first day but the sun, moon and stars, the apparent sources of light, on appeared on the fourth day. . . . In fact, the late creation of the heavenly bodies in the narrative illustrates the theological character of Genesis 1. In the ancient world, sun, moon and stars were often worshipped as deities. Genesis is at pains to make it clear that they are merely creatures, appearing rather late on the scene in order to indicate their properly subordinate status. . . . The much older story of Genesis 2 is even more obviously mythical in its character, meaning by ‘myth’ not a fairy story but a truth so deep that only story can convey it. This second chapter of Genesis offers important theological insights by means of the story that it tells: humanity’s place within nature” (ibid., 23).

[76]Lennox, *Seven Days that Divide the World*, 30. Lennox suggests that Scripture uses phenomenological language, the language of appearance. He explains that phenomenological language “describes what anyone can see. It talks about the sun rising just as everyone else does, including scientists, even though they know that the sun only appears to rise. . . . Saying that the sun ‘rises’ does not commit the Bible, or a scientist for that matter, to any particular model of the solar system” (ibid.).

[77]Campbell, *Making Sense of the Bible*, 18. Campbell claims that the six days of creation recorded in Gen 1 “seems tame and desperately out of date when confronted with modern science’s awareness of our 13.7 billion-year-old universe.” Gilkey comments, “Actually we are translating the biblical view into our own, at least in rejecting its concrete content of wonders and voices and so changing these categories from univocal concepts to empty analogies. But we have done this translating without being aware of the change we have made and thus without thinking out the problems in which this shift in cosmology and the resultant translation of biblical language involve us” (Gilkey, "Cosmology, Ontology, and the Travail of Biblical Thinking," 204).

had any hominid inhabitants. . . . Any attempt to struggle with these difficulties in order to try to find a literal interpretation of the chapter is, in fact, once again to miss the point.[78]

The immediate and obvious consequences in Polkinghorne's manner of relating contemporary cosmology to Scripture involves a revision or reinterpretation of Scripture based on scientific concepts. For Polkinghorne, theological langauge is non-literal and metaphorical features are often used, which is why he claims the text is not meant to be read "in a flat-footedly literal way."[79] If the texts are read in a *legalistic*[80] or *literalistic* manner,[81] then obviously the

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[78]Polkinghorne, *Encountering Scripture: A Scientist Explores the Bible*, 28. How does Polkinghorne interpret the Fall? The experience of self-consciousness possessed by human beings brought the Fall. He writes, "The Fall is indeed a fall 'upward', the gaining of knowledge, but it is an error to suppose that humans can thereby attain equality with their Creator, so that they can live their lives independently of God. This declaration of complete human autonomy, the assertion that we can simply 'do it my way', is the root meaning of sin. . . . This turning from God did not bring biological death into the world, for that had been there for many millions of years before there were any hominids. What it did bring was what we may call 'mortality', human sadness and bitterness at the inevitability of death and decay. Because our ancestors had become self-conscious, they knew long beforehand that they were going to die" (ibid.). Polkinghorne does recognize that his modern interpretation excludes an aspect that was used in early Christian centuries. The presence of disease in a good creation (Gen 1.10, 12, 18, 21, 25, 31) was understood by some of the Church Fathers as being caused by the cursed ground and the entry of death that marred an original perfect creation. The biblical text which claims these things is ignored by Polkinghorne. He writes, "This strategy for explaining the apparent imperfection of a world that is the creation of a perfect Creator is not available to us" (31). Compare Polkinghorne, *Reason and Reality: The Relationship between Science and Theology*, 72. "Nowhere is the textbook approach to Scripture more out of place than in Genesis 1-3. . . . We read them as powerful symbolic stories (myths) conveying the idea of a total dependence of the creation upon its Creator and (most astonishing of all) the sevenfold reiterated message that all is 'good'. Science, in making untenable a literal reading of Genesis 1 and 2 (itself a tendency originating in late medieval and reformation times), has liberated these chapters to play their proper and powerful role in Christian thought" (ibid.).

[79]Polkinghorne, *Theology in the Context of Science*, 100. Gilkey writes, "We deny this univocal understanding of theological words. To us, theological verbs such as 'to act,' 'to work,' 'to do,' 'to speak,' 'to reveal,' etc., have no longer the literal meaning of observable actions in space and time or of voices in the air. The denial of wonders and voices has thus shifted our theological language from the univocal to the analogical" (Gilkey, "Cosmology, Ontology, and the Travail of Biblical Thinking," 196).

[80]I am indebted to Martin Hanna for coining the expression *legalistic reading*.

[81]Lennox, *Seven Days that Divide the World*, 23-25. Lennox correctly explains that all language contains elements of literal and metaphor. He provides a couple of examples. The first is, "The car was flying down the road," where the *car* and *road* are literal but despite *flying* being a metaphor, the sentence does refer to something real. Another example is the statement made by Christ, "I am the door" (John 10.9). Clearly the primary, literal sense of a physical door is not meant but the metaphor does convey real truth regarding Christ as a real doorway into a literal experience of salvation. He makes a distinction between a *literalistic* and a *literal* meaning. *Literalistic* refers to the basic, primary meaning of a word and *literal* refers to the natural reading intended. Thus, in the sentence "the car was flying down the road," a *literalistic* reading implies that the car was actually flying and reading it *literally*, in the natural sense, means the car was going very fast.

narrative is incompatible with the conclusions drawn from modern cosmology and evolutionary biology. According to Polkinghorne, modern cosmology provides a detailed account of terrestrial and cosmic history. Evolutionary theory demonstrates that creation is a process, and Polkinghorne states that Genesis also portrays creation as a process.[82]

Another aspect that should be taken into consideration, according to Polkinghorne, is the genre of the biblical text. He explains that a fundamentalist biblical literalism reading of Gen 1-2 mistakes its genre.[83] A theological reading brings into focus the purpose of Gen 1-2.[84]

A Reinterpretation of Biblical Protology:
Rejection of Biblical Univocity

Interpretation is the key, and reinterpretation is necessary in light of the fact that science has changed the meaning of theological discourse.[85] Polkinghorne is aware of this, and how does he interpret the opening chapters of Genesis? Polkinghorne reads Scripture in the context of contemporary scientific cosmology, thus rejecting a univocal reading of the biblical narrative.

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[82]Polkinghorne, *Encountering Scripture: A Scientist Explores the Bible*, 28.

[83]Ibid., 21. "In fact, from the earliest Christian centuries it was recognized that Genesis is not giving a literal account. People noted that light was created on the first day but the sun, moon and stars, the apparent sources of light, only appeared on the fourth day. . . . The late creation of the heavenly bodies in the narrative illustrates the theological character of Genesis 1. In the ancient world, sun, moon and stars were often worshipped as deities. Genesis is at pains to make it clear that they are merely creatures, appearing rather late on the scene in order to indicate their properly subordinate status" (ibid.). Even though a theological reading might provide insights, does the genre conclude that Genesis is irrelevant for doing science?

[84]Ibid., 22. "Genesis 1 does not give us a quasi-scientific account of a hectic six days of divine activity, but is something altogether deeper and more interesting than that. It is a theological text whose principal purpose is to assert that nothing exists except through the will of God." Campbell interprets Gen 1 eschatologically as a "grand portrayal of an ordered world. Chaos has been banished; everything is in its place. All is good. . . . It is not the world we live in and the world we experience that is described this way; it is the world coming, in the text, from God's creative hand. Experience can encounter a chaotic and messy world. Israel's experience certainly did. . . . They portrayed it with the images of a world coming from the creative hand of God. Each week, they celebrated it on the seventh day. Christians today can rise to the imaginative challenge of finding longed-for order and stability in the image of a crucified God" (Campbell, *Making Sense of the Bible*, 19).

[85]Bronislaw Szerszynski, "Rethinking the Secular: Science, Technology, and Religion Today," *Zygon* 40 (2005): 816.

The biblical accounts of the creation found in Genesis cannot be accepted as true scientifically because they do not provide reliable contemporary scientific information. As already mentioned, Polkinghorne evades "fundamentalist biblical literalism" by claiming that Genesis should be understood theologically, not historically. He separates theology from history by not reading it as history but by reading and believing the text conveys timeless truths through figurative, theological language.[86] The message that Genesis conveys is that God continuously sustains the universe because it constantly depends on his providential care.[87]

Polkinghorne does not spurn the interpretation of evolutionary science. Rather, he rejects a univocal reading of the opening chapters of Genesis.[88] As a scientist, Polkinghorne continues to embrace a scientific literalism in regard to the *How* of the universe in order to bolster theology's cognitive status in a scientific culture. He continues to concede that only an evolutionary interpretation of nature will command respect intellectually. However, he suggests an alternative way of interpreting evolutionary science. The alternative way places evolutionary science in a theological framework, and Gen 1-2 is interpreted theologically and metaphorically.

Summary and Conclusions

It is evident that Polkinghorne provides a coherent model in the case of protology in his interpretation of science and theology. By placing the created universe in a theological

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[86]An excellent discussion of the usage of *literal* meaning can be found in R. W. L. Moberly, *The Bible, Theology, and Faith: A Study of Abraham and Jesus* (Cambridge: Cambirdge University Press, 2000), 225-232. Moberly concludes that an interpreter should take "full seriousness the integrity of the biblical text on its own terms: that is, to find the 'spiritual meaning' precisely in the 'literal sense'" (232).

[87]Polkinghorne, *Encountering Scripture: A Scientist Explores the Bible*, 22. He writes, "The sad irony of so-called 'creationism', based on a fundamentalist biblical literalism, is that in fact it abuses the very text that it seeks to respect" because "Genesis 1 does not give us a quasi-scientific account of a hectic six days of divine activity, but is something altogether deeper and more interesting than that. It is a theological text whose principal purpose is to assert that nothing exists except through the will of God" (ibid.). If this is the principal purpose, what might be the other lesser purposes of the text and how does Polkinghorne know this is the principal purpose of the text?

[88]Polkinghorne, "Beyond the Big Bang," 17. "The error is to believe that the doctrine of creation is concerned with the physical question of temporal origin ('Who lit the blue torch paper of the Big Bang?'), whilst in fact its focus is on ontological origin (Leibniz' question about why anything exists at all)" (ibid.).

framework, Polkinghorne points to an ultimate meaning in creation that is beyond the competence and vision of science.

However, by not having a strict theological focus on the biblical doctrine of creation, Polkinghorne, in the interest of cohesion, has adopted a system in which he reinterprets and reshapes theological concepts. He presupposes that modern science and theology are compatible by accomodating Genesis to theistic evolution, and his redefinition of cosmology relies on scientific knowledge and language. This is based on the presupposition that science determines the best possible interpretation of protology. His desire to bring the doctrine of creation into empirical conformity with a particular scientific theory leads Polkinghorne to reject a univocal reading of Gen 1-3, and he presumes that reinterpreting these texts in light of modern science does not compromise Scripture's authority.

The next chapter critically describes Polkinghorne's Eschatology and his relative acceptance of scriptural univocity.

CHAPTER IV

POLKINGHORNE'S ESCHATOLOGY AND THE RE-INTRODUCTION OF BIBLICAL UNIVOCITY

Introduction

By situating Polkinghorne's different scriptural approaches into case studies, one is able to investigate and discover more clearly the role Scripture plays in his theological method. Polkinghorne's manner of using Scripture in protology was presented in chapter 3. The aim of the present chapter is to delineate Polkinghorne's eschatology and how his relative acceptance of biblical univocity has impacted his eschatology.

Eschatology

Eschatology is the study of the final end of all things and the ultimate destiny for individuals and creation. Two key elements are identified in Polkinghorne's eschatology. First, he is concerned with history as it moves toward its fulfillment and, second, he is equally concerned with the fulfillment of history and its perpetuity. Polkinghorne argues that a hopeful eschatology must include both concerns.[1] Grounded on a theistic view of reality, he claims that there is legitimacy of a future hope for a universal resurrection and transformation. Yet, these claims rest

[1]Polkinghorne, *The God of Hope and the End of the World*, 81. "Others again, including the present writer, adopt the familiar eschatological stance of already/not yet, believing that it is necessary to combine elements of both realized and futurist eschatology, in what one may call an inaugurated, but not completed, eschatology." Regarding realized eschatology, he adds, "Realised eschatology finds its enabling in the hope sustained by a realistic futurist eschatology" (ibid., 49).

on revelation mediated in Scripture and tradition[2] through the use of eschatological language, which Polkinghorne labels "mythic language."[3] Understanding eschatological claims of a hopeful future are formulated through symbolic language, assigning deep and complete relevancy to the universe and its history.[4] Polkinghorne presents a future irradiated with hope of transformation for the universe despite the pessimistic forecast of scientific cosmology.[5] As a scientist, Polkinghorne is cognizant of the challenges scientific cosmology presents in terms of eschatology.

Scientific cosmology is not capable of offering any type of hope and, as Polkinghorne describes, "the bleak prognosis for the universe puts in question any notion of evolutionary optimism, of a satisfactory fulfilment solely within the confines of the unfolding of present physical process."[6] Then, how does Polkinghorne understand Christian eschatological claims in

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[2]Polkinghorne writes, "If, as I believe, any hope of a destiny beyond death can ultimately rest only on the faithfulness of God the Creator, then appeal to the revelatory insights . . . is absolutely fundamental to the discussion" (ibid., xvii).

[3]Polkinghorne, *The Faith of a Physicist: Reflections of a Bottom-up Thinker: The Gifford Lectures for 1993-4*, 164. "Needless to say, our recourse to mythic language is in order to speak of that which is not yet experienced, and not in the form of the illusory comfort of a fable."

[4]According to Richard Bauckham, eschatological language is symbolic and imaginative because eschatology transcends all known concepts. Yet, the symbols direct imaginative thought so "the *imaginative* is not necessarily the *imaginary*" and "hopeful imagining is protected from mere speculation in that it is grounded in the promises of God and resourced by the images of Scripture" (Richard Bauckham, "Eschatology," in *The Oxford Handbook of Systematic Theology*, ed. John Webster, Kathryn Tanner, and Iain Torrance (Oxford: Oxford University Press, 2007), 316-317).

[5]For example, Robert Russell writes that "John Polkinghorne offers the most promising insights for responding to the challenge of cosmology" (Robert J. Russell, "Cosmology and Eschatology," in *The Oxford Handbook of Eschatology*, ed. Jerry L. Walls (Oxford: Oxford University Press, 2008), 572).

[6]Polkinghorne, *The Faith of a Physicist: Reflections of a Bottom-up Thinker: The Gifford Lectures for 1993-4*, 162.

light of the pessimistic prognosis of scientific cosmology?[7] As a scientist and theologian, Polkinghorne concedes that nothing can be proven about what takes place after death, but he believes there are reasonable motivations for hope in a life to come or in a continued life. But, if proof cannot be offered, then how credible can any eschatological assertion be? Polkinghorne replys that "a credible eschatology is seeking to establish that the divine creation is truly and everlastingly a cosmos and not . . . a chaos whose final end must lie in futility. The message of eschatological hope is that the world makes sense, now and always."[8]

The ultimate hope of eschatology "will have to rest in an ultimate reality, that is to say, in the eternal God himself, and not in his creation."[9] Polkinghorne holds that Christian belief "provides the essential resource for answering this fundamental question."[10]

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[7]Discussions in scholarly works that treat specifically the relation between eschatology and scientific cosmology and its implications include: Richard Bauckham and Trevor Hart, *Hope against Hope: Christian Eschatology at the Turn of the Millenium* (Grand Rapids, MI: Eerdmans, 1999); Neil Gillman, "How Will It All End? Eschatology and Science in Religion," *Cross Currents* 57 (2007); Norman R. Gulley, "The Impact of Eschatology on Protology," *Journal of the Adventist Theological Society* 11 (2000); Michael G. Hasel, ""In the Beginning . . . " The Relationship between Protology and Eschatology," in *The Cosmic Battle for Planet Earth: Essays in Honor of Norman R. Gulley*, ed. Ron Du Preez and Jirí Moskala (Berrien Springs, MI: Old Testament Department, Seventh-day Adventist Theological Seminary, Andrews University, 2003); Ulrich H. J. Körtner, *The End of the World: A Theological Interpretation* (Louisville, KY: Westminster John Knox, 1995); Ted Peters, "Where Are We Going? Eschatology," in *Essentials of Christian Theology*, ed. William C. Placher (Louisville, KY: Westminster John Knox, 2003); Robert J. Russell, "Bodily Resurrection, Eschatology, and Scientific Cosmology: The Mutual Interaction of Christian Theology and Science," in *Resurrection*, ed. Ted Peters, Michael Welker, and Robert J. Russell (Grand Rapids, MI: Eerdmans, 2002); Robert J. Russell, "Sin, Salvation, and Scientific Cosmology: Is Christian Eschatology Credible Today?," in *Sin and Salvation*, ed. Duncan Reid and Mark William Worthing (Hindmarsh, Australia: Australian Theological Forum, 2003); Robert J. Russell, "Five Key Topics on the Frontier of Theology and Science Today," *Dialog* 46 (2007); Russell, "Cosmology and Eschatology," 563-580; Robert John Russell, "Eschatology and Scientific Cosmology: From Conflict to Interaction," in *What God Knows: Time, Eternity, and Divine Knowledge*, ed. Harry Lee Poe and J. Stanley Mattson (Waco, TX: Baylor University Press, 2006); Hans Schwarz, *Eschatology* (Grand Rapids, MI: Eerdmans, 2000); John Turl, "All Things New," *Science and Christian Belief* 19 (2007): 139-160.

[8]Polkinghorne, *Theology in the Context of Science*, 159. "Ultimately the issue is whether we live in a world that makes sense not just now, but totally and for ever" (ibid.).

[9]Polkinghorne, *The Faith of a Physicist: Reflections of a Bottom-up Thinker: The Gifford Lectures for 1993-4*, 163.

[10]Ibid. Polkinghorne does not claim to prove Christian eschatology. In relation to proof, he explains that "proof is an inappropriately cut-and-dried category for the discussion of any kind of profound metaphysical issue. What I am seeking to do is to present the motivations for Christian eschatological hope and to show that this hope is one that is intelligible and defensible in the twenty-first century" (ibid., xviii).

Polkinghorne's hopeful eschatology revolves around four propositions.[11] First, if the universe is a created entity, then it must make sense, that is, it has a purpose. Second, if God is a loving Creator, then there must be an ultimate destiny for the universe and its creatures. Third, any eschatological expectation must have elements of continuity and discontinuity, and finally, this hope is grounded on the steadfast love and faithfulness of God and the resurrection of Christ.

The hope of the transformation of the universe into the new creation is based on an analogy with the bodily resurrection of Christ. Polkinghorne introduces the expression *ex vetere*[12] in order to distinguish between the initial and present creation with the future transformed creation. He writes: "What is brought about is the divine redemptive transformation of the old creation. The new is not a second creation *ex nihilo*, but it is a resurrected world created *ex vetere*. Involved in its coming to be must be both continuity and discontinuity, just as the Lord's risen body bears the scars of the passion but is also transmuted and glorified."[13]

If the eschatological cosmic transformation is a radically new act of God, how can science be relevant? Polkinghorne emphasizes that eschatological fulfillment will have elements of continuity and discontinuity with the creation presently experienced in many ways. This is so because theologically there must be a continuity between present reality and the final transformation at the eschaton. To a certain degree, it will be the same creation with the same individual identities who belong to it. For Polkinghorne, it is the point of continuity that allows the natural sciences to be relevant and make a contribution, whereas the discontinuities are the property of theology.[14]

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[11]Polkinghorne, *The God of Hope and the End of the World*, 148-149.

[12]The definition of the term *ex vetere* is "from/out of the old."

[13]John C. Polkinghorne, "Eschatology: Some Questions and Some Insights from Science," in *The End of the World and the Ends of God: Science and Theology on Eschatology*, ed. John C. Polkinghorne and Michael Welker (Harrisburg, PA: Trinity, 2000), 30. See also Polkinghorne, *Reason and Reality: The Relationship between Science and Theology*, 102-103.

[14]Polkinghorne, "Eschatology: Some Questions and Some Insights from Science," 30.

Scientific Cosmology and the Problem of a Scientific Eschatology

Contemporary natural science presents descriptions of partial, global, and cosmic catastrophic events capable of obliterating life on this planet and the entire cosmic development.[15] Since there is no scientific supportable foundation for the belief in a transformed new heavens and new earth, scientific cosmology poses a serious challenge to any credible Christian eschatology based on the resurrection of Christ and the transformation of the universe into the new creation. If the manner in which the emergence of the universe came to be is taken as factual, then its demise should be thoughtfully considered. Regardless of the fact that the end of the cosmic time scale lies billions of years into the future, the prognosis that scientific cosmology presents, through the extrapolation of its present history, is a hopeless and futile end to all forms of life in the universe. Certain death is the ultimate destiny for the present and all future generations, as it was for all of the preceding forms of life during the evolution of the universe.[16]

The universe is controlled by the competing effects of expansion and gravity, and scientific cosmology asserts that the observable universe will eventually evanesce by one of two certain catastrophes: *freeze* or *fry*. The first scenario explains that the universe is infinite in size, and as a consequence of the big bang it is destined to expand unceasingly. If expansion prevails, then the temperature will exponentially drop to absolute zero. This scientific description of

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[15]Examples of partial and global catastrophes include geological and climatic changes, collision with a comet or meteor. Examples of cosmic catastrophes include the cyclical theory of the oscillating universe and the thesis of heat death based on the Second Law of Thermodynamics.

[16]Kathryn Tanner, "Eschatology without a Future?," in *The End of the World and the Ends of God: Science and Theology on Eschatology*, ed. John C. Polkinghorne and Michael Welker (Harrisburg, PA: Trinity, 2000), 222. She writes, “The best scientific description of the day leaves little doubt that death is the end toward which our solar system and the universe as a whole are moving. Our sun will one day exhaust its fuel, annihilating life on planet Earth” (ibid.).

universal death is termed *freeze*.[17] In the second model, the universe is finite in size and if gravity predominates, the universe's present expansion will eventually stop. The universe will then reverse and recollapse, ending with an implosion where the temperature will rise infinitely. This scientific description of universal death is termed *fry*.[18]

Both of these scenarios can either conflict with a future-oriented Christian eschatology or these dire perspectives can be consistent with God's *modus operandi*, thus defusing the challenge to a future-oriented Christian eschatology altogether.[19] What response can Polkinghorne's interpretation of Christian eschatology give to the challenge presented by scientific cosmology?

Biblical Eschatology: Relative Introduction of Biblical Univocity

An implication of a theistic perspective of reality is its assigning of relevancy and meaningfulness to the universe and its history.[20] Polkinghorne introduces eschatology as the

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[17]Polkinghorne, *The God of Hope and the End of the World*, 8-9. Polkinghorne explains that if expansion continues, "the galaxies now receding from each other will continue to do so for ever. Within each galaxy, gravity will bring about condensation into enourmous black holes, which will eventually decay into low-grade radiation through a variety of possible physical processess" (Polkinghorne, *The Faith of a Physicist: Reflections of a Bottom-up Thinker: The Gifford Lectures for 1993-4*, 162).

[18]Polkinghorne, *The God of Hope and the End of the World*, 9. If gravity prevails, Polkinghorne describes that the expansion of the universe "will one day be halted and reversed. What began with the big bang will end in a the big crunch, as the whole universe collapses back into a singular cosmic melting pot" (Polkinghorne, *The Faith of a Physicist: Reflections of a Bottom-up Thinker: The Gifford Lectures for 1993-4*, 162).

[19]God's *modus operandi* as viewed in protology. For example, Tanner lists possible explanations and one of them being that "God might indeed use the old world's destruction, as the scientists describe it, as a purgative means to a new heaven and earth beyond the reach of the old world's own capacities; the destruction of the world becomes in that case a kind of world crucifixion that signals the death of death by way of divine power" (Tanner, "Eschatology without a Future?" 222-223). Ted Peters comments, "Should the final future as forecasted by the combination of big bang cosmology and the second law of thermodynamics come to pass . . . we would have proof that our faith has been in vain. It would turn out to be that there is no God, at least not the God in whom followers of Jesus have put their faith" (Ted Peters, *God as Trinity: Relationality and Temporality in the Divine Life* (Louisville, KY: Westminster John Knox, 1993), 175-176). "Theology's expression of its hope must be consistent with science's prediction of physical futility, but theology is entitled to look beyond that and to make use of insights derived from its own conviction of the faithfulness of God" (Polkinghorne, *Science and Theology: An Introduction*, 118).

[20]Polkinghorne, *Science and Theology: An Introduction*, 114. "The claim is that the world is truly a cosmos and not a 'tale told by an idiot'. This is because God's will and purpose, and God's assurance of an ultimate fulfilment, are behind all that is happening" (ibid.).

response to the impending fact of cosmic annihilation. He asserts that any adequate theological response to science must rest on two foundational assumptions: the first is the everlasting faithfulness of God and the second is the idea that creation is important to God.[21] A hopeful eschatology is not based on evolutionary optimism but rather it is predicated on the enduring faithfulness of God.[22] Polkinghorne affirms that eschatology is indispensable to Christian theology[23] because it provides the answer by affirming that the universe makes complete sense. He infers that a unified theory of everything can be found in a theological understanding of reality. This view leads him to believe that "if the universe is to make complete sense, it will be through something like the continuity/discontinuity of the Christian resurrection hope. The theological motivation for entertaining that hope lies in the resurrection of Jesus and the faithfulness of (*chesed*) of God."[24]

In Polkinghorne's eschatological discourse, science is dependent on theology. In terms of eschatology, the principal role of science is to raise questions while looking at theology to provide the answers for a hopeful end.[25] But the exploration of a credible hope will not only make

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[21]John C. Polkinghorne, "Eschatological Credibility: Emergent and Teleological Processes," in *Resurrection* (Grand Rapids, MI: Eerdmans, 2002), 48.

[22]Polkinghorne writes, "The insight of God's steadfast faithfulness is its foundation for eschatological hope, the basis for theology's affirmation that the universe is not a chaos but a cosmos, not simply a world making sense now but always" (Polkinghorne, *Science and Religion in Quest of Truth*, 103). Elsewhere Polkinghorne writes that all eschatological hope "cannot be based on a kind of evolutionary optimism that depends solely on the extrapolation of present process. That would be reliance on a delusory hope, for there is no natural expectation that stretches beyond death, whether the death is that of the human individual or that of the universe" (Polkinghorne, "Eschatological Credibility: Emergent and Teleological Processes," 48). In another place, he also writes, "An ultimate hope will have to rest in an ultimate reality, that is to say, in the eternal God himself, and not in his creation" (Polkinghorne, *The Faith of a Physicist: Reflections of a Bottom-up Thinker: The Gifford Lectures for 1993-4*, 163). Elsewhere he writes, "Only the steadfast will of the Creator can ensure that the Big Bang was not an empty explosion fated to return again into eventual nothingness" (Polkinghorne, "Beyond the Big Bang," 24).

[23]Polkinghorne, *The Faith of a Physicist: Reflections of a Bottom-up Thinker: The Gifford Lectures for 1993-4*, 170.

[24]Polkinghorne, "Eschatology: Some Questions and Some Insights from Science," 38.

[25]Ibid., 41. Yet, Polkinghorne declares that "the form these answers take will have to bear a sufficiently consonant relation to the process of this present universe so as to be persuasive" (ibid.).

full use of the resources for understanding offered by science but will also be grounded on scriptural evidence and theological tradition.

Polkinghorne's conviction is framed in a resurrection concept of continuity and discontinuity, and it is here that we begin to gain insight into his contrastive reading of Scripture. How will the universe come to an end? Polkinghorne's claims of an optimistic and hopeful end, that is, the concept of discontinuity, are based on a univocal reading of theological phenomena that science cannot verify in order to deny or confirm its reality.[26] It becomes noticable that Polkinghorne is not following science blindly. His method of interpretation deviates because, in his cosmology, he yields to a scientific account of *How* the universe originated. But, in terms of eschatology, Polkinghorne chooses not to yield to the scientific account of *How* the universe will end but rather is open to and accepts a scriptural reading of eschatology. Through the concepts of discontinuity, Polkinghorne allows theology to continue not only answering the *Why* questions but even sanctions it to answer the *How* questions. He also assumes that through the linkage of the present creation to the future new creation, that is, the concept of continuity, is what will make Christian eschatology coherent with science. Polkinghorne clarifies this point:

> Science . . . could not usurp theology's role in speaking of what God might do by way of a new creation. However, if that new creation is to be related to the present creation in a way that involves both continuity and discontinuity (as the Christian resurrection hope suggests), then science may have something to say about the conditions of consonance and credibility that the continuity aspect of the relationship might be expected to fulfill.[27]

As already noted, this linkage requires Polkinghorne to interpret the discontinuity element of Scripture univocally. As a theist, Polkinghorne needs Scripture and biblical eschatology. But why? Polkinghorne needs biblical eschatology because "an unaided scientific

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[26]Polkinghorne, *Science and Religion in Quest of Truth*, 103. "Science, which can only tell the 'horizontal' story of unfolding present process, is not in a position either to deny or confirm this 'vertical' story of divine faithfulness" (ibid.).

[27]Polkinghorne, "Introduction: Eschatology and the Sciences," 17.

account of the world does not suceed in making complete sense of cosmic history."[28] Whereas in science, Polkinghorne yields to the scientific account of the cosmic past, in eschatology, he does not allow science to dictate exhaustively his belief and explanation of the cosmic future due to the inherent limitations of science. Eschatology is a matter of faith in God and Christ.

How should the language of these claims be understood in light of scientific cosmology and Christian theology? Polkinghorne takes eschatological language seriously and literally.

The God of Hope and the Resurrection of Christ

Polkinghorne contends that in order for eschatology to be persuasive, it has to adequately articulate God's overall purpose for all creation.[29] His hopeful and credible eschatology rests on two essentials as its foundation: God's enduring faithfulness and the resurrection of Christ:

> What could then be the ground of a true hope beyond history? There is only one possible source: the eternal faithfulness of the God who is the Creator and Redeemer of history. . . . Christian trust in divine faithfulness is reinforced by the knowledge that God is the One who raised Jesus from the dead. Only such a God could be the ground for that hope against hope that transcends the limits of any natural expectation.[30]

Because of God's eternal faithfulness, Polkinghorne then believes that God has an ultimate purpose for creation and that his faithfulness will endure. But, what evidence does he

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[28]Polkinghorne, "Eschatology: Some Questions and Some Insights from Science," 38.

[29]Polkinghorne, *The God of Hope and the End of the World*, 94. "If eschatology is to make sense, all the generations of history must attain their ultimate and individual meaning." Regarding the role of hope in God's purpose for creation, he claims that it should not only embrace the "possibilities of the present but also the sufferings of the past and expectations of the future" (ibid., 93). Polkinghorne warns of the danger of not qualifying "all creation." He comments, "The eschaton is in danger of becoming a museum collection of all that has ever been. It is hard to believe that individual stones as such either have or need an ultimate destiny" (ibid., 123).

[30]Ibid., 95. See also John C. Polkinghorne, "The Scientific Worldview and a Destiny Beyond Death," in *Immortality and Human Destiny* (New York: Paragon House, 1985), 180. "The Christian's belief in a destiny beyond death finds its principal support in the particular event of the resurrection of Jesus Christ, rather than in general considerations about the nature of the world" (ibid.).

offer that this is factual? What evidence does he present for the veracity of the the story of the resurrection of Christ? Both are derived from a univocal reading of Scripture. First, Polkinghorne affirms "a credible eschatology must find its basis in a 'thick' and developed theology." What type of robust theology does he have in mind? He answers:

> A kind of minimalist account of deity, which sees God as not much more than the Mind behind cosmic order, will not be adequate. Nor will a kind of minimalist Christology, which sees Jesus as no more than an inspired teacher, pointing humanity to new possibilities for self-realisation. . . . These concepts are too weak to bear so great a weight of expectation. To sustain true hope it must be possible to speak of a God who is powerful and active, not simply holding creation in being but also interacting with its history, the one who "gives life to the dead and calls into existence the things that do not exist" (Romans 4:17).[31]

In other words, his eschatological hope and his belief in the meaningfulness of human life contain rationalistic faith in biblical theology.[32] Second, eschatology is based on the resurrection of Christ. In Christ, there is a destiny for humanity and physical creation. It was the purpose of God that Christ should be the "first born from the dead" (Col 1.18). Polkinghorne believes that God's final aim is cosmic in scope. The resurrection of Christ demonstrated that death is not the end because a resurrection and transformation awaits those who trust in him. There is a single destiny for the universe and humanity. According to Polkinghorne, in order for theology to coherently argue for a destiny beyond death, it is essential to wrestle with the elements of continuity and discontinuity in terms of the New Creation and humanity.

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[31]Polkinghorne, *The God of Hope and the End of the World*, 95. We see the tension in Polkinghorne's interpretation. First, he believes in the literal resurrection of Christ and the power of God's words to "call into existence" things that do not exist, yet Polkinghorne appears not to be open in negotiating the historical validity of these claims. These are essential to his eschatological faith but in terms of biblical protology, where God spoke creation and life into existence. This he plainly rejects as myth.

[32]Polkinghorne, "Beyond the Big Bang," 24. "It is my religious faith that enables me to take the more hopeful view. I believe that the really Grand Unified Theory, the true Theory of Everything, is not some set of beautiful equations which we might hope one day to write on our T-shirts, but theology itself, with its account of the God who is the Sustainer of the physical world and the Ground of creation's eventual fulfillment. That is the meaning of the process that was set in motion at the fiery explosion of the Big Bang, fifteen billion years ago" (ibid.).

The New Creation: *Ex Vetere* in Contrast to *Ex Nihilo*

Polkinghorne's notion of God as Creator and sustainer of all creation implies that an exclusive anthropocentric approach to eschatology should be resisted in favor of a future cosmic destiny beyond death.[33] Because eschatological hope is cosmic in scope, Polkinghorne accepts univocally the universal hope presented in Rom 8.19-23 by proposing that the ultimate fulfillment for the whole universe is a New Creation inaugurated by the resurrection of Christ.[34]

> Just as we see Jesus' resurrection as the origin and guarantee of human hope, so we can also see it as the origin and guarantee of a universal hope. The significance of the empty tomb is that the Lord's risen and glorified body is the transmuted form of his dead body. Thus matter itself participates in the resurrection transformation, enjoying thereby the foretaste of its own redemption from decay. The resurrection of Jesus is the seminal event from which the whole of God's new creation has already begun to grow.[35]

Theologically, Polkinghorne argues that the natural laws and physical properties of the present universe will be transformed.[36] His understanding of the process and character of a *creatio continua* through evolutionary development influences his eschatology[37] even though it

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[33]Polkinghorne notes "that the empty tomb asserts that Christ's risen and glorified body is the transformation of his dead body, thereby implying a destiny in Christ for matter as well as for humanity" (Polkinghorne, *Science and Theology: An Introduction*, 117). Gabriel Daly writes, "Something *cosmic* has to happen if there is to be redemption in any real sense. A Christ who arises only in the human heart cannot meet the demands of a universe in travail" (Gabriel Daly, *Creation and Redemption* (Wilmington, DE: Michael Glazier, 1989), 100).

[34]Polkinghorne, *The God of Hope and the End of the World*, 113. "The new creation is 'in Christ' and it is his resurrection that is the seed from which the new has already begun to grow" (ibid., 84).

[35]Ibid., 113.

[36]"In fact, the 'matter' of the new creation . . . must be God's destiny for the futility-generating (entropy-increasing) matter of this world" (Polkinghorne, *Science and Theology: An Introduction*, 116).

[37]Polkinghorne, *The Faith of a Physicist: Reflections of a Bottom-up Thinker: The Gifford Lectures for 1993-4*, 167. "The understanding that this creates in my mind is that the old creation has the character which is appropriate to an evolutionary universe. . . . It is a universe, certainly not lying outside the sustaining and providential care of God, but nevertheless it is given its due independence to follow its own history. That historical process cannot avoid the cost of suffering which is the price of independence. The new creation represents the transformation of that universe when it enters freely into a new and closer relationship with its Creator, so that it becomes a totally sacramental world, suffused with the divine presence. Its process can be free from suffering, for it is conceivable that the divinely ordained laws of nature appropriate to a world making itself through its own evolutionary history should give way to a differently constituted form of 'matter', appropriate to a universe 'freely returned' from independence to an existence of integration with its Creator" (ibid.).

leads him to make a distinction between protology and eschatology in his attempt to find a resolution between the concept of process and the concept of hope.[38]

This resolution is found in his understanding of creation as a two-stage process.[39] First, the old creation exists at a distance from the veiled presence of God. This distance is necessary in order for creation to truly be free while being allowed to develop and make itself. The second step is the new creation made up of new matter and brought into closer intimacy with its Creator who is no longer veiled. His interpretation of the new creation is framed in terms of an eschatological transformation, not an eschatological replacement, satisfying the necessary continuity between the old and new creations.[40] It is important to note that by the adjective *new*, Polkinghorne does not imply the abolition of the present creation. Rather, the first creation will be a redeemed and transformed *ex vetere* creation and not a second, totally new creation *ex nihilo*. He argues that the

> new creation is not a second attempt by God at what he had first tried to do in the old creation. It is a different kind of divine action altogether, and the difference may be summarized by saying that the first creation was *ex nihilo* while the new creation will be *ex vetere*. In other words, the old creation is God's bringing into being a universe which is free to exist 'on its own', in the ontological space made available to it by the divine kenotic act of allowing the existence of something wholly other; the new creation is the divine redemption of the old.[41]

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[38]Ibid., 169. "The concept of a new creation *ex vetere* is the attempt to do justice both to the God of process and to the God of hope. It emphasizes that the One who creates is also the One who redeems. That hope of a transformed new creation in which all will participate is the only ultimate answer to the suffering present in the old creation, for theodicy cannot be based on the idea that the agony of past generations is the necessary price of some future evolved happiness for others alone. Each generation must receive the healing and fulfillment that it is due" (ibid.).

[39]Polkinghorne, *Theology in the Context of Science*, 158.

[40]Polkinghorne, *The God of Hope and the End of the World*, 116. He also adds, "This consideration implies that, the distinction between the two must be as sharp as that between death and resurrection. The one cannot be parlayed into the other" (ibid., 143).

[41]Polkinghorne, *The Faith of a Physicist: Reflections of a Bottom-up Thinker: The Gifford Lectures for 1993-4*, 167.

Polkinghorne speculates that the character of the new creation will be different from the current one.[42] It will not evolve from existing resources but will be infused with new laws conducive to the permanency of life along with the final eradication of suffering and death.[43]

If natural laws can be rewritten in a manner that suffering and death are excluded, then, why were these laws not the basis for the present creation? Polkinghorne explains that

> kenotic creation is intrinsically a two-stage act. First must come a world in which creatures exist at a sufficient distance from the infinite reality of their Creator so that they are allowed a true freedom to be themselves. If finite creatures are not to be overwhelmed, the divine presence must initially be veiled. The process of that world will be an evolutionary process in which creatures are allowed to make themselves, as potentiality is explored and brought to birth. We have seen that mortality is intrinsic to such an evolving world, which has to be poised at the edge of chaos. The old creation will fulfil some of the divine creative purposes, but not all of them. God's final intention is to draw all who will freely come, into closer contact with the divine life. . . . True fullness of life will come through this everlasting encounter, and there will be no need for the evolutionary sequence of finite generations. Theologically we may say that the world of the new creation will be the realm where final eschatological fulfilment will be attained through a panentheistic participation in divine reality (1 Corinthians 15:28).[44]

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[42]Polkinghorne, *The God of Hope and the End of the World*, 114. "This current universe is a creation endowed with just those physical properties that have enabled it to 'make itself' in the course of its evolving history. A world of this kind, by its necessary nature, must be a world of transience in which death is the cost of new life. . . . This creation is the result of a kenotic act by the Creator, who has made way for the existence of the created other. The physical fabric of such a universe must take a particular form, but there is no reason to suppose that the Creator cannot bring into being a new creation of a different character when it is appropriate to the divine purpose to do so" (ibid.).

[43]Ibid., 115-116. "Yet it seems a coherent hope to believe that the laws of its nature will be perfectly adapted to the everlasting life of that world where 'Death will be no more; mourning and crying and pain will be no more, for the first things have passed away' (Revelation 21:4), just as the laws of nature of this world are perfectly adapted to the character of its freely evolving process, through which the old creation has made itself."

[44]Polkinghorne, *Theology in the Context of Science*, 158. "First, the old creation, allowed to explore and realize its potentiality at some metaphysical distance from its Creator; then the redeemed new creation which, through the Cosmic Christ, is brought into a freely embraced and intimate relationship with the life of God" (Polkinghorne, *The God of Hope and the End of the World*, 116). "I think that the answer lies in that patient *creatio continua*, creation-through-process, which is the way of a loving Creator in his dealings with a creation to which he has given the gift of freedom" (Polkinghorne, *Reason and Reality: The Relationship between Science and Theology*, 102). See also Polkinghorne, *Science and Theology: An Introduction*, 116.

It has already been noted that the new creation is a transformation of the present creation. Still, by what means is this transformation brought about and how long will it take? Creation will be reclaimed by God through Christ. Based on a univocal reading of Scripture (Col 1.15-20), Polkinghorne infers that this transformation is generated as a result of a universal reconciliation to God because it will be "integrated into the divine life ('theosis')."[45] In other words, Polkinghorne believes that the eschatological cosmic destiny will be panentheistic in character.[46] The "new creation," writes Polkinghorne, "will be wholly sacramental, suffused with the presence of the life of God."[47] The new creation enters into a new state of intimacy with God, possible only through a "relinquishment of that gift of independence and a return"[48] by the old creation, but he does not go into detail concerning the transformational time lapse between the old and new creation. He discards the idea of the millennium serving as a bridge between the old and new creation, claiming he is "unconvinced of the need for such a transitional episode."[49] However long it takes, Polkinghorne speculates that the nature of temporality in the new creation will bear some similarity with the time of the present creation. He explains:

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[45]Polkinghorne, *Science and Theology: An Introduction*, 116. "In the letter to the Colossians, Paul speaks, most astonishingly, of the significance of Christ in truly cosmic terms: 'Through him [Christ] God was pleased to reconcile to himself all things [note, not just all people], whether on earth or in heaven [the known universe], by making peace through the blood of his cross' (1.20). Polkinghorne has emphasized that the empty tomb asserts that Christ's risen and glorified body is the transformation of his dead body, thereby implying a destiny in Christ for matter as well as for humanity" (ibid., 116-117).

[46]Polkinghorne, *The God of Hope and the End of the World*, 115. "I do not accept panentheism (the idea that the creation is in God, though God exceeds creation) as a theological reality for the present world, but I do believe in it as the form of eschatological destiny for the world to come. As Paul wrote to the Corinthians, God will then be 'all in all' (1 Corinthians 15:28)" (ibid.).

[47]Ibid.

[48]Polkinghorne, *Reason and Reality: The Relationship between Science and Theology*, 103. Polkinghorne explains that this new relationship with God produces a different type of good. He writes, "The pattern of present physical process represents that good which God in his wisdom bestows on a universe allowed to exist over against him and permitted to make itself through the realization of its own fruitful potentiality. The good that is possible in the new creation is a different good, for it is based on the coming-to-be of a different relationship between God and the world" (ibid., 102). Daly comments that "the new creation is what the Spirit of God does to the first creation" (Daly, *Creation and Redemption*, 100).

[49]Polkinghorne, *The God of Hope and the End of the World*, 86-87, 142.

> What does seem clear is that if it is intrinsic to humanity to be embodied, then it must be intrinsic to humanity to be temporal. The life of the world to come will doubtless be everlasting, but it will not be eternal in that special and mysterious timeless sense in which the word is applied to God himself. The patient process of this world will find its reflection in the redemptive process of the world to come. Our notion of heaven is delivered from any static, and potentially boring, conception. The life of heaven will involve the endless, dynamic exploration of the inexhaustible riches of the divine nature.[50]

The Psychosomatic Nature of Humanity and the Resurrection

If the universe has a purpose and ultimately makes sense, then the reality of death certainly brings into question God's intention for his creation. Does God simply abandon his creation, especially in terms of humanity, after serving its purpose, and if that is the case, how credible is a Christian eschatological hope? Polkinghorne argues that God has an eternal destiny for humanity: "It seems a coherent belief that God will remember and reconstitute the pattern that is a human being, in an act of resurrection taking place beyond present history. Thus the Christian hope centres on a real death followed by a real resurrection, brought about through the power and merciful faithfulness of God."[51]

Polkinghorne clarifies that even though death is a reality, it is not the ultimate end. He clearly accepts and maintains that the resurrection is a direct eschatological act of God.

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[50]Polkinghorne, *The Faith of a Physicist: Reflections of a Bottom-up Thinker: The Gifford Lectures for 1993-4*, 170. Elsewhere he writes, "The new creation will not be a timeless world of 'eternity', but a temporal world whose character is everlasting. . . . Just as it is intrinsic to humanity that we should be embodied, so it is intrinsic to humanity that we are temporal beings. One must recognize, however, that this conclusion runs counter to a good deal of eschatological thinking" (Polkinghorne, *The God of Hope and the End of the World*, 117).

[51]Polkinghorne, *Science and Theology: An Introduction*, 115. See also Polkinghorne, *The Faith of a Physicist: Reflections of a Bottom-up Thinker: The Gifford Lectures for 1993-4*, 163. "The Christian hope is, therefore, for me not the hope of *survival* of death, the persistence *post mortem* of a spiritual component which possesses, or has been granted, an intrinsic immortality. Rather, the Christian hope is of death and *resurrection*" (ibid.).

Polkinghorne veers from the classic theological definition of an inherent immortal soul.[52] He prefers a psychosomatic view of human nature as "animated bodies" to classical dualism "incarnated souls,"[53] thus accepting Scripture's primary definition of the soul as a unit.[54] Polkinghorne stresses the completeness of death due to its naturalness.[55] Yet, death is not the

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[52]Polkinghorne, *The Faith of a Physicist: Reflections of a Bottom-up Thinker: The Gifford Lectures for 1993-4*, 163-164. "That will be his eschatological act of resurrection. Thus, death is a real end but not the final end, for only God himself is ultimate. Although there have, of course, been strands of the Christian tradition which have used the language of the survival of an immortal soul, I believe that the tradition which is truer, both to New Testament insight and to modern understanding, is that which relies on the hope of a resurrection beyond death. If this psychosomatic understanding is correct, then it is intrinsic to true humanity that we should be embodied. We are not apprentice angels, awaiting to be disencumbered of our fleshly habitation. Our hope is of the resurrection of the *body*" (ibid.). For a brief essay on a scriptural monistic rendering of human nature, see Joel B. Green, ""Bodies--That Is, Human Lives": A Re-Examination of Human Nature in the Bible," in *Whatever Happened to the Soul? Scientific and Theological Portraits of Human Nature*, ed. Warren S. Brown, Nancey Murphy, and H. Newton Malony (Minneapolis, MI: Fortress Press, 1998), 149-173.

[53]John C. Polkinghorne, "The Person, the Soul, and Genetic Engineering," *Journal of Medical Ethics* 30 (2004): 595. Polkinghorne is fond of this classic sentence of H. Wheeler Robinson, "The Hebrew idea of personality is an animated body, and not an incarnated soul" (H. Wheeler Robinson, "Hebrew Psychology," in *The People and the Book*, ed. Arthur S. Peake (Oxford: Clarendon Press, 1925), 362.

[54]Polkinghorne writes, "I believe that we human beings are psychosomatic unities, a package deal with mind and matter in inseparably complementary relationship to each other. It is a conclusion that would not have surprised the writers of the Bible. It has often been acknowledged that they thought of human beings as 'animated bodies', rather than 'incarnated souls'. We are risen beasts and not fallen angels trapped in the flesh. If Christianity has often seemed to have bought into a dualist account of human nature, that has been because of platonic influence on its development, rather than being drawn from its scriptural roots" (Polkinghorne, "The Person, the Soul, and Genetic Engineering," 595). He also comments that "despite both Hebrew thought and much of the thinking of the New Testament being in accord with this unitary view of human nature, a difficulty might be feared to ensue for the coherence of eschatological hope" (Polkinghorne, *The God of Hope and the End of the World*, 105). Elsewhere he remarks that the "pysochosomatic account of human nature is the dominant, but not exclusive, way of thinking to be found in the Bible" (Polkinghorne, *Science and Theology: An Introduction*, 63).

[55]Death is natural because it is part of the physical fabric of the present creation. As documented in the previous chapter, death is not an intruder that entered God's creation. Instead, death is necessary because it is the cost of new life. Polkinghorne reads some Pauline passages univocally (e.g., Rom 8.19-23; 2 Cor 5.17; Col 1.15-20), but he rejects a univocal reading of certain biblical passages where death is presented as a consequence of human sin. Two examples are provided. First, Polkinghorne's understanding of Rom 5.12, "Therefore, as through one man sin entered into the world, and death through sin; and so death passed unto all men, for that all sinned" (ASV). Polkinghorne writes regarding this passage, "With our evolutionary understanding of the history of terrestrial life and of hominid origins, we can no longer hold this view literally in relation to the fact of physical death" (Polkinghorne, *The God of Hope and the End of the World*, 126). A second example of his rejecting death as a natural consequence to the entrance of sin is his interpretation of the *Fall* found in Gen 3 and how he relates it to Rom 5. He comments and concludes, "The episode that theologians call the Fall can then be understood as a turning away from God into the human self, by which our ancestors became curved in upon themselves and alienated from the

ultimate end because Polkinghorne is convinced of the truthfulness of a future supernatural human resurrection.[56] He explains:

> There is indeed the Christian hope of a destiny beyond death, but it resides not in the presumed immortality of a spiritual soul, but in the divinely guaranteed eschatological sequence of death and resurrection. Only a hope conceived of in this way can do full justice to human psychosomatic unity, and hence to the indispensability of some form of re-embodiment for a truly human future existence.[57]

What is this soul, what is it made of, and does it persist? Polkinghorne defines and describes the soul as a complex "information-bearing pattern" as a way to identify what is unique in each person.[58] This pattern slowly changes with time, representing the core reality of a person persisting from the beginning to the end of one's life. Each unique pattern contains all the

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divine reality. This was not the cause of physical death but it gave to that experience the spiritual dimension of mortality. Self-concious beings could anticipate their future death, but at the same time they had become divorced from the God who is the only ground for hope of a destiny beyond that death. Thus humanity became prey to that sadness and frustration at the thought of human transience. . . . In that sense 'death'—the bitterness of mortality—had truly come into the world and passed to all. I think this interpretation does the theological work that Paul wants it to do in Romans 5" (ibid.).

[56]"There is no natural hope of a destiny beyond death, a story that science could tell us in terms of its 'horizontal' account of what happens now. But that is not the only story to be told. Religion can tell the 'vertical' story of God's faithfulness, and that story undergirds the hope, already manifested by Jesus' resurrection, that the last word does not lie with death but with God" (John C. Polkinghorne and Nicholas Beale, *Questions of Truth: Fifty-One Responses to Questions About God, Science, and Belief* (Louisville, KY: Westminster John Knox, 2009), 22).

[57]Polkinghorne, *The God of Hope and the End of the World*, 108. Polkinghorne's reasons for rejecting dualism can be found in Polkinghorne, *Science and Theology: An Introduction*, 54. Elsewhere he indicates that "Christianity is not concerned with a claim that there is human survival because there is an intrinsically immortal, purely spiritual, part in our being. The ground of hope for a destiny beyond death does not lie in human nature at all, but in divine, steadfast love" (ibid., 115).

[58]Polkinghorne, *The God of Hope and the End of the World*, 105-106. "Whatever the human soul may be, it is surely what expresses and carries the continuity of living personhood. . . . The soul must be the 'real me' that links the boy of childhood to the ageing academic of later life. If that carrier of continuity is not a separate spiritual component, what else could it be? It is certainly not merely material. . . . What does appear to be the carrier of continuity is the immensely complex 'information-bearing pattern' in which that matter is organised. This pattern is not static; it is modified as we acquire new experiences, insights and memories, in accordance with the dynamic of our living history. It is this information-bearing pattern that is the soul." Elsewhere he writes along the same lines, "Whatever it may actually be, the soul is presumably what one might call 'the real me', the essence of my particular personhood. . . . It certainly is not just a crude material continuity, for that does not really exist. The atoms in our bodies are changing all the time. . . . Atoms are not the carriers of human continuity, but the real me is surely constituted by the almost infinitely complex *information-bearning pattern* in which these atoms are organised. . . . My soul is the pattern that is me" (Polkinghorne, *Science and the Trinity: The Christian Encounter with Reality*, 161).

experiences, memories, and knowledge of each individual. It is the form of the body, and when the body dissipates at death, the soul is also dissolved.[59] Even though the soul is not inherently immortal, it does perdure post-mortem, linking the past life to the future life, thus preserving its unique identity.[60] Where, then, does the soul proceed following death? Polkinghorne explains that the soul continues to exist because it is held only in the divine memory, not outside of it.[61] But, the fact that the soul is preserved in the divine memory, does not constitute living beyond death because it is intrinsic for psychsomatic unities to be embodied.

If embodiment is essential for true humanhood, then each soul should be re-embodied at the resurrection. The possibility of a resurrection will require a direct act of God in order for these souls to be revitalized, not through resuscitated bodies, but as new creations with new material bodies, translated from the conditions characterized by entropy, to serve as the carrier of continuity.[62] He explicates:

> Thus the Christian hope centres on a real death followed by a real resurrection, brought about through the power and merciful faithfulness of God. . . . If human beings are psychosomatic unities, then the persons reconstituted in the divine act of resurrection must have new bodies to act as the carriers of the soul. It is not necessary, however, that the 'matter' of these bodies should be the same matter as makes up the flesh of this present world. In fact, it is essential that it should not be. That is because the material bodies of this world are intrinsically subject to mortality and decay. If the resurrected life is to be a true fulfilment, and not just a repeat of an ultimately futile history, the bodies of that world-to-come must be different, for they will be everlastingly redeemed from mortality. Science knows only the matter of this world but it

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[59]Polkinghorne, *Science and Theology: An Introduction*, 115.

[60]Polkinghorne, *The God of Hope and the End of the World*, 107. "There is, therefore, no intrinsic immortality associated with the soul in this way of understanding it. Death is a real end. However, it need not be an ultimate end, for in Christian understanding only God is ultimate. It is a perfectly coherent hope that the pattern that is a human being could be held in the divine memory after that person's death" (ibid.). Polkinghorne grounds his belief in Mark 12.18-27, which closes with the text that God "is not the God of the dead, but of the living."

[61]Ibid.

[62]Ibid., 113.

cannot forbid theology to believe that God is capable of bringing about something totally new.[63]

The Four Last Things

The Four Last Things, death, judgment, heaven, and hell, have been the center of traditional Christian eschatology. Polkinghorne argues in favor of a universal eschatology, but these four are also pertinent to an individual eschatology. This penultimate section examines Polkinghorne's view on their nature.

Death

In addition to physical death, Scripture does mention spiritual death (Eph 2.1-2) and eternal death (e.g., Rev 21.8). Of these three types of death, Polkinghorne prefers to concentrate on the origin of physical death.[64] As previously mentioned,[65] physical death, according to Polkinghorne, cannot be understood as the consequence of sin:

> There has been a strong Christian tradition . . . that sees human death as the consequence of human sin. Paul expressed the idea when he wrote to the Romans concerning Adam that 'just as sin came into the world through one man and death came through sin, so death spread to all because all have sinned' (Romans 5:12). With our evolutionary understanding of the

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[63]Polkinghorne, *Science and Theology: An Introduction*, 115-116. Daly argues that the "faith of the Church has been from the start that what was raised from the dead was a *body* and not simply a soul, a spirit, a memory, or an inspiration. The trouble is that we have no language to describe a 'body' which is no longer in our time and space. . . . Christians have no business taking refuge in gnostic dualism as a stratagem for dealing with problems of creation *ex nihilo* and bodily resurrection from the dead. We may not know how to describe a risen body, but that does not license us to disregard its existence. . . . Revelation tells us nothing about the physical properties of risen bodies. . . . To profess faith in the resurrection of the body. . . does not entail the ability to describe the characteristics of a risen body. Equally, to express ignorance about the characteristics of a risen body does not prohibit one from professing faith in bodily resurrection" (Daly, *Creation and Redemption*, 101).

[64]Perhaps he has spiritual death in mind when he writes, "Those who knowingly turn from God in his world will find it correspondingly more painful and more difficult to make that turn of repentance if it is delayed to the life to come" (Polkinghorne, *The God of Hope and the End of the World*, 128). Eternal death for Polkinghorne seems to be irrelevant on account of his universalist approach to soteriology. See the subsequent sections on judgment, heaven, and hell.

[65]Refer to pages 74-75.

> history of terrestrial life and of hominid origins, we can no longer hold this view literally in relation to the fact of physical death.[66]

However, Polkinghorne does believe that the biblical text, in "mythic mode," must have been analogous to the history of past descendants. He speculates that at some point in the distant past, these ancestors turned away and estranged themselves from God. This estrangement was "not the cause of physical death," and as humanity gradually developed into self-conscious beings, they could now anticipate their death. Polkinghorne concludes it is in "that sense that 'death'—the bitterness of mortality—had truly come into the world and passed to all."[67]

Judgment

Polkinghorne defines judgment as "the acknowledgement of moral seriousness."[68] He speculates that a salvific process will include purgation and judgment as cleansing elements of each individual. He labels this judgment "purgatorial judgment," believing that the judgment is a process of human self-exposure, not a verdict.[69] He writes:

> Take that haunting parable of judgement, the sheep and the goats (Matthew 25:31-46). To the sheep the Lord says . . . To the goats, the Lord says the opposite. . . . These words present us with a formidable challenge, but if we take them seriously, do we find ourselves unambiguously in one company or the other? . . . We are neither wholly sheep nor wholly goat. Perhaps then, judgement is not simply a retrospective assessment of what we have been but it includes the prospective offer of what we might become. . . . Perhaps judgement builds up the sheep and diminishes the goat in each one of us.[70]

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[66]Polkinghorne, *The God of Hope and the End of the World*, 125-126.

[67]Ibid., 126. See also Polkinghorne, *Science and Theology: An Introduction*, 63-65. Could not this alienation from God, this loss of sensitivity or spiritual deadness be what Scripture describes as spiritual death (Eph 2.1-2)?

[68]Polkinghorne, *The God of Hope and the End of the World*, 129. "God is a holy God whose kingdom is the realm of moral purity. . . . The cross of Christ is the measure of the costliness of divine forgiveness. Sin is no trivial matter, but it is in fact a deadly matter (Romans 6:23), a spiritual gangrene that must be dealt with by excision. Judgment is the acknowledgment of moral seriousness" (ibid.). How should Polkinghorne's usage of Rom 6.23 be read and interpreted? In this last passage, he seems to use it univocally, but he affirms that death is the result of a continuous creation, not as a result of the *Fall*. See sections in chapter 3.

[69]Ibid., 130.

[70]Ibid., 129-130.

For Polkinghorne, viewing judgment as an encounter with self is a hopeful image. It will one day come to an end, followed by the gradual unveiling of the divine nature.

Heaven

Even though Polkinghorne does not thoroughly examine the concept of heaven, he does provides a brief sketch of his understanding of a heavenly life. First, there is an unsolved tension in Polkinghorne's soteriology. He appears to be partial to a universalist understanding of soteriology,[71] yet, he does not believe that God's offer of mercy is irresistable.[72] Second, Polkinghorne does not equate heaven with the perfect life on earth, but he does view it as a place of unlimited progress because humanity will participate in an endless process of divine self-revelation. "The life of heaven will be lived in the presence of the divine reality, but the exploration by finite creatures of the infinite riches of that reality will be unending. We shall enter further and further into that panentheistic experience."[73]

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[71]Polkinghorne, *The Faith of a Physicist: Reflections of a Bottom-up Thinker: The Gifford Lectures for 1993-4*, 171. The following quotes seem to suggest that the love of God is bound to eventually save all. He writes, "If what I have said is true, it follows that there cannot be a kind of curtain which comes down at death, dividing humanity irreversibly into the companies of the saved and of the damned. God's loving offer of mercy cannot be for the term of our earthly life alone, so that it is withdrawn after three score years and ten" (ibid.). Elsewhere he adds, "I do not think that it will only be those who have made a definite commitment to God in this life who will participate in salvation. The decisions and actions we take in this life are certainly very important and it is spiritually damaging wilfully to turn from God, but the divine love and mercy are not on limited offer for this life only. There will surely be further opportunities to turn to God in the clearer light of the world to come" (Polkinghorne, *Science and Religion in Quest of Truth*, 108-109).

[72]Polkinghorne, *The Faith of a Physicist: Reflections of a Bottom-up Thinker: The Gifford Lectures for 1993-4*, 171. Polkinghorne sees this unresolved tension in Scripture. He writes, "But will there be those who will refuse the divine pardon and purgation for ever, or in the end will all be saved (even Hitler and Stalin)? It is well known that the New Testament seems sometimes to speak in universalist terms (e.g., Rom. 11.32; 1 Cor. 15.22) and sometimes in terms of some who will be lost (e.g., Matt. 25.46; Rom. 2.6-11). I cannot believe that God will ever foreclose on his loving offer of mercy, but equally I do not believe he will override the human freedom to refuse" (ibid.).

[73]Polkinghorne, *The God of Hope and the End of the World*, 132-133. "What awaits us is the unending exploration of the inexhaustible riches of God, a pilgrim journey into deepest reality that will always be thrilling and life-enhancing. 'What no eye has seen, nor ear heard, nor human heart conceived, what God has prepared for those who love him' (I Corinthians 2:9; derived from Isaiah 64:4)" (ibid., 135). See also Polkinghorne, *Science and Religion in Quest of Truth*, 108.

Third, heaven, according to Polkinghorne, will be impervious to a second Fall. What assures the eternal security of heaven? Polkinghorne says it is the "openness of the new creation to its Creator, divine persuasion will indeed be that which brings about the divine will, without violence to the freedom of the creature."

> The sinful distortions of this life often make people misapprehend in grievously hurtful ways where the good actually lies. In the clear light of the divine presence, shining in the new creation, such disastrous errors will no longer be possible. We shall see the good, and freely and totally consent to it. Our wills and our desires will be turned by love. That will be the free source of celestial stability.[74]

Hell

The reality of hell is suspect in Polkinghorne's eschatology. By subscribing to universalism, the purpose and relevancy of a hell diminishes because "God's offer of mercy and forgiveness," according to Polkinghorne, "is not withdrawn at death but, rather, divine love is everlasting."[75] Polkinghorne rejects the classic notion of hell, a place of endless torture where a vindictive God casts people who did not make a commitment to him during their earthly years. This view of hell is rejected on account of its incompatibility with a loving God and the purposelessness of being created.[76]

If hell does exist, who would occupy it and what would it be like? Polkinghorne speculates that if hell is populated, it is because they deliberately chose to be there, not because they were cast there by God. Hell is a place where people remain in alienation from God,

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[74]Polkinghorne, *The God of Hope and the End of the World*, 134.

[75]Ibid., 136.

[76]Ibid., 138. Polkinghorne believes that thinking about hell as a place of eternal torment has been largely abandoned. "This has come about, not through surrender to a secular sentimentality, but through the realization of its incompatibility with the mercy of a loving God, who cannot be conceived to exact infinite punishment for finite wrong. Theology has proven itself to be open to correction" (Polkinghorne, *The Faith of a Physicist: Reflections of a Bottom-up Thinker: The Gifford Lectures for 1993-4*, 172).

believing they can live without his grace.[77] He also describes it as a place of "unending boredom, painted grey, because the divine life that is life indeed has been excluded from it by its inhabitants."[78]

Summary and Conclusions

Scientific cosmology presents a futile and hopeless future for creation. This meaninglessness is met by biblical eschatology which provides meaning and relevancy to the universe and its history. Polkinghorne interprets creation as being a two-stage process, and he believes that because of the eternal faithfulness and purposes of God, God will directly intervene in the bringing forth of a new creation following the eradication of death. This new creation is the center of eschatology.

His reading of biblical eschatology and its new creation is based on a relatively univocal reading of Scripture. However, an element of inconsistency arises in Polkinghorne's understanding of biblical univocity in connection with his theological interpretation between protology and eschatology. On the one hand, Polkinghorne rejects the scriptural descriptions of the origins of the original creation already in tune with its Creator as narrated in Gen 1-2 and the fall of humanity. On the other hand, he agrees largely with the scriptural descriptions of the new creation and their deeper existential encounter through direct divine intervention.

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[77]John C. Polkinghorne, *Living with Hope: A Scientist Looks at Advent, Christmas, and Epiphany* (London: SPCK, 2003), 58-59. "When we thought about the Fall, we saw that its real meaning lay in human alienation from God and the mistaken belief that we can go it alone without need for the help of divine grace. Hell is the place where that mistake continues to be made for ever. It is the setting of an unremitting refusal to allow ourselves ever to attain to the fulfilment of the true humanity that God intends for us. We can only hope and pray that in the end no one will persist everlastingly in that defiance of God's mercy. If that is the case, then hell will be empty, and we may be sure that this would be in accord with God's good will for human destiny" (ibid.).

[78]Polkinghorne, *Science and Religion in Quest of Truth*, 109. "If hell is the place where the divine life has been deliberately excluded, then some have thought that its inhabitants will eventually fade away into nothingness, because the divine Spirit has habitually been denied its sustaining work in their lives" (Polkinghorne, *The God of Hope and the End of the World*, 137).

This inconsistency in the interpretation of biblical language leads to the following question: If words that describe earthly things cannot be taken univocally, for example, Polkinghorne's protology, then similar words should not be applied to heavenly things in a relatively univocal way.

CHAPTER V

CRITICAL DISCUSSION AND EVALUATION: SUMMARY AND CONCLUSION

Summary

The first chapter of this thesis introduced the problem of the appearance of internal methodological and theological incoherence of the contrastive roles of Scripture in John Polkinghorne's writings. Chapter 2 surveyed Polkinghorne's methodology in science and theology. Chapters 3 and 4 compared and contrasted Polkinghorne's protology and eschatology in the context of science and theology. This study demonstrated that elements of consistency and elements of incoherence seem to exist in his interpretation.

The present chapter is a critical discussion and evaluation of Polkinghorne's protology and eschatology. This chapter will provide a succint overview of what seem to be internal consistencies and inconsistencies within his hermeneutic for the construction of his protology and eschatology. This study then finishes with a conclusion and recommendations for further research.

A Critique of Polkinghorne's Protology and Eschatology

Polkinghorne should be commended for advocating dialoague between science and theology while attempting to make the latter relevant in a skeptical world. He is also to be commended for proposing that science is not the only discipline able to discover and search for truth. Yet, there are elements of hermeneutical inconsistency. To illustrate, an inconsistency arises in connection with Polkinghorne's theological interpretation of protology and eschatology.

In terms of protology, Polkinghorne believes that science has authority to impose itself on theology based on epistemelogical reasoning. He rejects the scriptural descriptions of the original creation with no direct divine intervention and the fall of humanity as a univocal reading of Genesis indicates. Polkinghorne accepts cosmic and biological evolutionary history stretching over billions of years and revises and reinterprets the creation narratives of Scripture in light of scientific knowledge.

With regard to protology, Polkinghorne has conceded much to science, giving its interpretation of nature full credibility. Because of his overreliance on science, Polkinghorne accepts a full evolutionary view of protology, which leads him to reject a univocal reading of Gen 1-2, and to reinterpret it in accordance to secular science.

In addition to the reinterpretation of Gen 1-2, Polkinghorne, through the theological concepts of *ex nihilo* and *creatio continua*, adapts a rational strategy to support what he considers well-motivated belief and his bottom-up reflection on theology, including his critical realism and revised natural theology. The anthropic fine-tuning of natural laws leads him to believe that these laws constitute signs of a cosmic Mind and Purpose. He then assumes that God is a rational being, and that rational creatures can get a glimpse of the deep intelligibility of the physical universe.

However, in regard to eschatology, Polkinghorne holds a high view of Scripture. He postulates that God will miraculously usher in the new creation, agreeing largely with the scriptural descriptions of a new creation with direct divine intervention following the eradication of death. Polkinghorne acknowledges that there is a definite contradiction between the futuristic predictions of scientific cosmology and biblical eschatology. He accepts biblical eschatology in spite of scientific cosmology's negative prediction that all life in the universe will perish. Polkinghorne's hope is based on the eternal faithfulness of God and the resurrection of Jesus, and his reading of biblical eschatology and its new creation is based on an apparent and relative univocal reading of Scripture.

Concerning Scripture, Polkinghorne claims there is an evolution from the primitive to the more developed; still, he engages with Scripture seriously, acknowledging that it does contain some propositional truth. Polkinghorne subordinates parts of Scripture to science and other parts to theology. To illustrate this point, Polkinghorne sandwiches eschatology in the middle of two biblical doctrines: Creation and Christology. In regard to Christology, the Incarnation and bodily resurrection of Christ, and his full divinity are non-negotiables for Polkinghorne. He also holds that eschatology is a non-negotioable. These doctrines belong to theology and he interprets their language in an apparent and relative univocal manner.

Yet, this apparent manner of univocal interpretation is dissimilar in regard to the doctrine of Creation. The current state of science dictates that the evolutionary process of creation is a non-negotiable, whereas the biblical doctrine of Creation is negotiable. This point of science-theology convergence is acceptable for Polkinghorne because he holds that Scripture can be *updated* as science advances in knowledge because the theological language of Creation is symbolic. For Polkinghorne, the doctrine of creation is the property of science. This becomes more evident because Polkinghorne views death not as a consequence of sin but as a necessary element for a universe that has been endowed with properties to create itself. Polkinghorne's kenotic theology allows him to align an almost autonomous creation with secular science because God voluntarily limits himself to make room for creation to be truly free.

The question rises, what criteria does Polkinghorne present to distinguish between univocal and non-univocal literature in Scripture? Is it reason, faith, or both? Does authority reside in Scripture or in a theological interpretation of Scripture? Polkinghorne does not clearly state his criteria for maintaining this distinction. He does not blindly follow science, rather he limits science to protology only, so there is a critical principle involved, but it is not clearly stated. Could this imply that science could be limited even more? In addition, Polkinghorne does not explain his criteria for identifying which doctrines should be revised; he simply assumes it.

Further, according to Polkinghorne, theological language is the language of symbol, even though symbolic stories still communicate theological and non-theological propositions. Polkinghorne holds the belief that some traditional biblical doctrines need to be revised and reformulated where there is dissonance or overlapping with science. He runs the danger of oversimpifying because scriptural assertions address the questions of science to some extent.

For internal consistency, if theological language in protology is to be symbolic, then eschatological language should be symbolic as well. If eschatological language is interpreted and understood in an apparent and relative univocal manner, then theological language in protology should also be be interpreted and understood in an apparent and relative univocal manner.

Conclusions

Polkinghorne is clear that both science and theology are seeking for real truth about the universe. He opts for consonance between the two disciplines because both science and theology have their own domain. He strongly resists the notion that theology should be absorbed by science.[1] For Polkinghorne, theology provides coherent and intellecutaly satisfying answers to questions that go beyond the realm of science. Even though theology has its own conceptual autonomy, through revisions, theology must be consistent with the cosmological claims of modern science regarding origins where science-theology overlapping is present.[2]

The challenge is to maintain in balance preservation and innovation in theology, and

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[1]Polkinghorne, *Science and Theology: An Introduction*, 117-118. "Theology has a due autonomy that science must respect, in just the same way that science's deliberations are not open to theological control and interference. Yet knowledge is one and created reality is one (insights theologically underwritten by the unity of God) and so there must be some interrelationship between the insights and discourse of theology and the insights and discourse of science. . . . There remains the question of where, within the spectrum of relationships bounded by absorption at one end and total independence at the other, a balanced account of the interaction between science and theology is to be located" (ibid.).

[2]Ibid., 118. Polkinghorne writes, "Theology must respect what science has to say about the evolving processes of the universe." But he also states that "science is in no position to place constraints on how theology finds that it must understand this unique phenomenon, using terms that are adequate to the motivating evidence" (ibid.).

Polkinghorne attains this by employing a dual hermeneutic for interpreting Scripture. This dual hermeneutic is evident in Polkinghorne's symbolic interpretation of biblical protology and his apparent and relative univocal interpretation of biblical eschatology.

In sum, it is evident that this tension suggests a problem in his hermeneutics that affects his theological understanding of protology and eschatology. If scientific cosmology is not to be believed regarding biblical eschatology, then why should it be believed regarding biblical protology?

Further Research Needed

This study documented that there is a contrast in Polkinghorne's usage of Scripture between his protology and his eschatology. Further research should be pursued in at least two areas in Polkinghorne's hermeneutics. First, further work remains to be done as to *why* Polkinghorne interprets eschatology in an apparent and relative univocal fashion. Polkinghorne is consonant with modern cosmology, and it is clear why he rejects a univocal reading of biblical protology. However, the same cannot be said of his apparent and relative univocal reading of eschatology.

Second, with regard to critical realism, how does this epistemological position relate, if at all, to Polkinghorne's eschatology? This question deserves to be explored because critical realism has been the subject of criticism in its interpretation of natural phenomena. Since this is the case, can there even be a relation between critical realism and eschatology? Future research may prove useful in answering these questions.

BIBLIOGRAPHY

John Polkinghorne's works are listed in chronological sequence, from the earliest to the most recent. The secondary sources are listed in alphabetic order by surname, but for those authors who have multiple works, the order is also chronological, from the earliest to the most recent.

Works by John C. Polkinghorne

The Particle Play: An Account of the Ultimate Constituents of Matter. Oxford: W. H. Freeman, 1979.

Models of High Energy Processes Cambridge Monographs on Mathematical Physics. Cambridge: Cambridge University Press, 1980.

"Cosmos and Creator." *Theology* 84 (1981): 457-459.

"The Liberation of Life." *Theology* 85 (1982): 365-367.

"Science and the Renewal of Belief." *Theology* 86 (1983): 294-295.

"The Intelligent Universe." *Theology* 87 (1984): 453-454.

The Way the World Is: The Christian Perspective of a Scientist. Grand Rapids, MI: Eerdmans, 1984.

The Quantum World. Princeton, NJ: Princeton University Press, 1984.

"The Scientific Worldview and a Destiny Beyond Death." In *Immortality and Human Destiny*, 180-183. New York: Paragon House, 1985.

"God of Chance." *Theology* 88 (1985): 295-296.

"God in Creation: A New Theology of Creation and the Spirit of God." *Expository Times* 97 (1986): 285.

"Reality and Scientific Theology." *Journal of Theological Studies* (1986): 679-682.

"Creation and Evolution." *Expository Times* 97 (1986): 123-124.

One World: The Interaction of Science and Theology. Princeton, NJ: Princeton University Press, 1986.

Scienza E Fede. Milan: Mondadori, 1987.

"The Anthropic Cosmological Principle." *Scottish Journal of Theology* 40 (1987): 138-140.

"Philosophy of Science: The Natural Sciences in Christian Perspective." *Theology* 90 (1987): 245-246.

"The God Who Responds: How the Creator Relates to His Creation." *Expository Times* 98 (1987): 282-283.

"The Ghost in the Atom." *Faith and Thought (Victoria Institute)* 113 (1987): 90-91.

"Creation and the Structure of the Physical World." *Theology Today* 44 (1987): 53-68.

"Knowledge of God—Calvin, Einstein, and Polanyi." *Expository Times* 99 (1988): 314-315.

"Tradition and Authority in Science and Theology with Reference to the Thought of Michael Polanyi." *Theology* 91 (1988): 219-221.

"Models of God: Theology for an Ecological, Nuclear Age." *Expository Times* 99 (1988): 222-223.

"Einstein and Christ: A New Approach to the Defence of the Christian Religion." *Theology* 91 (1988): 219-221.

"Transcendence and Providence: Reflections of a Physicist and Priest." *Theology* 91 (1988): 219-221.

"Science and Theology in Einstein's Perspective." *Modern Theology 4* (1988): 219.

Science and Creation: The Search for Understanding. Boston, MA: Shambhala, 1988.

"The Quantum World." In *Physics, Philosophy, and Theology*, 333-342. Vatican City: Vatican Observatory, 1988.

Science, Reason and Religion." *Expository Times* 100 (1989): 439.

"A Brief History of Time: From the Big Bang to Black Holes." *Theology* 92 (1989): 235-236.

"A Note on Chaotic Dynamics." *Science and Christian Belief* 1 (1989): 123-127.

Rochester Roundabout: The Story of High Energy Physics. New York: W. H. Freeman, 1989.

Review of the Guidance on the Research Use of Fetuses and Fetal Material. London: H.M.S.O., 1989.

Science and Providence: God's Interaction with the World. London: SPCK, 1989.

"Setting the Problem." *CTNS Bulletin* 10, no. 2 (1990): 8-12.

"God's Action in the World." *CTNS Bulletin* 10, no. 2 (1990): 1-7.

"The Word of Science: The Religious and Social Thought of C. A. Coulson." *Expository Times* 102 (1990): 29.

"Biotechnology: A Brave New World?" *Expository Times* 101 (1990): 317-318.

"Grounds for Reasonable Belief." *Expository Times* 101 (1990): 219-220.

"What Decided Christianity: Event and Experience in the New Testament." *Expository Times* 102 (1990): 29.

Den Samme Verden: Fysikkens Og Religionens Verdensbillede. Forlag: Munksgaard, 1990.

"A Brief History of Eternity: A Considered Response to Stephen Hawking's A Brief History of Time." *Theology* 93 (1990): 407-408.

"From Creation to Chaos: Classic Writings in Science." *Expository Times* 102 (1990): 29.

"Christianity and the Nature of Science: A Philosophical Investigation." *Expository Times* 101 (1990): 158.

"God and the Cosmologists." *Theology* 93 (1990): 407-408.

"Cosmos as Creation: Theology and Science in Consonance." *Expository Times* 101 (1990): 317.

"Ethics in the Natural Sciences." *Expository Times* 101 (1990): 317.

"At Home on Planet Earth." *Expository Times* 101 (1990): 318.

"A Revived Natural Theology." In *Science and Religion*, edited by Jan Fennema and Iain Paul, 87-97. Dordrecht: Kluwer Academic Publishers, 1990.

"A Scientist's View of Religion." *Science and Christian Belief* 2 (1990): 83-94.

"Bohm Versus Bohr." *New Scientist* 128, no. 1743 (1990): 58.

"The Word of Science: The Religious and Social Thought of C. A. Coulson." *Epworth Review* 17, no. 2 (1990): 101-102.

"Cross-Traffic between Science and Theology." *Perspectives on Science and Christian Faith* 43 (1991): 144-151.

"The Philosophy of Quantum Mechanics: An Interactive Interpretation." *CTNS Bulletin* 11, no. 2 (1991): 41-42.

"Physics and the World." *Science and Christian Belief* 3 (1991): 131.

"Beyond the Big Bang: Quantum Cosmologies and God." *Epworth Review* 18 (1991): 108-109.

"The Mirror of Creation." *Theology* 94 (1991): 316-317.

"The Idea of the Miraculous: The Challenge to Science and Religion." *Expository Times* 102 (1991): 252-253.

"Religion in an Age of Science." *Expository Times* 102, no. 7 (1991): 220.

"The Interaction of Science and Theology." In *Fundamentalism and Tolerance*, 131-137,174. London: Bellew, 1991.

"The Nature of Physical Reality." *Zygon* 26 (1991): 221-236.

"God's Action in the World." *Cross Currents* 41, no. 3 (1991): 293-307.

"Religion's Private Hold on Faraday " *New Scientist* 130, no. 1771 (1991): 46.

Reason and Reality: The Relationship between Science and Theology. London: SPCK, 1991.

"God and the Processes of Reality: Foundations of a Credible Theism." *Zygon* 27 (1992): 348-350.

"Physics and Metaphysics: Theories in Space and Time." *Expository Times* 103 (1992): 124-125.

The Way the World Is: The Christian Perspective of a Scientist. London: Triangle, 1992.

"The Mind of God: Science and the Search for Ultimate Meaning." *Theology* 95 (1992): 396.

"[Response to Review Article by O R Barclay, Pp 127-129]." *Science and Christian Belief* 4 (1992): 130.

"Reckoning in Science and Religion." *Anglican Theological Review* 74, no. 3 (1992): 376-380.

"Uncertainty: The Life and Science of Werner Heisenberg." *Zygon* 28 (1993): 110-112.

"Science and Religion--Recent Writing." *Epworth Review* 20 (1993): 92-95.

"Chance and Chaos." *Science and Christian Belief* 5 (1993): 69.

"Lonergan." *Theology* 96 (1993): 485-486.

Religion and Current Science. New College Lectures. Kensington: University of New South Wales, 1993.

'Taking Science Seriously' and 'Taking Theology Seriously.' Idreos Lectures. Oxford: Harris Manchester College, 1993.

"Science and the Soul: New Cosmology, the Self and God." *Expository Times* 104 (1993): 156.

"The Laws of Nature and the Laws of Physics." In *Quantum Cosmology and the Laws of Nature*, edited by Robert J. Russell, Nancey Murphy and C. J. Isham, 437-448. Berkeley, CA: The Center for Theology and the Natural Sciences, 1993.

"Can a Scientist Pray?" *Colloquium* 26 (1994): 2-10.

"Response." In *Science and Theology*, 97-100. Grand Rapids, MI: Eerdmans, 1994.

"Nature, Reality, and the Sacred: The Nexus of Science and Religion." *Theology* 97 (1994): 392-393.

"Theism, Atheism and Big Bang Cosmology." *Expository Times* 105 (1994): 253.

"Theology for a Scientific Age: Being and Becoming: Natural, Divine and Human." *Theology* 97 (1994): 199-200.

"Theological Notions of Creation and Divine Causality." In *Science and Theology: Questions at the Interface*, edited by Murray Rae, Hilary Regan and John Stenhouse, 225-237. Grand Rapids, MI: Eerdmans, 1994.

The Faith of a Physicist: Reflections of a Bottom-up Thinker: The Gifford Lectures for 1993-4. Princeton, NJ: Princeton University Press, 1994.

"Worlds of Difference." *Times Higher Education Supplement*, January 28, 1994, 21.

"Cosmic Integers." *Nature* 369, no. 6482 (1994): 618.

"Alone Is Never Enough: Seeing the World through Both Eyes." *Omni* 17, no. 1 (1994): 4.

"Wise Men of Science, Think Again." *Times Higher Education Supplement*, December 23, 1994, 11.

"The Intelligibility of the Quantum World." *American Journal of Physics* 62, no. 1 (1994): 32.

Science and Christian Belief: Theological Reflections of a Bottom-up Thinker. London: SPCK, 1994.

"*Creatio Continua* and Divine Action." *Science and Christian Belief* 7 (1995): 101-108.

"Contemporary Interactions between Science and Theology." *Modern Believing* (1995): 33-38.

"A Scientist's Approach to Belief." *Sewanee Theological Review* 39 (1995): 9-50.

"Christian Doctrine in the Light of Michael Polanyi's Theory of Personal Knowledge: A Personalist Theology." *Science and Christian Belief* 7 (1995): 179.

"God, Cosmos, Nature and Creativity." *Expository Times* 107 (1995): 59.

"Beyond Legitimation: Essays on the Problem of Religious Knowledge." *Theology* 98 (1995): 208-209.

Serious Talk: Science and Religion in Dialogue. Valley Fogre, PA: Trinity, 1995.

"Toward a Theology of Nature: Essays on Science and Faith." *Pro Ecclesia* 4 (1995): 251-252.

"The Physics of Immortality: Modern Cosmology, God and the Resurrection of the Dead." *CTNS Bulletin* 15, no. 2 (1995): 23-24.

"I Am the Alpha and the Omega Point." *New Scientist* 145, no. 1963 (1995): 40-41.

"Myths and Materials." *Times Higher Education Supplement*, September 15, 1995, 22.

"Darwin's Dangerous Idea: Evolution and the Meanings of Life." *National Review* 47, no. 9 (1995): 63-65.

"The New Natural Theology." *Studies in World Christianity* 1 (1995): 41-50.

"Task Force to Review Services for Drug Misuers: Progress Report (Supplement)." *Drug Link* (January 1995): 1-4.

"From Physicist to Priest." *Dialog* 35, no. 2 (1996): 133-138.

"Chaos Theory and Divine Action." In *Religion & Science: History, Method, Dialogue*, edited by W. Mark Richardson and Wesley J. Wildman, 243-252. London: Routledge, 1996.

"Is There a God." *Science and Christian Belief* 8 (1996): 165.

"The Dynamism of Space: A Theological Study into the Nature of Space." *Theology* 99 (1996): 146-147.

"Foreword." In *God and the Mind Machine: Computers, Artificial Intelligence and the Human Soul*. London: SPCK, 1996.

Searching for Truth: A Scientist Looks at the Bible. Oxford: The Bible Reading Fellowship, 1996.

"About Time: Einstein's Unfinished Revolution." *Science and Christian Belief* 8 (1996): 82.

Searching for Truth: Lenten Meditations on Science and Faith. New York: Crossroad, 1996.

"The Advancement of Science: Science without Legend: Objectivity without Illusions." *Zygon* 31 (1996): 523-524.

Beyond Science: The Wider Human Context. Cambridge: Cambridge University Press, 1996.

"Heavy Meta." *Scientific American* 275, no. 5 (1996): 121-124.

"A Divine Package Deal." *Times Higher Education Supplement*, October 11, 1996, 19.

"Probable Miracles or Impossible Gods?" *Times Higher Education Supplement*, August 16, 1996, 23.

"So Finely Tuned a Universe." *Commonweal* 123, no. 14 (1996): 11-18.

Scientists as Theologians: A Comparison of the Writings of Ian Barbour, Arthur Peacocke and John Polkinghorne. London: SPCK, 1996.

"A Potent Universe." In *Evidence of Purpose: Scientists Discover the Creator*, edited by John Marks Templeton, 105-115. New York: Continuum, 1996.

Quarks, Chaos and Christianity: Questions to Science and Religion. New York: Crossroad, 1996.

"The Metaphysics of Divine Action." In *Chaos and Complexity: Scientific Perspectives on Divine Action*, edited by Robert J. Russell, Arthur R. Peacocke, and Nancey Murphy, 2, 147-156. Notre Dame, IN: University of Notre Dame Press, 1997.

"Putting It All Together: Seven Patterns for Relating Science and Christian Faith." *Science and Christian Belief* 9 (1997): 93-94.

"The Large, the Small and the Human Mind." *Science and Christian Belief* 9 (1997): 179-180.

"Time's Arrow's Chaotic Flight." *Times Higher Education Supplement,* November 21, 1997, 20.

"Cloning and the Moral Imperative." In *Human Cloning*, 35-42. Louisville, KY: Westminster John Knox, 1997.

"Natural Science, Temporality, and Divine Action." *Theology Today* 55, no. 3 (1998): 329-343.

"Beyond the Big Bang." In *Science Meets Faith*, edited by Fraser Watts, 17-24. London: SPCK, 1998.

"The Fabric of Reality." *Science and Christian Belief* 10 (1998): 95-96.

"The God/Man/World Triangle: A Dialogue between Science and Religion." *Expository Times* 109 (1998): 223.

"Impossibility: The Limits of Science and the Science of Limits." *Science and Christian Belief* 10 (1998): 109.

"From Physicist to Priest." In *Science and Theology: The New Consonance*, 56-64. Boulder, CO: Westview, 1998.

"Testament of Scientism." *New Statesman*, October 30, 1998, 47-48.

"How Scripture Nursed the Men of Science." *Times Higher Education Supplement*, August 7, 1998, 23.

"How Large Is God? The Voices of Scientists and Theologians." *Theology Today* 55, no. 1 (1998): 142.

"Bangs, Crunches, Whimpers, and Shrieks: Singularities and Acausalities in Relativistic Spacetimes." *Zygon* 33, no. 3 (1998): 483-484.

Belief in God in an Age of Science. New Haven, CT: Yale University Press, 1998.

Science and Theology: An Introduction. London: SPCK, 1998.

"Foreword." In *A Guide to Genesis*, 23, 192. London: SPCK, 1998.

"God, Faith and the New Millenium: Christian Belief in an Age of Science." *Science and Christian Belief* 10 (1998): 202.

"Physicist and Priest." *Spiritual Evolution* (1998): 113-120.

"Wolfhart Pannenberg's Engagement with the Natural Sciences." *Zygon* 34, no. 1 (1999): 151-158.

"God, Humanity and the Cosmos: A Textbook in Science and Religion." *Theology* 102 (1999): 376-377.

"Whatever Happened to the Soul: Scientific and Theological Portraits of Human Nature." *Theology* 102 (1999): 217-218.

"Duet or Duel: Theology and Science in a Postmodern World." *Theology* 102 (1999): 219.

"God, Creation, and Contemporary Physics." *Theology Today* 56, no. 1 (1999): 150-151.

"The Old One and Me." *Times Higher Education Supplement* September 3, 1999, 19.

"Book Reviews." *Theology Today* 56, no. 1 (1999): 150-151.

"Science in Culture." *Nature* 398, no. 6727 (1999): 480.

"God and Contemporary Science." *Modern Theology* 15, no. 3 (1999): 377-378.

"A Scientist Looks at Creation." *Living Pulpit* 9 (2000): 6-7.

"Twenty Years in the Science and Theology Alpine Climbing Club." *Zygon* 35 (2000): 985-988.

"The Life and Works of a Bottom-up Thinker." *Zygon* 35 (2000): 955-962.

"Science and Theology in the Twenty-First Century." *Zygon* 35, no. 4 (2000): 941-953.

"The Nature of Physical Reality." *Zygon* 35, no. 4 (2000): 927-940.

"Genes, Genesis, and God: Values and Their Origins in Natural and Human History." *Zygon: Journal of Religion & Science* 35, no. 1 (2000): 191-194.

An Gott Glauben Im Zeitalter Der Naturwissenschaften: Die Theologie Eines Physikers. Gütersloh: Kaiser; Gütersloher Verlagshaus, 2000.

"Cloning: After Dolly." In *Christians and Bioethics*, edited by Fraser Watts, 13-20. London: SPCK, 2000.

"Eschatology: Some Questions and Some Insights from Science." In *The End of the World and the Ends of God: Science and Theology on Eschatology*, edited by John C. Polkinghorne and Michael Welker, 29-41. Harrisburg, PA: Trinity, 2000.

"Groundwork of Science and Religion." *Theology* 103 (2000): 458.

"Neuroscience and the Person: Scientific Perspectives on Divine Action." *Journal of Theological Studies* 51, no. 2 (2000): 797-799.

"Faith and Science: Questions to Consider." *Expository Times* 111 (2000): 251.

"Romancing the Universe: Theology, Science, and Cosmology." *Theology* 103 (2000): 54-55.

Ciencia Y Teología, Una Introducción. Vol. 104, Presencia Teológica. Santander: Sal Terrae, 2000.

"What Counts Is Belief in Belief." *Times Higher Education Supplement*, October 6, 2000, 27.

"Sceptical Examination of Belief Disguises Surrender." *Times Higher Education Supplement*, June 7, 2000, 22.

"A Jesuit's Guide to the Galaxy." *Times Higher Education Supplement*, April 21, 2000, 30.

"Evolutionary and Molecular Biology: Scientific Perspectives on Divine Action." *Journal of Theological Studies* 51, no. 1 (2000): 421-422.

"Warmed without Need of God's Fire." *Times Higher Education Supplement*, January 21, 2000, 29-30.

"Introduction: Eschatology and the Sciences." In *The End of the World and the Ends of God: Science and Theology on Eschatology*, edited by John C. Polkinghorne and Michael Welker, 17-18. Harrisburg, PA: Trinity, 2000.

Faith, Science & Understanding. New Haven, CT: Yale University Press, 2000.

"Chaos Theory." In *The History of Science and Religion in the Western Tradition: An Encyclopedia*, edited by Gary B. Ferngren, Edward J. Larson, and Darrel W. Amundsen, 443-444. New York: Garland Publishing, 2000.

"More Than a Body?" In *God for the 21st Century*, edited by Russell Stannard, 134-136. Philadelphia, PA: Templeton Foundation Press, 2000.

"Why God Persists: A Scientific Approach to Religion." *Science and Religion Forum* 35 (2000).

"Introduction: Science and Theology on the End of the World and the Ends of God." In *The End of the World and the Ends of God: Science and Theology on Eschatology*, edited by John C. Polkinghorne and Michael Welker, 1-13. Harrisburg, PA: Trinity, 2000.

Editor. *The End of the World and the Ends of God: Science and Theology on Eschatology.* Harrisburg, PA: Trinity, 2000

"Coherence, Consonance, and Conversation: The Quest of Theology, Philosophy, and Natural Science for a Unified World-View." *Theology Today* 58 (2001): 264-266.

"Sleuthing the Divine: The Nexus of Science and Spirit." *Theology Today* 58 (2001): 264-267.

"Fields and Theology: A Response to Wolfhart Pannenberg." *Zygon* 36, no. 4 (2001): 795-797.

"Therapeutic Uses of Cell Nuclear Replacements." *Zeitschrift für evangelische Ethik* 45 (2001): 149-152.

"God and the Universe." *Journal of Theological Studies* (2001): 1001-1002.

"Creation through Wisdom: Theology and the New Biology." *Journal of Theological Studies* (2001): 1000-1001.

"Opening Windows onto Reality." *Theology Today* 58, no. 2 (2001): 145-154.

Editor. *The Work of Love: Creation as Kenosis*. Grand Rapids, MI: Eerdmans, 2001.

"Science and Theology since Copernicus: The Search for Understanding." *Science and Christian Belief* 13 (2001): 190-191.

"Science and Its Limits: The Natural Sciences in Christian Perspective." *Theology* 104 (2001): 52.

"Christian Faith in the Academy: The Role of Physics." In *Higher Learning & Catholic Traditions*, 39-59. Notre Dame, IN: University of Notre Dame Press, 2001.

"Physical Process, Quantum Events, and Divine Agency." In *Quantum Mechanics*, 181-190. Berkeley, CA: Center for Theology and the Natural Sciences, 2001.

"Kenotic Creation and Divine Action." In *Work of Love: Creation as Kenosis*, edited by John C. Polkinghorne, 90-106. Grand Rapids, MI: Eerdmans, 2001.

"Only the Hand of God Could Have Conjured up the Mind of Mankind." *Times Higher Education Supplement*, no. 1491 (2001): 20-21.

"Some of the Truth." *Science* 293, no. 5539 (2001): 2400.

"Understanding the Universe." In *Cosmic Questions*, edited by James B. Miller, 950, 175-190. New York: New York Academy of Sciences, 2001.

"Evolution and Information: The Context." *Currents in Theology and Mission* 28, no. 3-4 (2001): 248-253.

"Introduction." In *The Work of Love: Creation as Kenosis*, edited by John C. Polkinghorne, x-xiv. Grand Rapids, MI; Eerdmans, 2001.

Theologie Und Naturwissenschaften: Eine Einführung. Gütersloh: Gütersloher Verlagshaus, 2001.

"Biology and Theology Today." *Journal of Theological Studies* 53, no. 2 (2002): 805-806.

"Eschatological Credibility: Emergent and Teleological Processes." In *Resurrection*, 43-55. Grand Rapids, MI: Eerdmans, 2002.

Traffic in Truth: Exchanges between Science and Theology. Minneapolis, MN: Fortress, 2002.

Quantum Theory: A Very Short Introduction. Very Short Introductions. Oxford: Oxford University Press, 2002.

"A Scientific Theology." *Theology* 105 (2002): 304-305.

"The Credibility of the Miraculous." *Zygon* 37, no. 3 (2002): 751-757.

"Physical Process, Quantum Events, and Divine Agency." In *Quantum Mechanics: Scientific Perspectives on Divine Action*, edited by John C. Polkinghorne, Robert John Russell, Philip D. Clayton and Kirk Wegter-McNelly, 5, 181-190. Notre Dame, IN: University of Notre Dame Press, 2002.

The God of Hope and the End of the World. New Haven, CT: Yale University Press, 2002.

"Rebuilding the Matrix." *Science & Christian Belief* 14, no. 2 (2002): 187.

"Sacred Encounters." *Times Literary Supplement*, May 3, 2002, 32.

"Thoughts of a Rationalist." *Nature* 416, no. 6881 (2002): 583-584.

"Flights of Fancy." *Nature* 416, no. 6881 (2002): 584.

"God, Science and Philosophy." In *Comparative Theology*, 110-119. London: SPCK, 2003.

"With the Grain of the Universe." *Scottish Bulletin of Evangelical Theology* 21 (2003): 100-101.

"Intelligent Design Creationism and Its Critics: Philosophical, Theological and Scientific Perspectives." *Journal of Theological Studies* 54, no. 1 (2003): 460-461.

"The Miracles of Exodus: A Scientist's Discovery of the Natural Causes of the Biblical Stories." *Expository Times* 115 (2003): 104.

"God and Design: The Teological Argument and Modern Science." *Expository Times* 115 (2003): 103.

Is There a Destiny Beyond Death? The St George's Cathedral Lecture No. 10 (2003). Perth: St. George's Cathedral, 2003.

Living with Hope: A Scientist Looks at Advent, Christmas, and Epiphany. London: SPCK, 2003.

Belief in God in an Age of Science. New Haven, CT: Yale University Press, 2003.

"Creation." *Theology Today* 60, no. 2 (2003): 270-272.

"Physics and Metaphysics in a Trinitarian Perspective." *Theology and Science* 1, no. 1 (2003): 33-49.

"The Friendship of Science and Religion." *Spectrum* 31, no. 4 (2003): 31-39.

"The Archbishop's School of Christianity and Science: Living the Gospel." York Courses, 2003.

"Foreword." In *A Natural Theology of the Arts: Imprint of the Spirit*, ix: Burlington, VT: Ashgate, 2003.

"1.6 Origins and Ends, Space and Completion." In *Creation: A Reader*, edited by Jeff Astley, Ann Loades, and David Brown, 24-25. New York; London: T & T Clark, 2003.

"Chaos Theology: A Revised Creation Theology." *Theology* 106, no. 829 (2003): 48-49.

"A Scientific Theology: Vol 2, Reality." *Theology* 106, no. 832 (2003): 292-293.

"Incarnation and Physics: Natural Science in the Theology of Thomas F. Torrance." *Theology* 106, no. 831 (2003): 215-216.

"Progress in Religion? Interfaith Opportunities." *Theology* 106, no. 831 (2003): 188-191.

Science and the Trinity: The Christian Encounter with Reality. New Haven, CT: Yale University Press, 2004.

"The Human Genome Project." *Expository Times* 115, no. 111 (2004): 391-392.

"Response to Wesley Wildman's 'the Divine Action Project.' *Theology and Science* 2, no. 2 (2004): 190-192.

"The Inbuilt Potentiality of Creation." In *Debating Design: From Darwin to DNA*, edited by William A. Dembski and Michael Ruse, 246-260. Cambridge: Cambirdge University Press, 2004.

"A Scientist Looks at Theological Inquiry." In *Loving God with Our Minds: The Pastor as Theologian*, edited by Michael Welker and Wallace M. Jarvis, 91-97. Grand Rapids, MI: Eerdmans, 2004.

"Science and Wisdom." *Theology* 107, no. 835 (2004): 57-59.

"The Person, the Soul, and Genetic Engineering." *Journal of Medical Ethics* 30, no. 6 (2004): 593-597.

"Beyond Darwin: The Human Difference." *Christian Century* 122 (2005): 25-28.

Quarks, Chaos & Christianity: Questions to Science and Religion. 2d ed. New York, NY: Crossroad, 2005.

Science and Providence: God's Interaction with the World. Philadelphia, PA: Templeton Foundation, 2005.

"The Continuing Interaction of Science and Religion." *Zygon* 40 (2005): 43-50.

"Comments on Sanborn Brown's 'Can Physics Contribute to Theology?'" *Zygon* 40 (2005): 513-515.

"In the Beginning . . . Creativity." *Theology Today* 62 (2005): 264-266.

Exploring Reality: The Intertwining of Science and Religion. New Haven, CT: Yale University Press, 2005.

"Time in Physics and Theology." In *What God Knows: Time, Eternity, and Divine Knowledge*, edited by Harry Lee Poe and J. Stanley Mattson, 61-74. Waco, TX: Baylor University Press, 2005.

"Creation out of Nothing: A Biblical, Philosophical, and Scientific Exploration." *Theology* 108, no. 844 (2005): 292-293.

"The Pattern That Is Me." *Parabola* 30, no. 3 (2005): 80-82.

"The Cosmos in the Light of the Cross." *Theology* 108, no. 845 (2005): 374-375.

"Science and Spirituality: The Volatile Connection." *Theology* 108, no. 841 (2005): 55-56.

"Interfaith Opportunities." In *Spiritual Information: 100 Perspectives on Science and Religion*, edited by Charles L. Harper, 547-550. Philadelphia, PA: Templeton Foundation Press, 2005.

"Reductionism." *Interdisciplinary Encyclopedia of Religion and Science.* 2005. http://www.disf.org/en/Voci/104.asp

Science and Creation: The Search for Understanding. Philadelphia, PA: Templeton Foundation, 2006.

"Where Is Natural Theology Today?" *Science and Christian Belief* 18, no. 2 (2006): 169-179.

"Theology and Modern Physics." *Science and Christian Belief* 18, no. 2 (2006): 197-198.

"Rich Reality: A Response to the Boyle Lecture by Simon Conway Morris." *Science and Christian Belief* 18, no. 1 (2006): 31-34.

"Christian Interdisciplinarity." In *Christianity and the Soul of the University*, edited by Douglas V. Henry and Michael D. Beaty, 49-64. Grand Rapids, MI: Baker, 2006.

"Jürgen Moltmann's Engagement with the Natural Sciences." In *God's Life in Trinity*, edited by Miroslav Volf and Michael Welker, 61-70. Minneapolis: Fortress, 2006.

"Anthropology in an Evolutionary Context." In *God and Human Dignity*, edited by R. Kendall Soulen and Linda Woodhead, 89-103. Grand Rapids, MI: Eerdmans, 2006.

"Quantum Theology." In *God's Action in Nature's World: Essays in Honour of Robert John Russell*, edited by Ted Peters and Nathan Hallanger, 137-144. Aldershot, England; Burlington, VT: Ashgate, 2006.

"The Hidden Spirit and the Cosmos." In *The Work of the Spirit: Pneumatology and Pentecostalism*, edited by Michael Welker, 169-182. Grand Rapids, MI: Eerdmans, 2006.

"Christianity and Science." In *The Oxford Handbook of Religion and Science*, edited by Philip Clayton and Zachary Simpson, 57-70. Oxford: Oxford University Press, 2006.

"Does 'Science and Religion' Matter?" In *Why the Science and Religion Dialogue Matters*, edited by Fraser Watts and Kevin Dutton, 27-32. West Conshohocken, PA: Templeton Foundation, 2006.

"Science and Religion: Where Have We Come from and Where Are We Going?" In *Why the Science and Religion Dialogue Matters*, edited by Fraser Watts and Kevin Dutton, 41-52. West Conshohocken, PA: Templeton Foundation, 2006.

"The Church Is Marked by Openness to Science." In *The Many Marks of the Church*, edited by William Madges and Michael J. Daley, 171-174. New London, CT: Twenty-Third Publications, 2006.

"Space, Time, and Causality." *Zygon* 41, no. 4 (2006): 975-983.

"God, the Multiverse, and Everything: Modern Cosmology and the Argument from Design." *Theology* 109, no. 848 (2006): 145-146.

One World: The Interaction of Science and Theology. Philadelphia, PA: Templeton Foundation, 2007.

Quantum Physics and Theology: An Unexpected Kinship. New Haven, CT: Yale University Press, 2007.

The Way the World Is: The Christian Perspective of a Scientist. Louisville: Westminster John Knox, 2007.

"The Universe as Creation." In *Intelligent Design: William A. Dembski & Michael Ruse in Dialogue*, edited by Robert B. Stewart, 166-178. Minneapolis, MN: Fortress, 2007.

"Ernan McMullin and Critical Realism in the Science-Theology Dialogue." *Journal of Theological Studies* 58, no. 2 (2007): 797-799.

"Science and Religion: Bottom-up Style, Interfaith Context." *Zygon* 42, no. 3 (2007): 573-576.

"Michael Polanyi: Scientist and Philosopher." *Theology* 110, no. 854 (2007): 150-151.

From Physicist to Priest: An Autobiography. London: SPCK, 2007.

"Kenotic Creation and Divine Action." In *The Altruism Reader: Selections from Writings on Love, Religion, and Science*, edited by Thomas Jay Oord, 177-182. West Conshohocken, PA: Templeton Foundation Press, 2007.

"John Polkinghorne." In *The Faith of Scientists in Their Own Words*, edited by Nancy K. Frankenberry, 340-364. Princeton, NJ: Princeton University Press, 2008.

"The Big Questions in Science and Religion." *Science and Christian Belief* 20, no. 2 (2008): 222-223.

"The Language of God: A Scientist Presents Evidence for Belief." *Theology* 111, no. 863 (2008): 395-396.

Editor. *La Obra Del Amor: La Creación Como Kénosis*. Estella, Spain: Verbo Divino, 2008.

"Afterword: Some Further Reflections." In *Creation: Law and Probability*, edited by Fraser Watts, 189-192. Minneapolis, MN: Fortress, 2008.

"The Nature of Time." In *On Space and Time*, edited by Alain Connes and Shahn Majid, 278-283. Cambridge: Cambirdge University Press, 2008.

"Guest Editorial: The Future of Science and Religion Debate." *Science & Christian Belief* 20, no. 2 (2008): 130-132.

Theology in the Context of Science. New Haven, CT: Yale University Press, 2009.

"The Metaphysics of Divine Action." In *Philosophy, Science and Divine Action*, edited by F. Leron Shults, Nancey Murphy, and Robert J. Russell, 97-109. Leiden: Brill, 2009.

"God and Physics." In *God Is Great, God Is Good: Why Believing in God Is Reasonable and Responsible*, edited by William Lane Craig and Chad Meister, 65-77. Downers Grove, Ill: InterVarsity, 2009.

"A Scientist Looks at the Epistle to the Hebrews." In *The Epistle to the Hebrews and Christian Theology*, edited by Richard Bauckham, Daniel R. Driver, Trevor A. Hart, and Nathan MacDonald, 113-121. Grand Rapids, MI: Eerdmans, 2009.

"Scripture and an Evolving Creation." *Science and Christian Belief* 21, no. 2 (2009): 163-173.

"The Historicity of Nature: Essays on Science and Theology." *Theology* 112, no. 869 (2009): 396-397.

"Christology and Science." *Theology* 112, no. 869 (2009): 396-397.

"The Corporate Christ." In *Who Is Jesus Christ for Us Today? Pathways to Contemporary Christology*, edited by Michael Welker, Andreas Schuele, and Günter Thomas, 103-111. Louisville, KY: Westminster John Knox, 2009.

"Evolution and Providence: A Response to Thomas Tracy." *Theology and Science* 7, no. 4 (2009): 317-322.

"Introduction." In *The Trinity and an Entangled World: Relationality in Physical Science and Theology*, edited by John C. Polkinghorne, vii-xi. Grand Rapids, MI: Eerdmans, 2010.

"The Demise of Democritus." In *The Trinity and an Entangled World: Relationality in Physical Science and Theology*, edited by John C. Polkinghorne, 1-14. Grand Rapids, MI: Eerdmans, 2010.

The Polkinghorne Reader: Science, Faith, and the Search for Meaning. West Conshohocken, PA: Templeton Foundation Press, 2010.

Encountering Scripture: A Scientist Explores the Bible. London: SPCK, 2010.

Editor. *The Trinity and an Entangled World: Relationality in Physical Science and Theology*. Grand Rapids, MI: Eerdmans, 2010.

"Naturwissenschaft Und Theologie Auf Der Suche Nach Wahrheit." *Evangelische Theologie* 70, no. 4 (2010): 313-319.

Testing Scripture: A Scientist Explores the Bible: Grand Rapids, MI: Brazos Press, 2011.

Science and Religion in Quest of Truth. New Haven, CT: Yale University Press, 2011.

"Introduction." In *Meaning in Mathematics*, edited by John C. Polkinghorne, 1-2. Oxford: Oxford University Press, 2011.

"Mathematical Reality." In *Meaning in Mathematics*, edited by John C. Polkinghorne, 27-34. Oxford: Oxford University Press, 2011.

"Comment on Michael Detlefsen's 'Discovery, Invention and Realism'." In *Meaning in Mathematics*, edited by John C. Polkinghorne, 95-96. Oxford: Oxford University Press, 2011.

"Divine Action--Some Comments." *Science and Christian Belief* 24, no. 1 (2012): 31-32.

"The Nature of Time." In *On Space and Time (Canto Classics)*, edited by Shahn Majid, 278-283. Cambridge: Cambridge University Press, 2012.

Co-Authored Works with John C. Polkinghorne

Polkinghorne, John C., R. J. Eden, P. V. Landshoff, and D. I. Olive. *The Analytic S-Matrix*. Cambridge: Cambridge University Press, 1966.

Polkinghorne, John C., Eric Lionel Mascall, and Mark E. Glasswell. "The Empty Tomb." *Theology* 89 (1986): 296-300.

Polkinghorne, John C., and Chris J. Isham. "The Debate over the Block Universe." In *Quantum Cosmology and the Laws of Nature*, edited by Robert J. Russell, Nancey Murphy, and C. J. Isham, 135-144. Berkeley, CA: The Center for Theology and the Natural Sciences, 1993.

The Doctrine Commission of the Church of England. *The Mystery of Salvation*. Harrisburg, PA: Morehouse Publishing, 1995.

Polkinghorne, John C., and André Haacke. *Quarks, Chaos En Christendom: Vragen over Wetenschap En Religie*. Baarn: Callenbach, 1996.

Polkinghorne, John C., John Strang, and Michael Farrell. "Mistake in Report: Hepatitis B Vaccination for Drug Misusers Is Recommended." *British Medical Journal* 315, no. 7099 (1997).

Polkinghorne, John C., and Lyndon F. Harris. "Divine Action: An Interview with John Polkinghorne." *Cross Currents* 48 (1998): 3-14.

Polkinghorne, John C., Larry Dossey, Herbert Benson, and Peter Downie. *Healing through Prayer: Health Practitioners Tell the Story*. Toronto: Anglican Book Centre, 1999.

Polkinghorne, John C., and Gregor Etzelmüller. *An Gott Glauben Im Zeitalter Der Naturwissenschaften: Die Theologie Eines Physikers*. Gütersloh: Kaiser Gütersloher Verl.-Haus, 2000.

Polkinghorne, John C., and Michael Welker. *Faith in the Living God: A Dialogue*. Minneapolis, MN: Fortress, 2001.

Polkinghorne, John C., and George Beekman. *Quantum Theorie: De Kortste Introductie*. Utrecht: Het Spectrum, 2003.

Polkinghorne, John C., F. Leron Shults, Howard J. Van Till, David Ray Griffin, Philip Clayton, William R. Stoeger, Thomas Tracy, Howard Taylor, and Patrick Frank. "Dialogues." *Theology & Science* 2, no. 2 (2004): 173-204.

Polkinghorne, John C., Michael Gossop, and John Strang. "The Government Task Force and Its Review of Drug Treatment Services." In *Heroin Addiction and the British System: Treatment and Policy Responses*, edited by Michael Gossop and John Strang, 2, 195-202. Abingdon; New York: Routledge, 2005.

Polkinghorne, John C., and Michael Welker. *An Den Lebendigen Gott Glauben: Ein Gespräch*. Gütersloh: Gütersloher Verlagshaus, 2005.

Polkinghorne, John C., and Michael F. Fitzgerald. "Physicist and Priest: An Interview with John Polkinghorne." *Christian Century* 125, no. 2 (2008): 30-33.

Polkinghorne, John C., and Nicholas Beale. *Questions of Truth: Fifty-One Responses to Questions About God, Science, and Belief*. Louisville, KY: Westminster John Knox, 2009.

Secondary Sources

Achtner, Wolfgang. "Truth and Proof in Mathematics and (Philosophical) Theology." *Theology and Science* 9, no. 1 (2011): 75-89.

Allen, Paul L. *Ernan McMullin and Critical Realism in the Science-Theology Dialogue*. Burlington, VT: Ashgate, 2006.

Alston, William P. *Perceiving God*. Ithaca, NY: Cornell University Press, 1991.

Atkin, Jennifer Lee. "Revelation & Reason: As a Physicist Who Became an Anglican Priest, John C. Polkinghorne Forges Common Ground between Science and Religion." (2002). http://www.science-spirit.org/article_detail.php?article_id=299 (accessed January 16, 2007).

Atkins, Peter. "Atheism and Science." In *The Oxford Handbook of Religion and Science*, edited by Philip Clayton and Zachary Simpson, 124-136. Oxford: Oxford University Press, 2006.

Baldwin, John T. "The Geological Column and Calvary: The Rainbow Connection—Implications for an Evangelical Understanding of the Atonement." In *Creation, Catastrophe and Calvary*, edited by John T. Baldwin, 108-123. Hagerstown, MD: Review and Herald, 2000.

Barbour, Ian G. "Commentary on Theological Resources from the Physical Sciences." *Zygon* 1, no. 1 (1966): 27-30.

_____. *Issues in Science and Religion*. London: SCM Press, 1966.

_____. *Religion and Science: Historical and Contemporary Issues*. New York: HarperCollins, 1997.

_____. "Science and Religion, Models and Relations." *Encyclopedia of Science and Religion*. Edited by J. Wentzel van Huyssteen. London: Thomson Gale, 2003. 1: 760-766.

_____. "John Polkinghorne on Three Scientist-Theologians." *Theology and Science* 8, no. 3 (2010): 247-264.

Barnes, Michael H. *Understanding Religion and Science: Introducing the Debate*. New York: Continuum, 2010.

Barrett, Peter. *Science and Theology since Copernicus: The Search for Understanding*. Pretoria: University of South Africa, 2000.

Barrow, John, and Frank J. Tipler. *The Anthropic Cosmological Principle*. Oxford: Oxford University Press, 1986.

Barton, Stephen C., and David WIlkinson, eds. *Reading Genesis after Darwin*. Oxford: Oxford University Press, 2009.

Bauckham, Richard. "Eschatology." In *The Oxford Handbook of Systematic Theology*, edited by John Webster, Kathryn Tanner, and Iain Torrance, 306-322. Oxford: Oxford University Press, 2007.

Bauckham, Richard, and Trevor Hart. *Hope against Hope: Christian Eschatology at the Turn of the Millenium*. Grand Rapids, MI: Eerdmans, 1999.

Baumeister, Roy F. *Meanings of Life*. New York: Guilford Press, 1991.

Bishop, Stephen. "The Relationship of Science and Religion: A Study of the Writings of Revd Dr John Polkinghorne, FRS." M.A. thesis, University of Bristol, 1998.

Boyd, Craig A., and Aaron D. Cobb. "The Causality Distinction, Kenosis, and a Middle Way: Aquinas and Polkinghorne on Divine Action." *Theology and Science* 7, no. 4 (2009): 391-406.

Bradley, James E. "Theology and Mathematics--Key Themes and Central Historical Figures." *Theology and Science* 9, no. 1 (2011): 5-26.

Brewer, Elmer Woodson. "The Approaches of John Polkinghorne, Arthur Peacocke, and Ian Barbour for the Integration of Natural Science and Christian Theology." Ph.D. dissertation, Southern Baptist Theological Seminary, 1995.

Brooke, John H. *Science and Religion: Some Historical Perspectives* The Cambridge History of Science Series. Cambridge: Cambridge University Press, 1991.

Brush, Nigel. *The Limitations of Scientific Truth: Why Science Can't Answer Life's Ultimate Questions*. Grand Rapids, MI: Kregel Publications, 2005.

Camazine, Scott. "Patterns in Nature." *Natural History* 112, no. 5 (2003): 34-41.

Campbell, Antony F. *God First Loved Us: The Challenge of Accepting Unconditional Love*. Mahwah, NJ: Paulist Press, 2000.

_____. *Making Sense of the Bible*. New York: Paulist Press, 2010.

Canale, Fernando. *Creation, Evolution, and Theology: The Role of Method in Theological Accommodation*. Berrien Springs, MI: Andrews University LithoTech, 2005.

Carr, Bernard. "Cosmology and Religion." In *The Oxford Handbook of Religion and Science*, edited by Philip Clayton and Zachary Simpson, 139-155. Oxford: Oxford University Press, 2006.

Clark, David K. *To Know and Love God: Method for Theology*. Wheaton, IL: Crossway Books, 2003.

Clark, Gordon H. *Language and Theology*. Phillipsburg, NJ: Presbyterian and Reformed Publishing, 1980.

Corey, Michael A. "Anthropic Principle." *Encyclopedia of Science and Religion*. Edited by J. Wentzel van Huyssteen. London: Thomson Gale, 2003. 1:13-18.

Craig, William Lane. "The Anthropic Principle." *The History of Science and Religion in the Western Tradition: An Encyclopedia*. Edited by Gary B. Ferngren, Edward J. Larson, Darrel W. Amundsen, and Anne-Marie E. Nakhla. London: Garland Publishing, 2000. 366-368.

Cupitt, Don. *Christ and the Hiddenness of God*. Philadelphia, PA: Westminster Press, 1985.

Daly, Gabriel. *Creation and Redemption*. Wilmington, DE: Michael Glazier, 1989.

Dinter, Astrid. *Vom Glauben Eines Physikers: John Polkinghornes Beitrag Zum Dialog Zwischen Theologie Und Naturwissenschaften*. Mainz: Matthias-Grünewald-Verlag, 1999.

Domning, Daryl P., and Monika K. Hellwig. *Original Selfishness: Original Sin and Evil in the Light of Evolution*. Burlington, VT: Ashgate, 2006.

Ellis, George. "Ordinary and Extraordinary Divine Action: The Nexus of Interaction." In *Chaos and Complexity: Scientific Perspectives on Divine Action*, edited by Robert J. Russell, Nancey Murphy, and Arthur R. Peacocke, 359-395. Berkeley, CA: The Center for Theology and the Natural Sciences, 1997.

_____. "Physics, Complexity, and Religion." In *The Oxford Handbook of Religion and Science*, edited by Philip Clayton and Zachary Simpson, 751-766. Oxford: Oxford University Press, 2006.

_____. "Ordinary and Extraordinary Divine Action: The Nexus of Interaction." In *Philosophy, Science and Divine Action*, edited by F. Leron Shults, Nancey Murphy, and Robert J. Russell, 1, 305-349. Leiden: Brill, 2009.

Fergusson, David. "Types of Natural Theology." In *The Evolution of Rationality*, edited by F. LeRon Shults, 380-393. Grand Rapids, MI: Eerdmans, 2006.

Ferré, Frederick. *Language, Logic and God*. New York: Harper & Row, 1961.

Gilkey, Langdon. "Cosmology, Ontology, and the Travail of Biblical Thinking." *The Journal of Religion* 41 (1961): 194-205.

_____. *Religion and the Scientific Future*. New York: Harper & Row, 1970.

_____. *Nature, Reality, and the Sacred*. Minneapolis, MN: Fortress, 1993.

Gillman, Neil. "How Will It All End? Eschatology and Science in Religion." *Cross Currents* 57, no. 1 (2007): 38-50.

Gingerich, Owen. "Kepler's Trinitarian Cosmology." *Theology and Science* 9, no. 1 (2011): 45-51.

Green, Joel B. ""Bodies--That Is, Human Lives": A Re-Examination of Human Nature in the Bible." In *Whatever Happened to the Soul? Scientific and Theological Portraits of Human Nature*, edited by Warren S. Brown, Nancey Murphy, and H. Newton Malony, 149-173. Minneapolis, MI: Fortress Press, 1998.

Grelot, Pierre. *The Language of Symbolism*. Translated by Christopher R. Smith. Peabody, MA: Hendrickson, 2006.

Gulley, Norman R. "The Impact of Eschatology on Protology." *Journal of the Adventist Theological Society* 11 (2000): 54-101.

Hasel, Michael G. ""In the Beginning . . . " The Relationship between Protology and Eschatology." In *The Cosmic Battle for Planet Earth: Essays in Honor of Norman R. Gulley*, edited by Ron Du Preez and Jirí Moskala, 17-32. Berrien Springs, MI: Old Testament Department, Seventh-day Adventist Theological Seminary, Andrews University, 2003.

Haught, John F. *Deeper Than Darwin: The Prospect for Religion in the Age of Evolution*. Boulder, CO: Westview Press, 2003.

_____. "Kenosis." *Encyclopedia of Science and Religion*. Edited by J. Wentzel van Huyssteen. London: Thomson Gale, 2003. 2:500-502.

_____. "God and Evolution." In *The Oxford Handbook of Religion and Science*, edited by Philip Clayton and Zachary Simpson, 697-712. Oxford: Oxford University Press, 2006.

_____. *God after Darwin: A Theology of Evolution*. Boulder, CO: Westview Press, 2008.

Haviland, David A. *Cultural Anthropology*. New York: Harcourt Brace College Publishers, 1999.

Hefner, Philip J. "Religion-and-Science." In *The Oxford Handbook of Religion and Science*, edited by Philip Clayton and Zachary Simpson, 562-576. Oxford: Oxford University Press, 2006.

Henry, Carl F. H. *God, Revelation, and Authority*. Vol. 3. Waco, TX: Word Books, 1979.

Hess, Peter M. J. "God's Two Books: Special Revelation and Natural Science in the Christian West." In *Bridging Science and Religion*, edited by Ted Peters and Gaymon Bennett, 123-140. Minneapolis, MN: Fortress Press, 2003.

Hiebert, Robert J V. "Create, Creation." *Baker Theological Dictionary of the Bible*. Edited by Walter A. Elwell. Grand Rapids, MI: Baker Books, 1996. 132-136.

Hodgson, Peter C. "Theology and the Philosophy of Science." *Religious Studies Review* 3, no. 4 (1977): 215-218.

Hodgson, Peter E. *Theology and Modern Physics*. Aldershot, England: Ashgate, 2005.

Hogan, Edward M. *Whether Theology Is a Science?* PhD dissertation, Boston College, 2001.

_____. "John Polkinghorne and Bernard Lonergan on the Scientific Status of Theology." *Zygon* 44, no. 3 (2009): 558-582.

House, H. Wayne, and Kyle A. Roberts. *Charts on Systematic Theology*. Grand Rapids, MI: Kregel, 2006.

Howell, Kenneth J. "Theodicy." *The History of Science and Religion in the Western Tradition: An Encyclopedia*. Edited by Gary B. Ferngren, Edward J. Larson, Darrel W. Amundsen, and Anne-Marie E. Nakhla. London: Garland Publishing, 2000. 74-75.

Hunter, Cornelius G. *Science's Blind Spot*. Grand Rapids, MI: Brazos Press, 2007.

Knight, Christopher C. *Wrestling with the Divine*. Minneapolis, MN: Fortress, 2001.

Knight, Philip J. "The Adequacy of Language as a Critique of Religious Critical Realism." *Modern Believing* 2 (1999): 41-49.

Knut-Willy, Saether. *Traces of God: Exploring John Polkinghorne on Theology and Science*. Trondheim, Norway: Tapir Academic Press, 2011.

Körtner, Ulrich H. J. *The End of the World: A Theological Interpretation*. Louisville, KY: Westminster John Knox, 1995.

Kukla, André, and Joel Walmsley. "A Theory's Predictive Success Does Not Warrant Belief in the Unobservable Entities It Postulates." In *Contemporary Debates in Philosophy of Science*, edited by Christopher Hitchcock, 133-148. Oxford: Blackwell Publishing, 2004.

Kvasv, Ladislav. "The Invisible Link between Mathematics and Theology." *Perspectives on Science and Christian Faith* 56, no. 2 (2004): 111-116.

Kwan, Kai Man. "A Critical Faith Vs. Uncritical Suspicion: Towards Critical Realism." *Stimulus* 16, no. 1 (2008): 33-36.

Lennox, John C. *Seven Days That Divide the World*. Grand Rapids, MI: Zondervan, 2011.

Leplin, Jarrett. "A Theory's Predictive Success Can Warrant Belief in the Unobservable Belief in the Unobservable Entities It Postulates." In *Contemporary Debates in Philosophy of Science*, edited by Christopher Hitchcock, 117-132. Oxford: Blackwell Publishing, 2004.

Leslie, John. *Universes*. London: Routledge, 1989.

Lewis, Albert C. "The Divine Truths of Mathematics and the Origins of Linear Algebra." *Theology and Science* 9, no. 1 (2011): 109-120.

Long, V. Philips, Tremper Longman, Richard A. Muller, Vern S. Poythress, and Moisés Silva. *Foundations of Contemporary Interpretation*. Grand Rapids, MI: Zondervan, 1996.

Losch, Andreas. "Our World Is More Than Physics: A Constructive—Critical Comment on the Current Science and Theology Debate." *Theology and Science* 3, no. 3 (2005): 275-290.

_____. "On the Origins of Critical Realism." *Theology and Science* 7, no. 1 (2009): 85-106.

_____. "Critical Realism: A Sustainable Bridge between Science and Religion?" *Theology and Science* 8, no. 4 (2010): 393-416.

MacLennan, Ronald B. "Belief-Ful Realism and Scientifc Realism." *Zygon* 36, no. 2 (2001): 309-320.

Malcolm, W. G. "Thinking About God and Infinity: Can Mathematics Contribute?" *Stimulus* 18, no. 2 (2010): 35-41.

McGrath, Alister E. *Science & Religion: A New Introduction*. 2nd ed. Chichester, West Sussex, U.K.: Wiley-Blackwell, 2010.

McMullin, Ernan. "Realism in Theology and Science: Response to Arthur Peacocke." *Religion and Intellectual Life* 2, no. 4 (1985): 39-47.

_____. "Belief in God in an Age of Science." *Commonweal* 125, no. 17 (1998): 22-23.

Moberly, R. W. L. *The Bible, Theology, and Faith: A Study of Abraham and Jesus*. Cambridge: Cambirdge University Press, 2000.

Moltmann, Jürgen. "Reflection on Chaos and God's Interaction with the World from a Trinitarian Perspective." In *Chaos and Complexity: Scientific Perspectives on Divine Action*, edited by Robert J. Russell, Nancey Murphy, and Arthur R. Peacocke, 205-210. Berkeley: Vatican Observatory Publications; The Center for Theology and the Natural Sciences, 1997.

Morgan, Vance G. "Mathematics and Supernatural Friendship." *Philosophy & Theology* 18, no. 2 (2006): 319-335.

Murphy, Nancey. "From Critical Realism to a Methodological Approach: Response to Robbins, Van Huyssteen, and Hefner." *Zygon* 23, no. 3 (1988): 287-290.

_____. *Theology in the Age of Scientific Reasoning*. Ithaca: Cornell University Press, 1990.

_____. "Science, Divine Action, and the Intelligent Design Movement: A Defense of Theistic Evolution." In *Intelligent Design: William A. Dembski & Michael Ruse in Dialogue*, edited by Robert B. Stewart, 154-165. Minneapolis, MN: Fortress, 2007.

Nash, Ronald. *The Word of God and the Mind of Man*. Phillipsburg, NJ: P&R, 1982.

Nelson, Dean, and Karl Giberson. *Quantum Leap.* Oxford, UK: Monarch Books, 2011.

Peacocke, Arthur R. *Creation and the World of Science*. Oxford: Oxford University Press, 1979.

_____. "The Sound of Sheer Silence: How Does God Communicate with Humanity?" In *Philosophy, Science and Divine Action*, edited by F. Leron Shults, Nancey Murphy, and Robert J. Russell, 1, 53-95. Leiden: Brill, 2009.

Peters, Ted. *God as Trinity: Relationality and Temporality in the Divine Life*. Louisville, KY: Westminster John Knox, 1993.

_____. "Science and Theology: Toward Consonance." In *Science and Theology: The New Consonance*, edited by Ted Peters, 11-39. Boulder, CO: Westview Press, 1998.

_____. "Where Are We Going? Eschatology." In *Essentials of Christian Theology*, edited by William C. Placher, 347-365. Louisville, KY: Westminster John Knox, 2003.

_____. "Contributions from Practical Theology and Ethics." In *The Oxford Handbook of Religion and Science*, edited by Philip Clayton and Zachary Simpson, 372-387. Oxford: Oxford University Press, 2006.

Peterson, Gregory R. "Science and Religion, Methodologies." *Encyclopedia of Science and Religion*. Edited by J. Wentzel van Huyssteen. London: Thomson Gale, 2003. 1:756-759.

Platinga, Alvin. "What Is 'Intervention'?" *Theology and Science* 6, no. 4 (2008): 369-401.

_____. "Theism and Mathematics." *Theology and Science* 9, no. 1 (2011): 27-33.

Polanyi, Michael. *Science, Faith and Society*. Chicage, IL: The University of Chicago Press, 1964.

_____. *Personal Knowledge: Towards a Post-Critical Philosophy*. Chicago, IL: The University of Chicago Press, 1974.

Powers, Robert E. "Science and Religion: Toward a Unitary View: Perspectives from Ian Barbour and John Polkinghorn." M.Div. thesis, Emory University, 1996.

Ratzsch, Del. *Science and Its Limits*. Downers Grove, IL: InterVarsity Press, 2000.

_____. *Nature, Design and Science*. Albany, NY: State University of New York Press, 2001.

Remmert, Volker R. "Galileo, God and Mathematics." In *Mathematics and the Divine: A Historical Study*, edited by Teun Koetsier and Luc Bergmans, 347-360. Amsterdam: Elsevier, 2005.

Robinson, H. Wheeler. "Hebrew Psychology." In *The People and the Book*, edited by Arthur S. Peake, 352-382. Oxford: Clarendon Press, 1925.

Russell, Robert J. "Does the 'God Who Acts' Really Act in Nature?" In *Science and Theology: The New Consonance*, edited by Ted Peters, 77-102. Boulder, CO: Westview Press, 1998.

_____. "Special Providence and Genetic Mutation: A New Defense of Theistic Evolution." In *Evolutionary and Molecular Biology: Scientific Perspectives on Divine Action*, edited by Robert J. Russell, William R. Stoeger and Francisco J. Ayala, 191-223. Berkeley, CA: The Center for Theology and the Natural Sciences, 1998.

_____. "Bodily Resurrection, Eschatology, and Scientific Cosmology: The Mutual Interaction of Christian Theology and Science." In *Resurrection*, edited by Ted Peters, Michael Welker, and Robert J. Russell, 3-30. Grand Rapids, MI: Eerdmans, 2002.

_____. "Sin, Salvation, and Scientific Cosmology: Is Christian Eschatology Credible Today?" In *Sin and Salvation*, edited by Duncan Reid and Mark William Worthing, 130-154. Hindmarsh, Australia: Australian Theological Forum, 2003.

_____. "Five Key Topics on the Frontier of Theology and Science Today." *Dialog* 46, no. 3 (2007): 199-207.

_____. "Cosmology and Eschatology." In *The Oxford Handbook of Eschatology*, edited by Jerry L. Walls, 563-580. Oxford: Oxford University Press, 2008.

Russell, Robert J., Nancey C. Murphy, and C. J. Isham. *Quantum Cosmology and the Laws of Nature: Scientific Perspectives on Divine Action*. 2nd ed. Berkeley, CA: Center for Theology and the Natural Sciences, 1996.

Russell, Robert J., Ted Peters, and Nathan Hallanger. *God's Action in Nature's World: Essays in Honour of Robert John Russell*. Burlington, VT: Ashgate, 2006.

Russell, Robert John. "Eschatology and Scientific Cosmology: From Conflict to Interaction." In *What God Knows: Time, Eternity, and Divine Knowledge*, edited by Harry Lee Poe and J. Stanley Mattson, 95-120. Waco, TX: Baylor University Press, 2006.

Schwarz, Hans. *Eschatology*. Grand Rapids, MI: Eerdmans, 2000.

Shapiro, Stewart. "Theology and the Actual Infinite: Burley and Cantor." *Theology and Science* 9, no. 1 (2011): 101-108.

Shults, F. LeRon, Nancey C. Murphy, and Robert J. Russell. *Philosophy, Science, and Divine Action*. Vol. 1. Leiden: Brill, 2009.

Smedes, Taede A. *Chaos, Complexity, and God: Divine Action and Scientism*. Leuven: Peeters, 2004.

Soskice, Janet Martin. *Metaphor and Religious Language*. Oxford: Clarendon Press, 1987.

_____. "*Creatio Ex Nihilo*: Its Jewish and Christian Foundations." In *Creation and the God of Abraham*, edited by David B. Burrell, Carlo Cogliati, Janet M. Soskice and William R. Stoeger, 24-39. Cambridge: Cambridge University Press, 2010.

Stenmark, Mikael. "Scientism." *Encyclopedia of Science and Religion*. Edited by J. Wentzel van Huyssteen. London: Thomson Gale, 2003. 2:783-785.

Stiver, Dan R. *The Philosophy of Religious Language: Sign, Symbol & Story*. Cambridge, MA: Blackwell, 1996.

Stoeger, William R. "Scientific Accounts of Ultimate Catastrophes in Our Life-Bearing Universe." In *The End of the World and the Ends of God: Science and Theology on Eschatology*, edited by John C. Polkinghorne and Michael Welker, 19-28. Harrisburg, PA: Trinity, 2000.

_____. "The Big Bang, Quantum Cosmology and Creation Ex Nihilo." In *Creation and the God of Abraham*, edited by David B. Burrell, Carlo Cogliati, Janet M. Soskice, and William R. Stoeger, 152-175. Cambridge: Cambridge University Press, 2010.

Strauss, Mark L. *How to Read the Bible in Changing Times*. Grand Rapids, MI: BakerBooks, 2011.

Szerszynski, Bronislaw. "Rethinking the Secular: Science, Technology, and Religion Today." *Zygon* 40, no. 4 (2005): 813-822.

Tanner, Kathryn. "Eschatology without a Future?" In *The End of the World and the Ends of God: Science and Theology on Eschatology*, edited by John C. Polkinghorne and Michael Welker, 222-237. Harrisburg, PA: Trinity, 2000.

Tapp, Christian. "Infinity in Mathematics and Theology." *Theology and Science* 9, no. 1 (2011): 91-100.

Thiselton, Anthony C. *Hermeneutics: An Introduction*. Grand Rapids, MI: Eerdmans, 2009.

Toon, P. "Kenosis, Kenotic Theology." *Evangelical Dictionary of Theology*. Edited by Walter A. Elwell. Grand Rapids, MI: Baker Academic, 2001. 651-653.

Tully, David Glenn. "Critical Realist Faith: John Polkinghorne's Theology for a Scientific Culture." M.Div. thesis, Emmanuel School of Religion, Johnson City, TN, 1999.

Turl, John. "All Things New." *Science and Christian Belief* 19, no. 2 (2007): 139-160.

van den Brink, Gijsbert. *Philosophy of Science for Theologians: An Introduction*. Frankfurt am Main: Peter Lang, 2009.

van Huyssteen, J. Wentzel, Niels Henrik Gregersen, Nancy R. Howell, and Wesley J. Wildman. "Introduction." *Encyclopedia of Science and Religion*. Edited by J. Wentzel van Huyssteen. London: Thomson Gale, 2003. 1:ix-xii.

van Kooten Niekerk, Kees. "A Critical Realist Perspective on the Dialogue between Theology and Science." In *Rethinking Theology and Science*, edited by Niels Henrik Gregersen and J. Wentzel Van Huyssteen, 51-86. Grand Rapids, MI: Eerdmans, 1998.

_____. "Critical Realism." *Encyclopedia of Science and Religion*. Edited by J. Wentzel van Huyssteen. London: Thomson Gale, 2003. 1:190-193.

Ward, Keith. "Cosmos and Kenosis." In *The Work of Love: Creation as Kenosis*, edited by John C. Polkinghorne, 152-166. Grand Rapids, MI: Eerdmans, 2001.

_____. "Creation." *Encyclopedia of Science and Religion*. Edited by J. Wentzel Van Huyssteen. London: Thomson Gale, 2003. 1:184-187.

Wegter-McNelly, Kirk. "Fundamental Physics and Religion." In *The Oxford Handbook of Religion and Science*, edited by Philip Clayton, 156-171. Oxford: Oxford University Press, 2006.

Welker, Michael. "Science and Theology: Their Relation at the Beginning of the Third Millenium." In *The Oxford Handbook of Religion and Science*, edited by Philip Clayton and Zachary Simpson, 551-561. Oxford: Oxford University Press, 2006.

Wildman, Wesley J. "Evaluating the Teleological Argument for Divine Action." In *Philosophy, Science and Divine Action*, edited by F. Leron Shults, Nancey Murphy and Robert J. Russell, 1, 141-189. Leiden: Brill, 2009.