SCIENCE AND RELIGION: A SEARCH FOR SYNERGISM

A Thesis

by

J. MICHAEL JONES

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

MASTER OF ARTS

May 2006

Major Subject: Philosophy

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Approved by:

Chair of Committee,	John J. McDermott
Committee Members,	Hugh J. McCann
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ABSTRACT

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In this thesis, I consider the problem of relating science and religion, and search for a solution that will provide a useful model both for individual believers as well as professional scientists and theologians. In this search, I take up the works of three of the most influential thinkers to write on the subject: Andrew Dickson White, Alfred North Whitehead, and Ian G. Barbour. I survey each of their texts and evaluate the philosophy of science and religion that they present. In the end, I conclude that the version of process philosophy adopted by Ian Barbour offers the most promising solution to the problem of relating science and religion.

To Dorcas,

Nemo mortalium omnibus horis sapit,
sed nonnemo supra caeterus.

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I owe a special debt of gratitude to my committee chair, John J. McDermott. His discernment, example, and instruction have been an inspiration throughout the course of this project. The insights I have gleaned under his tutelage have left an indelible impression upon my life and thought, the hallmark of a great teacher.

Thanks also to the other members of my committee, Hugh J. McCann and David A. Erlandson. Their comments during this process have been especially helpful in forming the final version of this work.

I offer a very special thanks to my family; without their continual encouragement from the very beginning, I would have been altogether unfit to undertake such a task. Mom, Nino, and Poppo: your love and support have meant far more to me than a hundred theses could justly describe.

Finally, to my wife, Dorcas, I owe my most sincere and humble thanks. Without your constant love and friendship to lift and to guide, I would have never known the peaks and high places to which our Creator commends us.

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CHAPTER I

INTRODUCTION

This thesis begins with a worry. The worry arises over doubts about how to understand the relationship between science and religion. It is hard to imagine two areas of human thought and activity which have inspired more minds, created more controversies, or challenged more intellects than these two have. From ancient civilization through to the modern world, science and religion have held center stage in the history and development of humankind. Nevertheless, there remains no received conception of how these two remarkably complicated facets of human nature should relate to one another. Centuries of mutual investigation, bitter conflict, and disinterested isolation reveal the enigmatic character of this relationship and leave the contemporary thinker to puzzle over their association.

This dilemma is made worse by political and ideological biases. The last century saw a number of incidents between rival factions over the influence of science and religion, specifically in regard to creation and evolution. These debates have resulted in litigation, open hostility, and lasting resentment. Together all of these things conspire against a genuine reconciliation, suggesting instead that science and religion are locked in perpetual conflict.

I find this situation troubling. Setting aside the political agendas and social grudges which fuel much of this debate, there is a problem which runs deeper and is far

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This thesis follows the style of *The Chicago Manual of Style*.

more unsettling. Namely, if science and religion are in fact continually at odds with one another, then we must abandon any hope of epistemological unity. That is, whatever science and religion tell us about our world and ourselves can never be harmonized; instead we are left with a dissected and fragmented understanding of our experiences. If this view of science and religion is correct, then, not only should we never expect to find such an epistemological unity, we should no longer search for it. To accept this conclusion, though, is to give up too quickly.

While the challenge of reconciling science and religion is one of the most difficult tasks facing intellectuals of the 21st century, it is, nevertheless, one which must be met. Both of these represent institutional and epistemological bulwarks of human activity. The depth with which they are entrenched in our thinking and experience, as well as the enormous diversity of their respective activities, presents a seemingly insurmountable obstacle blocking the way to a fruitful relationship. Nevertheless, to dismiss the problem solely on account of its sheer magnitude is representative of intellectual cowardice and only allows the issue to become further complicated by partisan rhetoric and conceptual opacity. I believe that a solution can be found to this difficulty which benefits both science and religion; a synergism between the two which will accomplish more for human understanding than either in isolation. This thesis is a search for just such a solution. The reconciliation which I am seeking here concerns two specific areas: the life of the individual believer, and the professional practice of science and theology.

Reconciliation is especially important to individual believers since both science and religion inform us about the world, our experiences, and our own nature. Science and religion both provide a picture of reality and offer insight and instruction for daily life. As such, they form the basis for the belief systems of many modern people. It is this practical, day-to-day sort of understanding that I am most interested in addressing. As an individual with epistemological commitments to both science and religion, how ought I to reconcile the two? In other words, viewing myself as a person embedded in a universe that reveals itself to me in both scientific and religious ways, how can I best understand this apparent dichotomy of experience? A helpful reconciliation in this regard is one which will provide the individual with a basis for relating her scientific and religious beliefs in a comprehensive way, one which unifies the information received from both sources.

Though my primary concern is for individual understanding, in a secondary manner I am also concerned with achieving a useful account of science and religion that will benefit both practicing scientists and theologians. I believe that, while there is much between these two domains that is independent of the other, there is also some measure of overlap in their areas of inquiry. A useful reconciliation in this regard will draw lines of separation where mutual independence should be respected, and will open doors for dialogue where it is most likely to be fruitful. Such an account would then be able to guide research in both fields, fostering interdisciplinary exchanges where they are most useful, but reserving respectful isolation otherwise.

Given the enormity of the task at hand, I will not attempt an entirely novel solution to the problem. The expertise and level of development needed to conduct such an inquiry falls well outside the scope of this thesis. For that reason, I have chosen to focus on the work of three of the most prominent figures in the history of science and religion studies: Andrew Dickson White, Alfred North Whitehead, and Ian G. Barbour. Each of these individuals has written extensively on the subject and I will evaluate their texts in search of the reconciliation described above.

In the second chapter, I will consider the voluminous work of A. D. White. Generations of Americans have been profoundly influenced by his *History of the Warfare of Science With Theology*.[1] In it he describes the historical relationship between science and religion as it is revealed through the progress of each of the major sciences. I will present a very brief account of White's history and then evaluate its usefulness in light of our current question. I will ultimately conclude that the reconciliation which White effects between science and religion is neither historically accurate nor generally helpful. Nevertheless, a good understanding of White's position will be beneficial in our continuing search for reconciliation, in as much as it is representative of many people's (often unreflective) views on the subject.

After dismissing White's solution, in the third chapter I will consider the position offered by A. N. Whitehead. In his Lowell lectures from 1925 and 1926, *Science and the Modern World* and *Religion in the Making* respectively,[2] he provides a way of

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[1] Andrew Disckson White, *A History of the Warfare of Science With Theology in Christendom, 2 vols.* (New York: George Braziller, 1955 [originally published in 1895]).
[2] Alfred North Whitehead, *Science and the Modern World* (New York: The Free Press, 1967), and *Religion in the Making* (Cambridge: Cambridge University Press, 1930).

relating science and religion through metaphysics. Specifically, he uses his process metaphysical view to give a comprehensive account of how science and religion stand in relation to each other. I will give a short exposition of Whitehead's conceptions of science, religion, and process thought. I will then tie all of these together and show how they bear upon the immediate question. Lastly, I will raise some problems for Whitehead, specifically concerning the identity of the self and conception of God on the process view. While the account that emerges from Whitehead's work is promising, these problems prevent it from delivering a decisive solution. Moreover, the 20th century saw major advances in science after the time that Whitehead wrote; many of these advances reshaped old scientific understandings of the world in ways that are relevant to this investigation. For a more recent process based view of science and religion, I turn in the fourth chapter to the work of Ian G. Barbour.

In *Religion in an Age of Science*,[3] Barbour continues in Whitehead's wake, using process metaphysics as a means for reconciling science and religion. He also considers new developments in, among other things, quantum mechanics and biological theory. After surveying the recent progress of these two areas, I will show how Barbour extends Whitehead's original view. Finally, I will return to the problems which beset Whitehead in the third chapter and will consider Barbour's responses to them. In the end, I will show that, while some problems still remain, Barbour's reconciliation of science and religion through process philosophy presents us with a viable solution to our present problem.

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[3] Ian G. Barbour, *Religion in an Age of Science* (San Francisco: Harper and Row, 1990).

Before embarking on this search, we will do well to heed the following admonition by Whitehead:

> It would, however, be missing the point to think that we need not trouble ourselves about the conflict between science and religion. In an intellectual age there can be no active interest which puts aside all hope of a vision of the harmony of truth. To acquiesce in discrepancy is destructive of candour, and of moral cleanliness. It belongs to the self-respect of intellect to pursue every tangle of thought to its final unravelment. If you check that impulse you will get no religion and no science from an awakened thoughtfulness. The important question is, In what spirit are we going to face the issue.[4]

[4] Whitehead, *Science and the Modern World*, 185.

CHAPTER II
HISTORICAL CONFLICT: ANDREW DICKSON WHITE

In the literature which treats the relationship between science and religion, Andrew Dickson White has secured himself a place of lasting notability. The first president of Cornell and history professor at the same university wrote what many believed to be the definitive statement concerning the historical interactions of science and religion.[1] In his massive text, White surveys the areas of Biology, Physics, Meteorology, Politics, Geography, and nearly all points in between, retelling the story of the gradual shift from religious myth to scientific fact. In this chapter, I will give an exposition of two sections of White's history, biology and medicine, in order to provide a proper setting for a critical analysis of his view. I will develop the philosophy of science and religion that is embedded in his work and try it to see whether it gives a fruitful account of these two great areas of human understanding. Though I ultimately conclude that White fails in providing a satisfactory solution to our problem, I believe that an investigation of his work will prove useful in the overall aims of this project.

We must note at the beginning that White is unique among the three authors I am considering in this project. Whereas Whitehead and Barbour express their views of science and religion in philosophical prose, White presented his in the form he was most acquainted with: history. Throughout the text, White never gives any direct statements about how science and religion should relate; he does not even explain what he means

[1] I am referring here to his *History of the Warfare Between Science and Theology in Christendom, 2 vols.* (New York: George Braziller, 1955 [originally published in 1895]). Hereafter, I will cite this text as *HWSTC*.

when he talks about these two complex features of human activity. Instead, he simply tells the story of science and religion as well as he can, leaving whatever philosophical conclusion might be drawn from it to be filled in by the reader. It may seem odd, then, to find White's text treated in the same light as the philosophical works of Whitehead and Barbour. There are at least three reasons why, when considering the question of how religion and science should be reconciled, one should study A. D. White.

First, his work has been widely influential; this popular book has impressed a certain understanding of science and religion upon generations of readers. Second, underneath the wealth of facts, dates, and names of schoolmen and saints, White does have a philosophy of science and religion and it is one which deserves close consideration. Third, the position White takes, though I ultimately reject it as a fruitful solution to our problem, does provide a good starting place for the discussion. This is because the philosophy of science and religion that permeates the work remains popular to this day, even if many who hold it do so more or less uncritically. Also, White provides a good beginning point because he provides a historical introduction to the problem. With that being said, I will now turn my attention to an exposition of White's historical narrative in order to set the stage for later discussion.

The History of the Warfare

From Creation to Biology

White begins his history of the movement toward modern biology with a discussion of the biblical account of creation. This story is familiar enough to most of us: God creates

the entire universe, stars, moon, plants, animals, and man in six days. This creative work was believed to be accomplished by either the physical crafting of the creator's hands or by the command of his voice.[2] In one of these two forms, the story continues through the history of Christianity, appearing prominently in religious sculpture and painting and depicted dramatically in the work of John Milton. Several of the early church fathers resisted the view that the creative work of God was done by hand or voice; Gregory of Nyssa and Augustine were both critical of this position.[3] However, in the end, the literal view of creation according to the description of Genesis gained prominence in the received traditions of the church.

In addition, it was believed that this creative work of God wrought the entire universe from nothing, creation *ex nihilo*. Many of the church fathers taught that there was no pre-existing matter from which God formed the world. Despite some measure of theological resistance – Augustine, again, resisted this view, believing that matter existed 'without form and void' prior to the creation[4] – the church generally accepted as orthodox the view of God's miraculous creation from nothing.

After establishing how Christian theology settled the manner of creation, White then discusses the issue of the date and time of this creation. Though there is a difficulty here, arising from the two apparently inconsistent accounts in the book of Genesis,[5] White suggests that for centuries orthodox Christian theology settled on a compromise between an instantaneous and six-day creation. Aquinas later provided some relief from

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[2] *Genesis* chapters 1 & 2.
[3] *HWSTC*, vol. 1, p. 3.
[4] *Ibid.* 4, 5.
[5] *Ibid.* p. 5 ff.

this seeming contradiction when he suggested that God created the matter of the universe all at once, but that its forming into various elements of the ordered world occupied six full days.[6]

Concerning the date of creation, White details the development of an elaborate measurement of universal history according to the scriptural record. He cites John Lightfoot, Vice Chancellor of Cambridge during the seventeenth century, where the renowned Hebrew scholar declares that 'this work took place and man was created by the Trinity on October 23, 4004 B.C., at nine o'clock in the morning.'[7] We may chuckle at the presumption of such a claim now, but at the time of its publication, Lightfoot's statement was meant to be a definitive treatment concerning the age of the universe and White treats it as such. This figure, or some approximation of it, soon gained considerable adherence among religious believers.[8]

The Christian belief in creation is thus established by White to have involved the immediate action of God in six days, some 4,000 years before our present era. White then proceeds to describe the history and development of evolutionary theory.

White traces the beginnings of evolutionary theory back to the Chaldean and Babylonian civilizations.[9] Here the story is of God creating a watery chaos from which all animal life springs forth. A similar tale was believed by Egyptians peoples in relation

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[6] *Ibid*. 7, 8.
[7] *Ibid*. 9.
[8] *Ibid*. 9, 10. White points out, with no small pleasure, that during the time Lightfoot declares creation to have taken place, Egyptian and Asian peoples were already enjoying a high level of civilization.
[9] *Ibid.* 59 ff. White also traces the legends leading to the Hebrew story of creation in genesis to these same sources. For instance, see p. 2 of this same volume.

to the Nile river.[10] Later, this notion was adapted by the Greeks, most notable among them being Aristotle and his idea of higher levels of organization succeeding from lower levels through fundamental principles of nature.[11] Augustine even argues in his unfinished work on Genesis against the Manicheans that 'certain very small animals may not have been created on the fifth and sixth days, but may have originated later from putrefying matter.'[12] So, while the idea of biological evolution was yet unpopular among Christian theists, it was not altogether unknown to them.

Evolutionary understanding stagnated through the close of the Middle Ages, largely because of theological hindrances. By that time, though, large scale geographical explorations were underway and observations made which provoked new thought concerning the origins of life and matter and which offered new challenges to the orthodox theological position. White credits theorists such as Bruno, Descartes, Leibniz, Spinoza, Hume, and Kant as all contributing toward the advancement of an evolutionary theory of nature.[13] Each of these contributors, White tells us, was checked in their progress by the authority of the church. The momentum begun in the early modern period continued into the nineteenth century when several theories of evolution were put forward. It was not until 1859, though, that evolution gained its most influential statement and one of its greatest champions. This, of course, was the year Charles Darwin published *The Origins of Species*, a work which did much to upset the

[10] *Ibid.* 52.
[11] *Ibid.*
[12] *Ibid.* 53.
[13] *Ibid.* 57, 8.

established theological idea of creation. Fierce criticism was heard from all across Britain and the continent, as well as the United States.[14]

White describes the effects of Darwinism upon theology as 'like a plough into an ant-hill. Everywhere those thus rudely awakened from their old comfort and repose had swarmed forth angry and confused.'[15] Many theologians decried Darwin and his work as an attempt to limit the glory of God. However, the tenor of theological clamor soon shifted from condemnation to attempts at compromise.[16] Thus, in Oxford and Cambridge the teaching of evolution was gradually accepted 'as a leaven' to the orthodox theology.[17] The Catholic church also issued a statement asserting that 'the doctrine of evolution is no more in opposition to the doctrine of the Catholic Church than is the Copernican theory or that of Galileo.'[18]

Though White cites examples of belated outbursts against the theory, he ultimately declares evolution the victor in the battle against theology. At the closing of the chapter, he sums up his account succinctly when he states,

> Whatever additional factors may be added to natural selection – and Darwin himself fully admitted that there might be others – the theory of an evolutionary process in the formation of the universe and of animated nature is established, and the old theory of direct creation is gone forever. In place of it science had given us conceptions far more noble, and opened the way to an argument for design infinitely more beautiful than any ever developed by theology.[19]

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[14] *Ibid*. 70-73.
[15] *Ibid*. 70.
[16] *Ibid.* 81, 2. This theme of compromise is one which is repeated in nearly all of the areas of science which White covers in his history.
[17] *Ibid*. 82.
[18] *Ibid.*
[19] *Ibid.* 86.

From Miracles to Medicine

White begins his history of medicine by giving an account of the nature of ancient and early Christian understanding of illness and disease. He traces the notion of demon possession back to ancient Egypt, India, and China as an explanation for sickness.[20] This understanding is later introduced to the Hebrews by way of the Chaldean and Babylonian peoples.[21] Belief in such superstitions grew commensurately with the influence of Christianity. The chief causes of illness were then understood to be either the vengeful but just effects of God or the malignant working of the devil. Correspondingly, cures for such afflictions were best wrought by spiritual men and according to biblical authority and precedent.

The belief in such supernatural illnesses and miraculous cures developed into elaborate legends regarding the healing works of men of God. White uses the life of Francis Xavier as an example of how facts of pious men were often turned into exaggerated accounts of miracles and healing. White selects Xavier because of the finely detailed biographical information that remains about the saint's life; however, he explains that the form of historical exaggeration developed upon the works of Xavier is commonplace among many other similar individuals.

White goes to great length and cites the minutest historical details in reconstructing his account of the misappropriation of Xavier's pious life. He demonstrates, through Xavier's own writings as well those of Joseph Acosta, a near contemporary of Xavier's and historian in the order founded by the saint, that Xavier

[20] *Ibid*. vol. 2, p. 1, 2.
[21] *Ibid.* 2.

never claims to have worked a miracle.[22] Nevertheless, White shows how stories of miracles began to appear shortly after Xavier's death. These were expounded upon further by later writers until a papal bull, issued by Urban VIII, canonized Xavier as a saint.[23] In this fashion, White casts a shadow over much of the church's teaching on miracles, though he maintains that there is no reason to suppose deliberate deception on the part of those who recorded such noble, but regrettable, mistakes.[24]

As notions of miracles, healing, and demonic illnesses were solidified in the thought of the church, heated opposition was raised against the scientific investigation of the body and the physical causes for its afflictions. Several reasons can be given for this resistance. Some based their opposition upon devout religious commitment, others upon political and ideological positions, and still others opposed the study of medical science for economic reasons.[25] All of these combined to thwart efforts toward a natural understanding of the body. In his history, White focuses on two specific areas of medicine that faced powerful opposition from church authorities: the study of anatomy by dissection and the use of inoculation and vaccination to prevent disease.

White locates the earliest religious hostility toward dissection in ancient Egypt; in that culture the embalmer, who preserved the great mummified remains we cherish

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[22] *Ibid.* 7, 9.
[23] *Ibid*. 20. White points out the irony surrounding Urban VIII's canonization of Xavier. He says, 'there is much food for reflection in the fact that the same Pope who punished Galileo, and was determined that the Inquisition should not allow the world to believe that the earth revolves about the sun, thus solemnly ordered the world, under pain of damnation, to believe in Xavier's miracles, including his "gift of tongues," and the return of the crucifix by the pious crab.' *Ibid*. For the reference to Xavier's putative miracle of tongues and the story of the crab see *Ibid.* 19.
[24] *Ibid.* 21, 42.
[25] *Ibid*. 29.

today, was viewed by his contemporaries as accursed.[26] This belief was carried over, like many others, into the Christian tradition. [27] This general dislike for dissection was molded with the later belief that to do any harm to the body would potentially interfere with its resurrection as described in the New Testament. Accordingly, many church authorities issued statements banning the practice of surgery and dissection, drastically limiting the opportunity for scientific observations concerning the nature of the body and disease. In a similar fashion, Christian theology later developed dogmatic positions against the use of inoculation and vaccination to prevent disease. Sermons with titles such as 'The Dangerous and Sinful Practice of Inoculation' were published in England and abroad condemning the practice as an affront to the providence of almighty God.[28] As might be expected, such opposition effectively hindered significant scientific advance upon the subject.

Nevertheless, science did advance. White goes into great detail describing the activity of Andreas Vesalius, the founder of modern anatomy. Vesalius did his dissections in the sixteenth century under fear of theological censure and excommunication. However, the results he produced were greater than any other known at the time. Through strategic political connections, Vesalius gained some protection

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[26] *Ibid.* 31.
[27] *Ibid.* White points out a strange irony here when he says, 'To these arguments against dissection was now added another – one which may well fill us with amazement. … [O]f all organizations in human history the Church of Rome has caused the greatest spilling of innocent blood. … Strange is it, then, to note that one of the main objections developed in the Middle Ages against anatomical studies was the maxim that "the Church abhors the shedding of blood".' *Ibid*.
[28] *Ibid.* 55, 6.

from the mandates of the church and his findings opened the door for later researchers.[29] The benefits gained from anatomical knowledge began to slowly overcome the superstitions surrounding the church's abhorrence to the practice of dissection.

Likewise, vaccinations and inoculations proved so useful to preserving life that church authorities were forced to rethink their position on the matter. White directs attention to the smallpox plague in Canada during 1885 to illustrate this point.[30] During that outbreak of the infection, Protestants, who accepted vaccination, were preserved while the Catholic population perished in great numbers. As the number of casualties increased, resistance remained for some time among devout Catholics. Eventually, by municipal order, vaccinations were received and the infection contained. Instances like this served as a costly rebuttal of the church's dogmatic stance over vaccination and inoculation.

At this point, White notes the shift in theological thinking toward a compromise with medical science, a theme which is repeated in nearly all of his accounts. It is not long, though, before White declares a unanimous victory for science. He concludes his chapter on medicine with the following statement:

> In summing up the history of this long struggle between science and theology, two main facts are to be noted: First, that in proportion as the world approached the "ages of faith" it has receded from ascertained truth, and in proportion as the world has receded from the "ages of faith" it has approached ascertained truth; secondly, that, in proportion as the grasp of theology upon education tightened, medicine declined, and in proportion as that grasp has relaxed, medicine has been developed. The world is hardly beyond the beginning of medical discoveries, yet they

[29] Despite Vesalius' political alliances, White tells us that the anatomist was, nevertheless, driven from his work by the church authorities.
[30] *Ibid*. 60, 1.

> have already taken from theology what was formerly its strongest province – sweeping away from this vast field of human effort that belief in miracles which for more than twenty centuries has been the main stumbling-block in the path of medicine; and in doing this they have cleared higher paths not only for science, but for religion.[31]

White's Philosophy of Science and Religion

Having presented a brief exposition of White's narrative, I will now take up the task of developing more clearly and precisely the philosophy of science and religion that is embedded throughout. I will pay special attention to White's use of the terms 'religion,' 'theology,' and 'science.' After gaining a clear sense of White's conception of these terms, I will piece them together into a clear statement of White's philosophical position.

In presenting his work as he does, White seems to think that the recurring themes in history can inform us as to the nature of science and religion; especially when the theme in question has recurred so often and in almost precisely the same way. This theme that I am referring to appears as follows: theological dogmatism is established, science challenges the theological position and is persecuted for its intellectual honesty, and finally evidence accumulates and the scientific theory pushes the dogmatic theology into retreat and ultimately surrender. It is this process which White believes is fundamental to the relationship between science and religion.

What sort of relationship develops, though, with this theme as its basic characteristic? To answer that, first we must get clear about what White means when he refers to dogmatic theology. To begin with, White does not mean religion or religious people in general; that is a different subject which I will return to later. It seems

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[31] *Ibid*. 65, 6.

relatively clear, and others have confirmed this,[32] that White is referring to systematized theology which is put in a place where it has control over people's lives. That is, a set of doctrines laid out rigidly and used by a class of people in power to control, for good or ill, the beliefs of others. This, of course, is far different from speaking of religion in general and we will do well to bear this in mind through the rest of this discussion.

This understanding is well supported by White's own words. In the general introduction to the text, White provides several direct statements which make this point clear. For instance, when giving his reasons for first attempting the work, he says,

> Meanwhile Prof. John W. Draper published his book on *The Conflict between Science and Religion*, a work of great ability, which, as I then thought, ended the matter, so far as my giving it further attention was concerned. [However, Draper] regarded the struggle as one between Science and Religion. I believed then, and am convinced now, that it was a struggle between Science and Dogmatic Theology. More and more I saw that it was the conflict between two epochs in the evolution of human thought – the theological and the scientific.[33]

So, while White takes an embattled view of theology, he nevertheless remains favorable to religion as such. This is evidenced when he says, 'My hope is to aid – even if it be but a little – in the gradual and healthful dissolving away of this mass of unreason, that the stream of "religion pure and undefiled" may flow on broad and clear, a blessing to humanity.'[34]

Religion, as such, is something that White believes should be liberated from its dogmatic theology. Religion does not, then, enter into this conflict; White believed

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[32] See, for example, Claude Welch, 'Dispelling Some Myths About the split Between Theology and Science in the Nineteenth Century' in *Religion and Science: History, Method, Dialogue* (eds.) W. Mark Richardson and Wesley J. Wildman (New York: Routledge, 1996).
[33] *HWSTC*, vol. 1, p. ix.
[34] *Ibid*. vi.

dogmatic theology was the chief combatant. While dogmatic theology occupies one side of the battlefield, it still remains to clearly identify its interlocutor. The obvious answer, of course, is 'science.' However, White leaves some measure of ambiguity concerning just what he means by 'science' and we would do well to investigate this point before attempting any further expression of his view.

From White's text we can discern at least two notable features of his understanding of science. First, he believed science to be the great benefactor of mankind. That is, science is the highest achievement, most practically and epistemologically rewarding endeavor that humankind could venture upon. In his chapter describing the ascendancy of evolution over creation, White describes science as 'the better tendency in humanity.'[35] He also says, 'Not one of [the great sacred books of the world], indeed, conforms to the measure of what mankind has now reached in historical and scientific truth; to make a claim to such conformity is folly, for it simply exposes those who make it and the books for which it is made to loss of their just influence.'[36] For, far above theology or its religious texts, science is the single great source of knowledge in the world.

Second, White believed science to be a great benefit to religion in its conquering of dogmatic theology. In a very real sense, we see from White's account that science actually takes the place of the older theology. Concerning Vesalius, he writes,

> his poor blind foes aided in destroying one of religion's great apostles. What was his influence on religion? He substituted, for the repetition of worn-out theories, a conscientious and reverent search into the works of

[35] *Ibid.* 32.
[36] *Ibid.* 23.

> the great Power giving life to the universe; he substituted, for representation of the human structure pitiful and unreal, representations revealing truths most helpful to the whole human race.[37]

Religion is improved, then, according to White, as science, like an ectome, removes its failing superstitions and replaces them with scientific understanding. On this same issue, White also says,

> Science, while conquering [theologians insisting on the truth of the Bible], has found in our Scriptures a far nobler truth than that literal historical exactness for which theologians have so long and so vainly contended. … [A]nd modern science, in substituting a new heaven and a new earth for the old – the reign of law for the reign of caprice, and the idea of evolution for that of creation – has added and is steadily adding a new revelation divinely inspired.[38]

Therefore, beyond its general benevolence toward humankind, White believed science has a special role in the improvement of religion.

The conflict, then, depicted in White's history is understood as being fought between dogmatic theology which encroaches onto areas of physical reality, asserting itself as authoritative, and science which, beyond the basic conception of empirically based experiment and observation, is further held to be the highest aim of humankind, a great benefactor not only to human understanding in general but to religious understanding in particular. It is upon these two characters in human history that White discloses his theme of the scientific defeat of theology. According to White's view, then, theology, as I have described it above, is dispensed with by science. By accomplishing this, science improves religion and human understanding generally. Science continues its upward climb, less and less fettered by old theological baggage, as

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[37] *Ibid*. vol. 2, p. 55.
[38] *Ibid.* vol. 1, p. 22-24.

the great champion of human capability and achievement. Reconciliation between science and religion, then, is effected when science satisfactorily un-encumbers itself from theology. At that time both science and religion can coexist harmoniously.

White believed, somewhat optimistically, at the time that he wrote that this unfettering of science had already taken place. At the end of each chapter he describes the final attempts of theology to wrestle with firmly established scientific theories, ultimately ending in the defeat of theology. Looking back on White's text a hundred years later, though, we see that such bold proclamations were premature. As I have expressed earlier, serious issues remain between science and theology in our present day. In the last section of this chapter, I will consider White's view as I have developed it here to see whether it offers any help at relieving our present worries on this subject.

Criticisms of White's View

When evaluating White's work there are a few things that we must keep in mind. As I pointed out earlier, White's text is historical in nature; it was not written to provide an explicit philosophy of science and religion. While I believe that there is ample evidence of an underlying philosophy supporting and motivating the historical facts White presents, for him, the philosophical implications of his work were secondary to the presentation of its history. Also, as with any author, we must take care not to unduly transpose the work, without proper qualification, into our contemporary discussions. White, like each of the other writers I consider in this project, was deeply involved with the issues of his day and he should be understood in that context. This, of course, does

not mean that he has nothing to offer us presently; I would not have selected his work for investigation if I believed that was so. Rather, it means that we must be mindful that White's circumstances were in some areas quite different from our current situation. With these cautionary words, I will proceed in my evaluation of White's view.

The first and most common criticism that is raised against White's view is that it is too selective in its historical presentation to provide an accurate account of the complex interactions between science and theology.[39] Critics of White vary in the degree to which they level this charge at the historian. Some go as far as to say that his account is largely a misrepresentation of historical fact.[40] Others read him somewhat more charitably, claiming that his presentation is not so much inaccurate as it is inadequate. That is, the material he presents is fine, as such. The problem is that it only tells part of the story. I tend to side with these latter critics. Though lacking the historical background to comment on the accuracy of White's writing,[41] I nevertheless can see that his account was selective in its details. For example, White says almost nothing about times when science and theology were interconnected or the long periods when they remained independent co-inhabitants of human activity.[42]

On this same note, White's portrayal of a one-way dialogue between science and religion seems very strange. According to White's account, science informs religion, but

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[39] Welch, 'Dispelling some Myths about the Split Between Theology and Science in the Nineteenth Cetnury'.
[40] This is the position of Rodney Stark in *For the Glory of God: How Monotheism Led to Reformations, Science, Witch-Hunts, and the End of Slavery* (Princeton: Princeton University Press, 2003) and Collin A. Russell in 'The Conflict of Science and Religion' in *Science and Religion: A Historical Introduction* (ed.) Gary B. Ferngren (Baltimore: The John Hopkins University Press, 2002).
[41] I would be a remarkable feat for anyone to be able to speak authoritatively on the immense history covered in White's text. The book's 800 plus pages covers every major area of scientific interest during the 19th century, tracing its history in minute detail from ancient civilization to the modern era.
[42] Russell, 'The Conflict of Science and Religion', 7-9.

religion has nothing to offer in return to science. This picture lacks the depth of interaction that we would expect between two areas so pervasive as science and religion. White, though, recognizes virtually no intellectual movement from religion to science. In response to this position, I believe there is a great debt that science owes to religion and not just religion in general, but a particular type, with a developed theology. It has been argued quite convincingly that the rise of modern science was due in large part to the existence and practice of monotheistic religions, specifically Christianity.[43] For, while there were certain technological advances in the far East, we see nothing of the systematic investigation of nature that came to characterize scientific methodology. In passing over this point, White's history presents a limited view of the more complex relationship that has held historically between science and religion.

While we do well to recognize these limitations of White's account, there is, perhaps, a possible response that we might offer in the historian's defense on this point. He may well accept the claim that he has limited his presentation of the subject and purposively so. His work, though, was intended to chronicle the *warfare* between science and theology. In that case, there may be a good reason to avoid discussions of whatever peaceful occasions there might have been between the two; all that he is interested in here is the feuding. Similarly, we would not expect a history of the warfare between the United States and Japan to include information about long periods of peace, say, during the settling of the American colonies. In such a work, the writer is only concerned with detailing the hostilities that arose between the two states. I think that a

[43] See, for example, Rodney Stark, *For the Glory of God: How Monotheism Led to Reformations, Science, Witch-Hunts, and the End of Slavery*, especially chapter 2.

similar justification can be given for White.[44] He was not concerned with giving an account of the quiet, uneventful periods of independence; his work was to tell the story of the warfare.

Be that as it may, I still think that this deficiency raises serious issues for White's account of science and theology in general. While the response I just mentioned might acquit White of the charge of historical inadequacy, it does not help the case for his larger view of the relationship between science and theology. Returning to my analogy, we will not possess a thorough understanding of U.S./Japanese relations if all we know about them is the conflict that took place during the second World War. The overall picture is far more complicated than that, including many factors which point toward a different relationship model than one of continuous warfare. In facing the present issue of how to reconcile science and religion, White's account is impoverished in either one of two ways. Either he meant only to tell of the warfare to the exclusion of all else, in which case any philosophy developed from his work will be gravely inadequate, or he believed that the overwhelming characteristic of the science/theology relationship was in fact one of conflict, in which case he has considerably misrepresented the facts.

Despite the consideration raised above, I tend to believe that, in White's case, he took the nature of science and theology to be fundamentally in conflict. This philosophy permeates his writings and I believe directed his attention to certain cases over others. This, though, brings me to the next point on which I wish to take issue with White. Namely, I question whether his use of militant rhetoric is at all helpful in gaining a

[44] Coincidentally, none of White's modern critics, including Stark, Russell, and Welch, make any note of this seemingly reasonable response to White's lack of non-combative accounts.

satisfactory answer to the science/religion problem. One of the most noticeable things as one reads White's history is his repeated use of terms such as warfare, conflict, attack, crush, retreat, surrender, and the like. While the view that science and religion are in conflict is certainly not foreign to our present discussions,[45] it is not cast in such patently militaristic terminology.[46] White may well have had some justification for his use of this language, given the context of his writing; nevertheless, the dramatic ideological restrictions that this rhetoric presupposes adds another mark against White's view. Using militant terms to describe the interactions of science and religion shapes the debate into a strict and confining mold. The effects of such language decrease the possibilities of a useful dialogue.

Regardless of whether or not White's militant rhetoric is helpful in resolving issues between science and religion, I do not think that his application of these terms to the history of science and religion is accurate. Admittedly, there were episodes in this history which warrant such terms; one thinks immediately of the Inquisition and its attitude toward certain scientific ideas of the day.[47] However, on a whole I believe such talk is very misleading. For example, there is no indication that theorists such as Bacon, Descartes, Newton, or Darwin viewed their work as ammunition in a war against

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[45] A similar position is often defended by such thinkers as Daniel Dennett, Richard Dawkins, and Michael Ruse.

[46] At this point, though, it seems we owe White a measure of historical charity. Much of his use of these terms could be explained by the fact that he was responding to the events of the decades immediately preceding his writing. During that time there was fierce debate from both sides concerning the uses of theology in science.

[47] It is worth noting that a number of recent historians of science and religion describe the conflict that arose in the Inquisition as primarily between differing theologies, not theology and science. For instance, see Stark, *For the Glory of God*, 127, 8. Moreover, Stark notes that most of the books banned by the Inquisition were neither scientific nor religious, but pornographic. The point here is simply that there have been some historical misconceptions about how science and religion related under the Inquisition.

theology. What is more likely is that White reads this interpretation back into these historical events when viewing them from his 19th century vantage point. In actuality, the relationship between scientist and theologian was often far more complex and interesting than simple combat; many times the two roles of defender of the faith and investigator of nature were occupied by a single individual.[48] To force the relationship of two such vast and intricate subjects in a strict, militaristic mold fails to do justice to the situation.

The arguments I have raised in response to White so far have been mostly historical. This, I suppose, is fitting since the work in question was concerned chiefly with the history of science and theology. These things being said, though, I now turn to philosophical and methodological problems which beset this view of science and religion proposed by White.

There is one very important question that has yet to be answered by White's position. Namely, one wonders what is left of religion on this view. We have seen that, for White, religion is something different than dogmatic theology; he embraces the former but has great enmity for the latter. What exactly, though, is White's religion supposed to be? For, according to White's account, science systematically removes from religion its dogmatic theology as well as the soundness of its scriptural basis,[49] and replaces it all with some form of natural theology based entirely upon the findings of science. This view, though, would be hard to reconcile with most common forms of

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[48] See John Hedley Brooke, *Science and Religion: Some Historical Perspectives* (New York: Cambridge University Press, 1991).
[49] *HWSTC*, vol. 1, p. 22, 3.

western Christianity. First, in all major Christian traditions there is some form of dogmatic theology, some sort of doctrine or creed meant to edify and instruct the faithful in their belief. This theology, of course, has the possibility to conflict with science; however, it does not seem to be a proper solution to the problem to expect these institutions to give up their theology. Part of the reason that there is a worry over the relationship between science and religion is because, even though effecting a satisfactory union may be very difficult, there seems to be strong reasons to accept them both. Stripping the doctrinal basis away from religion, as White suggests, does resolve the problem; however, this is simply cutting the Gordian knot. What we are after is a solution that takes the complexities of science and religion at face value and finds a useful way to relate the two. White fails to achieve this in his account of religion.

Also, a theology which consists in nothing else than natural theology would be seriously impoverished. Though it seems evident, and White certainly attests to this, that we can learn something of God through natural investigation in the world, this ultimately amounts to very little. Again, reducing theology to science solves the science/religion quandary only by eliminating one of the key features of the problem. This procedure will bring us no closer to our goal of a fruitful and mutually beneficial reconciliation.

White, though, may well accept a 'truce' from religion on this count. That is, whatever theology remains after science has removed those elements that are contradictory with empirical findings would be allowed. In this case, after the necessary process of elimination by science of hurtful religious doctrine, the two could co-exist in

peaceful independence. I do not believe that this offers an improvement to White's view. To begin with, viewing science and religion as independent in this way will raise serious problems for White's conception of science.

According to White, science is in a constant state of upward movement, the great benefactor of humankind, stacking one great achievement upon another whenever it is not impeded by theology. However, this understanding of science leaves much to be desired. First, we now recognize that science has just as much capability for the peril and destruction of humanity as it does for our benefit. Perhaps White failed to see this point because of the time he lived and wrote. A century later, though, looking back over two world wars, nuclear threats, global warming, and a host of other technologically prompted disasters, there is little doubt that a more cautionary approach is needed. The science that is portrayed in White's work is at its best when it is free of any entity enforcing sanctions from the outside. However, to declare science autonomous from religion and any other restrictive force, as White does, is unhelpful for humanity in general and does not bring us closer to a solution to our worries.

There are other serious problems which arise if we view science and religion as fundamentally independent, as is the result of White's view after the former's purification of the latter. My chief objection to viewing science and religion as independent from each other, nonoverlapping magisteria,[50] is that it presents us with a sharp and unnatural dichotomy. Of course, we make similar divisions, and rightfully so, all the time: we designate departments in universities to teach discrete disciplines and so

[50] This is the catch phrase for this view, coined by the late biologist Stephen Jay Gould. See his *Rock of Ages: Science and Religion in the Fullness of Life* (New York: Ballantine Publishing, 1999).

forth. This separation, though, only occurs after we have experience of the wholeness of the world. In the case of science and religion we are dealing with two areas with such a wide influence and application that to separate them neatly does an injustice to their mutual aims. White believed, as do I, that science and religion both inform us about the nature of humankind and the world we live in; to make such a marked division between them seems most unnatural. What is more, though we may make useful divisions among academic subjects, it is another matter altogether to suspect these divisions to be consistently maintained in the life and mind of an individual. That is, neat dissections are not easily permitted when it comes to the large structure of beliefs that a person relies upon to guide her through life. Science and religion both have an enormous role to play in this capacity and it is ultimately unhelpful to view them as entirely separate.

Concluding Remarks

While White's work provides an excellent place to embark on a discussion of the relationship between science and religion and their reconciliation, it does not provide a satisfactory endpoint. There are several reasons for this. Perhaps chief among them is that White's conceptions of science and religion ultimately prove too restrictive to account for the complexities that each area of thought exhibits. His caricature of conflict is also too confining, limiting the fuller range of expression both science and religion deserve. This perception, no doubt, motivated White's selection of cases which further limits the usefulness of his view. What is needed instead is a view of science and religion that respects the relevant domains of both and promotes a mutual humility

between them. Something like this is just what we will find in the work of Alfred North Whitehead, and it is to his text that we turn in the next chapter.

CHAPTER III
THE PROCESS RESPONSE: ALFRED NORTH WHITEHEAD

In this chapter I will consider A. N. Whitehead's views on science and religion as they are presented in *Religion in the Making*, the Lowell lectures for 1926.[1] I will also make occasional reference to his Lowell lectures from the previous year, *Science and the Modern World*.[2] I will first develop Whitehead's notion of religion as well as that of science. I will then provide some limited exposition of his process metaphysics. Afterwards, I will bring all of these together and consider how Whitehead's views address our original problem of reconciling science and religion.

Religion, Science, and Metaphysics

Religion

In *Religion in the Making*, Whitehead attempts to give an account of the nature and justification of religious doctrine, as well as their development through civilization. His insight and dialectical skill is evident throughout the work; he treats one of the most complicated issues of human history with great dexterity. What emerges from his account is a view of religion that comprehends equally well both the global aspirations and the deeply personal, individual facets that comprise religious belief and experience. In this portion of the chapter, I will present the view of religion that develops out of Whitehead's text, providing as well as I can a fair portrayal of his position.

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[1] Alfred North Whitehead, *Religion in the Making* (Cambridge: Cambridge University Press, 1930), hereafter cited as *RM*.
[2] Alfred North Whitehead, *Science and the Modern World* (New York: The Free Press, 1967), hereafter cited as *SMW*.

Throughout the book, Whitehead makes a number of 'religion is' statements. I do not believe that any single one of these is meant to provide the full picture of Whitehead's view on religion; however, when taken together, each adds an important element to the overall concept. In what follows, I will use these statements as launching points for developing Whitehead's understanding of religion.

Early on in his discussion, Whitehead remarks that, 'Religion is force of belief cleansing the inward parts. For this reason the primary religious virtue is sincerity, a penetrating sincerity.'[3] This sets the stage well for Whitehead's account. According to him, religion in its present form gains its impetus from looking inwards; it is the force that reckons a person with themselves. The issue of sincerity is important because it becomes the cornerstone from which religious affections proceed. If it is not properly in place, the rest of the structure will be unstable.

On a closely related issue, another central theme in Whitehead's understanding of religion is that of solitude. Here, again, he brings out the existential nature of the subject and its intimate relation with the life of the individual. He says, 'Religion is what the individual does with his own solitariness,'[4] and, 'religion is solitariness; and if you are never solitary, you are never religious.'[5] In this sense, it is only when we learn to be alone with ourselves that we are religious. It is in the times when we are most removed from the world outside and most closely attuned to our own individual existence that we are affected by religious understanding. On this point, one is reminded

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[3] *RM*, 5.
[4] *Ibid.*, 6.
[5] *Ibid.*, 7.

of Kierkegaard and his Knight of Faith who lived and believed alone with God.[6] For Whitehead also, this is a fundamental aspect of religious belief.

Whitehead points out that the concept of solitude is present, and intimately so, in all of the major religions of the civilized world. He informs us that,

> The great religious conceptions which haunt the imaginations of civilized mankind are of solitariness: Prometheus chained to his rock, Mahomet brooding in the desert, the meditations of the Buddha, the solitary Man on the Cross. It belongs to the depth of the religious spirit to have felt forsaken, even by God.[7]

This idea of solitude, though, does not appear immediately when one surveys the history of religion. According to Whitehead, it is only in the latter stages of the historical development of religion that it takes on this quality.

Whitehead identifies four phases of religious progression through history. From most primitive to most sophisticated they are as follows: ritual, emotion, belief, and rationalism. He points out that, 'It is not until belief and rationalization are well established that solitariness is discernible as constituting the heart of religious importance.'[8] He defines ritual as, 'the habitual performance of definite actions which have no direct relevance to the preservation of the physical organisms of the actors.'[9] Whitehead notes that a number of other animals have rituals, behavior patterns they exhibit which offer no benefit toward survival or procreation. In humans this activity, he

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[6] Søren Kierkegaard, (trans) Robert L. Perkins, *Fear and Trembling* (Macon, GA: Mercer University Press, 1993).
[7] *Loc. cit.*, 9.
[8] *Ibid.*
[9] *Ibid.*, 10.

tells us, eventually takes on greater significance. Certain of these rituals produced an emotional response, which could be repeated by repeating the ritual.[10]

Whitehead goes on to tell us that mythology was added to ritual and emotion, resulting in belief. Mythology was used to explain the existence of the ritual and, in turn, reinforced the emotional charge of the phenomenon. From this there eventually developed senses of clan identity, a sort of early nationalism, associated with belief in a shared mythology and mutual participation in its rituals. The final stage of religious development, though, drastically changes this scenario.

Concerning the rationalization of religion, Whitehead says,

> The age of martyrs dawns with the coming of rationalism. The antecedent phases of religion had been essentially sociable. Many were called, and all were chosen. The final phase introduces the note of solitariness: "Strait is the gate, and narrow is the way, … and few there be that find it." When a modern religion forgets this saying, it is suffering from an atavistic relapse into primitive barbarism. It is appealing to the psychology of the herd, away from the intuitions of the few.[11]

Rationalization and solitariness, then, are the singular marks of the most highly developed religions. At least two things should be said on this point.

First, rationalization attempts to frame religious beliefs into coherent structure. Before this stage, differing beliefs, likely having developed from different mythologies, themselves having developed to account for different rituals, could all coexist. There was no struggle to systematically organize them. According to Whitehead, though, 'rational religion is religion whose beliefs and rituals have been reorganized with the aim

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[10] Whitehead remarks that, in this way, religion and sport share a common ancestry in human development. *Ibid.*, 11.
[11] *Ibid.*, 18.

of making it the central element in a coherent ordering of life.'[12] This is the beginning of systematic, dogmatic thinking concerning religious concepts.

Second, this movement toward rationalization, as Whitehead explains, coincides with the movement toward solitude. The effect this has is that rational religion no longer receives its information from the experiences of the group; instead, religious dogma is informed by the experiences of a few select individuals. Whitehead says, 'The relevance of [the concepts of rational religion] can only be distinctly discerned in moments of insight, and then, for many of us, only after suggestion from without. Hence religion bases itself primarily upon a small selection from the common experiences of the race.'[13] This is the age of prophetical utterance; it is the inspired religious spokesperson who directs the doctrine of rational religion.

This raises the issue of applicability; that is, there is now a worry whether the experiences of the few will be genuinely applicable to the rest of us. Whitehead addresses this when he says, 'religion is primarily individual, and the dogmas of religion are clarifying modes of external expression. … Expression, and in particular expression by dogma, is the return from solitariness to society.'[14] So, while rational religious dogma is developed from the experiences of the few religious luminaries, it is meant to serve only as an outward guide: rational religion, for all believers, remains supremely personal. As Whitehead warns, to rest one's beliefs solely upon the dogmatic assertions of others is to retreat to the baser forms of religious understanding.

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[12] *Ibid.*, 20.
[13] *Ibid.*, 21.
[14] *Ibid.*, 122, 3.

Beyond this, there is another reason for accepting the applicability of rational religion, even though it is motivated by the insights of only small sets of experiences. For Whitehead, religion deals with features of reality that are fixed and unchanging; it is man's great attempt at understanding the most fundamental features of ourselves and our world. He says that religion is founded 'on our apprehension of those permanent elements by reason of which there is a stable order in the world, permanent elements apart from which there could be no changing world.'[15] Also, 'Religion is the art and theory of the internal life of man, so far as it depends on the man himself, and on what is permanent in the nature of things.'[16] Therefore, even though insights in rational religion are gained primarily and most directly by a select few, according to Whitehead we can nevertheless apply them universally. That is because this form of religion is set upon uncovering the most basic and unchanging features of reality.

In the problem of relating science and religion, we are concerned with rational religion. For one, this is the only sort that is potentially in conflict with science. Also, all of the major world religions have reached this stage of development, even if they may lapse occasionally into baser expressions. With this idea of religion in mind, having covered its most important elements, its stages of development, solitariness, and universality, I will now turn my attention to developing in a similar fashion Whitehead's idea of science.

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[15] *Ibid*., preface.
[16] *Ibid*., 48.

Religion and Science

For Whitehead, there are a number of commonalities between science and religion. Unlike White, he sees the two as closely related in important ways, both contributing equally to a comprehensive understanding of humankind and our world. According to Whitehead, knowledge is gained through an interrelation of science and religion, neither providing an absolute authority on all matters of human interest. Both science and religion for Whitehead must be consulted if we are to gain understanding.

By placing boundaries on the influence of both science and religion, Whitehead makes a marked improvement over White's account. In Whitehead's view there is an esteem for the respective natures of these two enterprises, recognizing one as a primarily personal investigation into the ultimate and unchangeable value of things and the other as an attempt to discover generalities that hold over the physical world. The greatest limitation in science, according to Whitehead's view, is its total reliance upon induction, whose justification presents us with 'an unsolved problem … bequeathed to us by the seventeenth century.'[17] This limits science's ability to speak on matters that are more properly the subject of religion, such as infinity and absolutes.

Also, by basing itself upon induction, science must embrace certain metaphysical assumptions. Whitehead says,

> Induction presupposes metaphysics. In other words, it rests upon an antecedent rationalism. You cannot have a rational justification of your appeal to history till your metaphysics has assured you that there *is* a history to appeal to; and likewise your conjectures as to the future

[17] *SMW*, 42.

> presuppose some basis of knowledge that there *is* a future already subjected to some determinations.[18]

Whitehead develops further what this metaphysic should be, as well as the importance of the antecedent rationalism. I will return to these issues below. For now, it is important only that we notice the boundaries on science; it is not the limitless human capability which White presents in his history.

Whitehead also warns us against errors that commonly arise in an unreflective conception of the nature of science. He cautions readers to avoid, 'The dangers of unimaginative empiricism' as well as 'the fallacy of misplaced concreteness.'[19] Both of these have caused serious problems in the history of science and we do well to mark Whitehead's advice. There is, though, another common mistake in science that directly concerns its relationship with religion. This is the problem we saw in White that can occur when science is left to run free without any moral restraint. Whitehead addresses this point when he says, 'Religion insists that the world is a mutually adjusted disposition of things, issuing in value for its own sake. This is the very point that science is always forgetting.'[20] Religion, then, must instruct science on certain issues concerning the inherent order and value of things. This interdependency is crucial for a sustainable and beneficial relationship between science and religion; the results if this does not happen are, potentially, catastrophic.

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[18] *Ibid*., 44. emphasis original.
[19] *Ibid*. The danger of unimaginative empiricism refers to the scientists' tendency to view the world only according to the received scientific view. If everyone had done this there never would have been a Newton or an Einstein; indeed, it is hard to see how any scientific advance would be achieved on this view. The fallacy of misplaced concreteness is Whitehead's term describing the act of using abstract objects as though they were concrete, such as with higher orders of mathematics.
[20] *RM*, 128, 9.

Given these limitations, Whitehead recognizes that no intellectual system will have access to every epistemologically significant domain. Science, religion, and metaphysics must all share in the task of informing humankind about the world. Whitehead tells us that,

> You cannot shelter theology from science, or science from theology; nor can you shelter either of them from metaphysics, or metaphysics from either of them. There is no short cut to truth. Religion, therefore, while in the framing of dogmas it must admit modifications from the complete circle of our knowledge, still brings its own contribution of immediate experience.[21]

Whitehead, thus, believes that each of these areas has its own unique set of data and experiences which go toward forming a fuller understanding of the world. However, each must be sensitive to the information coming in from the others when developing its systematic structure. On a similar note, he says, 'Progress in truth – truth in science and truth of religion – is mainly a progress in the framing of concepts, in discarding artificial abstraction or partial metaphors, and in evolving notions which strike more deeply into the root of reality.'[22] This is the goal of Whitehead's interconnected understanding of science and religion. They are both aspects of humanity which strive for understanding. In this endeavor they share not only the experiences of the other but also a similar method for acquiring truth.

Whitehead goes even further, though, in describing the connection between science and religion. At one point he even claims that science is a sort of theology. We see this when he says that,

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[21] *Ibid*., 67.
[22] *Ibid*., 117.

> science had appeared as a third organized system of thought [beyond religion and philosophy] which in many respects played the part of a theology, by reason of the answers which it gave to current theological questions. Science suggested a cosmology; and whatever suggests a cosmology, suggests a religion.[23]

So, by way of the questions which it engages, Whitehead tells us that science often bears close similarities to religion. We should not, of course, take this to mean that science and religion are somehow identical; Whitehead is clear that they are not. However, this points to one of the great benefits of his view: he accepts a measure of independence between the two areas but nevertheless recognizes that there are very important elements of each on which they converge. This respect for the complexities of science and religion makes Whitehead's view initially much more appealing in attempting to solve the present dilemma.

To truly appreciate the connections that Whitehead draws between science and religion, though, we must gain an understanding of his metaphysical system. This is because Whitehead believed the reconciliation between science and religion was best effected through the metaphysical principles that support them both. I will now give a brief exposition of his metaphysical view with special attention given to the features that are operative in producing Whitehead's solution to the science/religion problem.

Process Metaphysics

Perhaps the best way to begin a discussion of Whitehead's metaphysics is to first say what it is not. Whitehead contrasts his metaphysics with the dualism, materialism, and

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[23] *Ibid*., 126.

idealism that developed during the seventeenth and eighteenth centuries. Whitehead is here concerned with the relationship between mind and body and begins this investigation with a discussion of Descartes. He says,

> in some sense no one doubts but that there are bodies and minds. The only point at issue is the status of such bodies and minds in the scheme of things. Descartes affirmed that they were individual substance, so that each bit of matter is a substance, and each mind is a substance.[24]

This notion of substance is fundamental for most modern metaphysics and it provides an important departure point for Whitehead's account.

Quoting Descartes, Whitehead presents the typical early modern view of substance: 'And when we conceive of substance, we merely conceive an existent thing which requires nothing but itself in order to exist.'[25] Descartes notes, though, that this applies only to God. Other substances, then, on this view 'are things which need only the concurrence of God in order to exist.'[26] The problem for Descartes is that he must somehow prove God's existence in order to have a stable base upon which to rest the remaining substances, namely mind and matter. Whitehead remarks, though, that 'Descartes' proof of the existence of God is accepted by very few philosophers, religious or otherwise. Indeed, given his starting point, it is difficult to see how any proof can be found.'[27]

In order to overcome this difficulty, successive philosophies eliminated one or more of Descartes original substances. Hence, we have Hobbes' materialism and

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[24] *Ibid*., 92.
[25] *Ibid*.
[26] *Ibid*., 93.
[27] *Ibid*., 93, 4.

Berkeley's idealism.[28] The problem Whitehead has with each of these philosophies is that they still rest upon the existence of individual substances and this, he believed, was their greatest error. Whitehead rejects the notion of discreet, isolated substances in favor of a view that integrates all objects into a complex set of relations.[29] He says, 'According to the doctrine of this lecture, every entity is in its essence social and requires the society in order to exist. In fact, the society for each entity, actual or ideal, is the all inclusive universe, including its ideal forms.'[30] For Whitehead, there are no substances, as such, because there is nothing which meets the requirements set out by Descartes. He says, 'there is no entity, not even God, "which requires nothing but itself in order to exist."'[31] Instead, every entity depends upon a society of other entities for mutual existence.

This position has several implications. First, substance is no longer viewed as the basic metaphysical unit. Instead, Whitehead claims occasions are the most fundamental element of the metaphysical realm and their actors are organisms, not atomic bits of matter. Movement between occasions make up the process which is the namesake for Whitehead's philosophy. This process constitutes a creative act in which an actual fact, or ground, gives rise to a novel event, or consequent. Whitehead describes this process as follows:

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[28] While dealing with these early Modern metaphysics, Whitehead does not bother to distinguish his view from the vitalism that arose among the Cambridge Platonists. Initially this strikes me as odd, since Whitehead's view appears to share some important commonalities with certain forms of vitalism. I will return to this issue in the fourth chapter when I discuss Barbour's extension of Whitehead's view.

[29] Though he does not speak of the philosopher directly, this idea of relation bears a certain resemblance to Leibniz's metaphysics.

[30] *Ibid*., 94, 5.

[31] *Ibid*., 94.

> In this fusion of ground with consequent, the creative process brings together something which is actual and something which, at its entry into that process, is not actual. The process is the achievement of actuality by the ideal consequent, in virtue of its union with the actual ground. In the phrase of Aristotle, the process is the fusion of being with not-being.[32]

This process is directed by the arrangement of the ideal forms, and this brings us to another important element in Whitehead's metaphysics. Whitehead bases his system upon platonic principles. The ideal forms are what give order and unity to the world; they constitute the structure that arranges the universe in a way that can be apprehended by humankind. Whitehead points out, though, that the forms alone do not provide this. Left to themselves the ideal forms have no order; they are an infinite and indefinite possibility. There must, therefore, be an entity which imposes order on the limitless possibilities of the forms. He says,

> It is not the case that there is an actual world which accidentally happens to exhibit an order of nature. There is an actual world because there is an order in nature. If there were no order, there would be no world. Also since there is a world, we know that there is an order. The ordering entity is a necessary element in the metaphysical situation presented by the actual world.[33]

This entity, Whitehead tells us, is God. He states that

> Apart from God, the remaining formative elements [specifically the ideal forms] would fail in their functions. There would be no creatures, since, apart from harmonious order, the perceptive fusion would be a confusion neutralizing achieved feeling. Here "feeling" is used as a synonym for "actuality."[34]

God, then, plays a key role in the ordering of the world of occasions by limiting and focusing the role of the forms through his creative work.

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[32] *Ibid*., 101.
[33] *Ibid*., 91.
[34] *Ibid*., 90, 1.

To cast this scenario in more recent terminology, we might view God, according to Whitehead's view, as the entity which limits the set of all possible worlds. It is because of God's nature that there is such a limitation; specifically, Whitehead informs us that the nature of things is limited by the goodness of God.[35] He further describes this limitation of the world as follows:

> the nature of God is the complete conceptual realization of the realm of ideal forms. … the ideal forms are in God's vision as contributing to his complete experience by reason of his conceptual realization of their possibilities as elements of value in any creature. Thus, God is the one systematic, complete fact, which is the antecedent ground conditioning every creative act.[36]

As we saw earlier, the 'ground' in an occasion is that antecedent actual fact which in some real sense determines the novelty that can be expressed in the consequent. God is the initial ground for all successive occasions and as such limits the expression of the forms in a way that renders them ordered and intelligible.

As a final note on Whitehead's metaphysics, we should note an important divergence between the God of process philosophy and that of the more traditional view. As we saw a moment ago, God according to process metaphysics is not independent in regard to his existence. Whitehead describes a close interconnection between God, the forms, and the actual world when he says,

> Apart from these forms, no rational description can be given either of God or of the actual world. Apart from God, there would be no actual world; and apart from the actual world with its creativity, there would be no rational explanation of the ideal vision which constitutes God.[37]

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[35] *Ibid*., 138.
[36] *Ibid*.,138, 9.
[37] *Ibid*., 141.

God's nature and existence, then, even though they constitute the ground from which proceed all later occasional instances of the forms, is nevertheless dependent upon these same forms. In a similar way, all entities in Whitehead's philosophy bear a relation to all others through this process of successive occasions.

Process Philosophy and the Science/Religion Problem

But where does this get us in reconciling science and religion? When we begin to tie together all the elements of Whitehead's thought that were presented above, a unique solution to our problem begins to emerge, based on process metaphysics. Given Whitehead's views, the most basic elements in ontology are events or occasions, creative acts moving from an actual fact to something novel. God is the most fundamental ground, or actual fact, and from his nature proceeds all of the novelty of the universe. He limits the possibilities of the actual world by his own creative work and God is immanently involved in the natural world and its process of development. Science studies nature in an attempt at finding generalities that hold across a large set of events. These generalities, like everything else, are derivatives of God's nature and impression on the universe. As creative acts, though, these events have a particularly aesthetic quality. Religion becomes the study of these aesthetic values and the relationships between them. Therefore, according to Whitehead, even though science and religion have many institutional and methodological characteristics that separate them, they nevertheless share some very important commonalities.

Both science and religion are seeking knowledge about the world, one through the search for wide ranging generalities and the other through the investigation of values. Knowledge of both of these areas, though, has a common source: it is God's immanent activity, specifically his limiting of the ideal forms, which gives the world the nature that it has. Science and religion are reconciled on this view because they are both human activities intent on gaining understanding about the nature of things. Given that there are no real contradictory elements in the world, their respective pursuits and the knowledge that results from them will not be in conflict. If there is a contradiction between science and religion, it arises because one or both of them are mistaken on the matter. According to Whitehead, whatever difficulties arise between science and religion can be overcome through dialogue between the two, along with the input of metaphysics.

This moves us a long way beyond White in gaining a genuine reconciliation of science and religion. On White's view, if there was a conflict, science always won. What is more, according to White, there was no real dialogue between the two since religion had nothing of interest to offer the scientific understanding of the world. According to Whitehead, though, science and religion, along with metaphysics, are all informants of the universe. That is, they each add something important to our overall comprehension of the nature of things. To study only one in isolation from the others results in an impoverished view of the world.

Whitehead offers another advantage in relating science and religion in that he bases this relationship upon a coherent metaphysical system. By doing this, he provides a unified view of the relationship between science and religion as well as the larger

context in which they both occur. However, as helpful as this may be, addressing the problem of science and religion primarily through metaphysics raises problems of its own. In what follows I will consider criticisms of Whitehead's view, particularly concerning the application of his metaphysics.

Criticisms of Whitehead's View

While Whitehead's view promises to provide a coherent picture of science and religion, relating the two in a useful way, in doing so he creates other serious problems. I will address two which I believe to be the most troubling. The first difficulty strikes at the heart of the motivation for reconciling science and religion in the first place. The second relates to Whitehead's metaphysical treatment of God.

My first concern with Whitehead's position is that, in developing his metaphysically based response to the science/religion issue, he has damaged one of the most important supporting elements driving the movement toward harmony. Namely, I am concerned with the nature of the self as it appears in Whitehead's understanding of reality. The concept of self is a crucial component motivating reconciliation between science and religion. It is at this level that we experience the fullness and unity of the world. Of course, we can dissect discrete disciplines in academic departments, and we can divide the investigations of various fields according to their subjects, methods, or applications. However, as I pointed out in the previous chapter, we only make these divisions after we have experienced life as a unity of continuous experience. There is a

wholeness to reality which must be appreciated, regardless of how we may define particular areas of inquiry for our own practical purposes.

This wholeness of life suggests that whatever informs us of one area of experience should be harmonious with those things which inform us of other areas. While science and religion may conflict at times, we are driven to expose these apparent conflicts as misunderstandings. We seek a union between science and religion because of a conviction that the things they are revealing to us are all constituents of the same universe. The driving force here is to make sense of the continuous experience of the individual. The knowledge and beliefs deriving from science and religion all occur within the life and minds of individuals. It is ultimately coherency on this level that we are seeking when we attempt a reconciliation between science and religion.

On the face of it, it may seem as though Whitehead's system does well in this regard. As I noted earlier, he represents both science and religion as partial informants to our comprehensive understanding of nature and as such they can be maintained in a consistent union. However, the problem arises when we apply Whitehead's fundamental metaphysical principles to this same issue of self that was so important when first addressing the science/religion problem.

According to Whitehead, the world is in a process of development, each entity undergoing movements from actual fact to novelty. This is embodied in his fundamental ontological device: events. This phenomenon occurs at every level of existence, from rocks and trees, to humans and even God. The problem, though, is that an event requires a temporal lapse. That is, for any event to occur, for any process to take place, there

must be a passing of time. Supposedly the time that it takes for different events will vary; however, each one still requires the passage of some definite measure of time.

This may not seem problematic at first; it is natural enough to think that events are temporally ordered. When we apply this process to the self, though, a disturbing problem arises. Each individual person undergoes this same movement from actual fact to novel consequent as part of her existence. What concerns me here is that Whitehead's view, by breaking up the movements of the self with events, eliminates the possibility of self-identity across time. In other words, at the instant in between the passing from the actual fact to the novel consequent, the self is dissected and loses continuity.

This is an odd result from Whitehead's system and one which I do not believe he intended or anticipated. It may be that his view can be adjusted in order to relieve this difficulty; in fact, we will see in the next chapter that Ian Barbour attempts such a modification. However, at present this raises a serious problem for Whitehead. His metaphysical system has delivered a result which both contradicts many thinker's intuition on the subject and undermines one of the greatest motivations for seeking unification between science and religion in the first place.

The second specific problem I see with Whitehead's position concerns his conception of God and is, I believe, just as formidable an obstacle as the problem of identity. Central to Whitehead's view is the idea that all entities are related together and bear some measure of dependence upon each other. This principle holds for all entities whatsoever: inanimate objects, humans, ideal forms, God. The difficulty here is that it makes a marked and considerable break with much orthodox thinking on the nature of

God.[38] It has been the received view of the major Christian churches, at least as far back as Augustine, that God is not dependent upon anything outside himself for his existence.[39] According to Whitehead, though, God is dependent upon other entities for his existence. He makes this point exceedingly clear when he says in response to Descartes that 'There is no entity, not even God, "which requires nothing but itself in order to exist."'[40]

Much of this dependency may be a result of Whitehead's platonism. For instance, Whitehead develops a close interdependency between God and the ideal forms when describing their relationship to the actual world. Others have encountered a similar problem when trying to combine a thoroughgoing platonism with orthodox Christian theism and there have been serious attempts at harmonizing the two on this issue.[41] Thomas Morris and Christopher Menzel have come as close as I believe any philosopher will at achieving a coherent mingling of the two, though ultimately they fail to achieve their goal.[42]

The problem facing the platonic theist here is to describe a way in which God can be sovereign over the ideal forms and also independent of them for his existence. This relates to what recent philosophers of religion have referred to as the 'sovereignty/aseity

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[38] This by itself is not reason to reject the theory, it may be that we must revise the theology; however it is a serious issue that must be faced.
[39] See, for example, David Werther, 'Augustine and Absolute Creation' *Sophia* Volume 28, Issue 1, 1989, pp. 41-52.
[40] *RM*., 94.
[41] See Thomas Morris and Christopher Menzel, 'Absolute Creation' *American Philosophical Quarterly*, Volume 23, Number 4, October 1986, pp. 353-362.
[42] In 'Absolute Creation and "the Ultimate Act of Boot-Strapping"' (unpublished) I argue that Morris and Menzel's view leads to the incoherent conclusion that God creates himself.

intuition.'[43] What inevitably winds up happening, though, is either one of two things. Either the theist must admit that God is responsible for creating himself, an admittedly incoherent position, or she must admit that God does in fact depend upon something outside himself for his existence, in which case she has broken once more with the orthodox position.

This difficulty arises merely from resting the existence of God upon the forms. Whitehead's position, however, is further implicated in this problem in that it ties God's existence, in some sense, to every other entity. According to Whitehead, God is like all other beings on this issue, he requires a community in order to exist.[44] While I believe this notion of social dependency makes sense when it is applied to entities in general, it creates serious difficulties with traditional theism when it is applied to God.

The two problems I have elaborated on here, however, do not necessarily eliminate Whitehead's solution to our problem. While they both present genuine difficulties, I do not believe they provide sufficient reason to dismiss Whitehead's position. In the end what I think is needed is a better application of Whitehead's view to the science and religion issue. In the next chapter, I will consider the views of Ian Barbour who has been working on the problem of science and religion for over forty years, using Whitehead's process philosophy to help bridge the divide between the two.

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[43] Alvin Plantinga, *Does God Have a Nature* (Milwaukee, WI: Marquette University Press, 1980).
[44] *RM.*, 94, 5.

CHAPTER IV
RECENT PROCESS THOUGHT: IAN G. BARBOUR

Ian Barbour is considered by many to be a pioneer in studies at the intersection of science and religion. Holding degrees in both physics and theology, he approaches the subject with the sort of first-hand knowledge that is crucial for addressing the most relevant issues and working towards a useful solution. In the four decades that he has been writing on science and religion, he has never strayed far away from Whitehead's process philosophy as a means for reconciling the two. This alone suggests that the view deserves further consideration. In this chapter I will develop Barbour's view (largely an extension of Whitehead's original position) as he presents it in his Gifford Lectures entitled *Religion in an Age of Science*.[1] The goal, as with the previous two chapters, is to determine whether his account provides a useful solution to the science/religion problem as I have outlined it above.

Barbour devotes several chapters of his work to developing contemporary understandings of major scientific theories and deals with the philosophical implications arising from them. In what follows, I will survey this portion of his work, focusing on his treatment of quantum physics and biology. Though quantum physics and evolutionary biology were present when Whitehead wrote, there have been significant advancements that affect the application of his system to the science/religion problem. Barbour will bring our present discussion of science into the 21st century and through it

[1] Ian G. Barbour, *Religion in an Age of Science*, (San Francisco: Harper and Row, 1990). Hereafter referenced as *RIAS*.

we will see further evidence for a view of nature that is remarkably similar to that which Whitehead proposed near the beginning of the last century.

New Challenges in Physics and Biology

Advances in Physics

Whitehead was aware of quantum physics when he delivered his Lowell lectures; indeed, it served as part of the motivation for his metaphysical views. Nevertheless, our present understanding of the very smallest parts of the world reveals things which were not fully disclosed in the early 20th century. Specifically, difficulties have arisen that raise questions for some of the fundamental metaphysical assumptions at work in science. For that reason, I will give a brief exposition of two of the major features of modern quantum theory: complementarity and indeterminism. I will also consider the effects this theory has on understandings of part/whole relations, all of which will provide further support for a version of Whitehead's multi-leveled view of reality.

Complementarity has been most famously demonstrated with the two-slit experiment. In this experiment, photons of light are passed through two slits in a screen where they then collide with a light-sensitive film on the opposite side. The photons strike the screen as individual particles, though, in doing so, they create interference patterns on the screen typical of waves. The result is that we observe light behaving at

times like a particle and at times like a wave.[2] Several solutions have been offered to account for this duality; however, there is yet no consensus among experts in the field.

In attempting to reconcile this dilemma, two models have gained the greatest notoriety; Barbour terms them classical realism and instrumentalism. The former gets its motivation from Newtonian physics and asserts that a theory is not complete unless it can specify exact spatio-temporal measurements for the system in question. Because of complementarity, quantum physics cannot do this and, thus, is incomplete on this view. This was the position of Einstein; he suspected that there were 'hidden variables' that would eventually be discovered to account for the irregularities observed by earlier experiments. Instrumentalism, on the other hand, claims that the theories of science are only human, mental projections onto the world and are not present in nature as such. In instrumentalism, prediction is the fundamental goal of science, not understanding.

Barbour rejects both of these models and instead, taking his lead from Niels Bohr, advocates what he calls 'critical realism.'[3] He says,

> Critical realists view theories as partial representations of limited aspects of the world as it interacts with us. Theories allow us to correlate diverse aspects of the world manifest in differing experimental situations. To the critical realist, models are abstract and selective but indispensable attempts to imagine the structures of the world that give rise to these interactions. The goal of science, in this view, is understanding, not control. The corroboration of predictions is one test for valid understanding, but prediction is not itself a goal of science.[4]

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[2] For a more detailed description of this experiment, see W. H. Newton-Smith (ed.), *A Companion to the Philosophy of Science* (Malden, MA: Blackwell Publishers, 2001), pp. 377 -80.

[3] Bohr has often been understood as supporting an instrumentalist interpretation of quantum physics. Barbour, though, provides good evidence to think that he was really closer to the critical realist position than either of the others. See *RIAS*, 97 -100.

[4] *Ibid*., 99.

By adopting this approach, Barbour admits the limited abilities of theories to grasp the structure of the world, especially in areas as complicated as quantum physics, but still maintains that there is some important measure of cohesion between nature and our descriptions of it. There is something, then about light that is both wave-like and particle-like.

While critical realism is the process philosopher's response to complementarity, indeterminacy presents a unique, but related, problem. The problem here is that, for any single quantum entity, it is impossible to give a complete physical description. According to the Heisenberg Uncertainty principle, we can determine the momentum of a particle or its position, but we cannot determine both.[5] For, the more accurately we fix its momentum, the less accurately we are able to fix its position and *vice versa*. The result of this indeterminacy is that we can speak of quantum events like, say, the disintegration of radioactive atoms only in a statistical manner. We could say very precisely when one-half of a group of such particles will disintegrate; however, it is impossible to say with any certainty when any individual particle will do so.

Again, Barbour presents us with several options that have developed over the last century for understanding the indeterminacy that we find in nature's smallest parts. The first possibility is that indeterminacy is the result of human ignorance. That is, the only reason we cannot fix both the position and momentum of an electron is because we have not discovered all of the relevant measurements. This answer fits with the classical realist interpretation and suggests again the existence of hidden variables.

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[5] *Companion to the Philosophy of Science*, 377, 8.

Next, we might suppose that indeterminacy results because of fundamental limitations governing our observation and experimentation at the lowest levels of reality. In other words, we can never move beyond indeterminacy in our conception of quantum events because that part of the world is closed off to our theoretical equipment. Our descriptions, therefore, stop at indeterminacy. This view accommodates the instrumentalist interpretation.

Finally, Barbour presents his own favored view on the subject: indeterminacy is inherent in nature. According to this interpretation, we do not observe indeterminacy because of a limitation in observational or theoretical technique. Instead, we observe it simply because this is the way the world is; quantum events are representative of genuine openness and possibility in nature. Barbour states that,

> The future is not simply unknown. It is "not decided." More than one alternative is open and there is some opportunity for unpredictable novelty. Time involves a unique historicity and unrepeatability; the world would not repeat its course if it were restored to a former state, for at each point a different event from among the potentialities might be actualized. Potentiality and chance are objective and not merely subjective phenomena.[6]

At first glance, Barbour's position appears closely related to the 'many-worlds interpretation.'[7] However, he rejects this view, invoking Ockham's razor, and instead claims that

> [the many-worlds view] seems to be in principle untestable, since we have no access to other universes containing the potentialities unrealized in ours. It seems much simpler to assume that potentialities not

[6] *RIAS*, 103.

[7] This view claims that each quantum potentiality actualizes in some other universe. Our universe just happens to be the one among a multitude of actually existing possible worlds based on the indeterminacy of quantum events. For an account of this view, see Paul Davies, *God and the New Physics* (New York: Simon and Schuster, 1983), 116-8, 137.

> actualized in our universe are not actualized anywhere. Then we would have one universe which is objectively indeterminate.[8]

The second thing, then, that Barbour draws out of quantum physics is the actuality of objective openness in nature. This accords well with Whitehead's original position.

Another challenge that arose as a result of quantum theory concerns the relationship between parts and wholes and the reduction of larger entities to their smaller constituents. Early views of the atom consisted of three separate entities: protons, neutrons, and electrons. These were understood as elementary particles which combined to form atoms. In the middle of the last century, though, this view was disrupted by the discovery of even smaller elements of matter. The smaller particles, called 'quarks,' behaved quite differently from the three former types of particles. For example, quarks have never been observed existing independent of other particles.[9] This upsets the view of whole entities made up from composites of smaller independent units of matter. Instead, a view emerges of matter that is inherently social. On this point, Barbour tells us, 'Quarks apparently cannot exist except in a larger whole. The various "elementary particles" composed of quarks, seem to be temporary manifestations of shifting patterns of waves that combine at one point, dissolve again, and recombine elsewhere.'[10]

This view is very different from the earlier view of isolated, independent material substance. Once more, advances in quantum physics seem to offer more support for a Whiteheadian view of nature. Physics, though, is not the only area where we find such

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[8] *RIAS*, 104
[9] *Ibid*.
[10] *Ibid*.

evidence. In what follows, I will give a brief account of the advances in biological theory that have import for resolving the science/religion question.

Advances in Biology

We saw in the second chapter some of the historical difficulties that arose in the wake of Darwin's publication of a systematic theory of evolution. Barbour takes special note of three challenges that the theory provoked, especially for religious believers. First, it presented an apparent contradiction with scriptural authority and the creation account of Genesis 1 and 2. This challenge has been largely overcome by the adoption of some form of metaphorical interpretation of the relevant texts.[11] Barbour contends, though, that the more serious and lasting effects of evolutionary theory on religious understanding have been in regard to human dignity and design in nature.

In light of evolutionary understanding, humanity no longer occupies a unique place in the order of the universe; there is no apparent, marked division between human and animal life. Also, evolutionary theory seems capable of dismissing any inference to divine design deriving from the complexities of nature. According to the theory, the universe is as it is simply by random processes. Both of these offer substantial difficulties which any thoughtfully developed theism must eventually face. These challenges, though, can be approached with relative ease by process philosophy. We have already seen that, according to this system, there are no clear divisions between

[11] Metaphorical interpretation of this text have been common in the Christian tradition at least as far back as Augustine. See his *The Literal Meaning of Genesis, 2 vols.* (New York: Newman Press, 1982). For Augustine, of course, 'literal' meant non-allegorical; his interpretation depicted something that occurred in the past, compared to a future projection. Literal interpretations have become more common, though, especially among evangelical conservatives and 'creation scientists'.

organisms; nevertheless, humanity's position is unique because of its level of experience. Also, the process thinker need not worry so much about Darwinism displacing design. According to Whitehead, God's character is displayed through the becoming process of the evolutionary world. Having recognized the challenges biology has posed to theology, I will now turn to the challenges it has presented to the modern scientific understanding of nature.

Perhaps the biggest issue biology poses for present scientific discussion is that of reductionism. As we saw above, this debate is an important issue for physics; biology, though, offers a unique position on the matter. There has been a debate for some time concerning whether or not biological phenomena are reducible to chemistry and, ultimately, physics.[12] Many biologists assert that their field studies events and processes which are unique to a certain level of existence and are, therefore, not reducible to lower level explanations. In his treatment of the subject, Barbour considers three possible types of reductionism in biology.

The first of these he calls 'methodological reduction.' This is understood primarily as a strategy for research; it is meant to guide the investigations of scientists. Its benefit is primarily practical: some very good science can be done by focusing on the molecular components of biological organisms. However, Barbour warns that this approach loses its utility if it extends beyond being one of several practical guides for research and asserts itself as the only beneficial means for investigating biological

[12] Jerry Fodor has been a particularly vocal opponent to the reduction of biology and other areas to physics. See his 'Special Sciences (Or: The Disunity of Science and a Working Hypothesis)' *Synthese*, 1974, vol. 28. pp. 97 -115 and 'Special Sciences: Still Autonomous After All These Years' *Nous-Supplement*, 1997, pp. 149 – 163.

entities. Barbour also considers 'epistemological reduction,' which states that biological theory is reducible to, or explainable in terms of, lower level theories such as chemistry or physics. Barbour gives several reasons for rejecting this view. He notes the use of unique terms in biological theories, such as fitness, adaptation, predator, and organ, as examples of concepts that are not reducible to chemical or biological concepts.[13] Also, he cites the emergence of 'interlevel theories' for proof that biology cannot be epistemologically reduced to lower level theories.[14] For example, the connection of genes with DNA combined genetic studies with molecular biology and together produced results that neither could have achieved in isolation. This indicates that not all scientific theories are reducible to physics as epistemological reduction suggests.

The third sort of reductionism Barbour considers is 'ontological reduction.' This is the view that reality consists only of elementary physical particles. Higher levels of organization, such as those studied by biologists, are just epiphenomenal, mental constructs we use to navigate through life. The only real stuff in the world, according to this view, is elementary particles. Barbour does not argue specifically against this view, though it is clear from later remarks that he rejects it.

On Barbour's behalf, there are at least two things that can be said against ontological reduction. First, the idea of ontological reduction suggests a very awkward place to rest one's ontology. The concept of 'most elementary particle' is a slippery slope; what is seen as smallest one day, may be replaced by something even smaller the next. Ontological reduction, ultimately, is forced to define its ontology according to the

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[13] *RIAS*, 166.
[14] *Ibid*., 167.

human capacity for observation, a very arbitrary scale. Second, it has been argued elsewhere that, if it is true that reality consists solely of matter (or energy), as ontological reductionism suggests, science is not in a position to discover this.[15] Such broad metaphysical claims fall outside the realms of the purely empirical scientific endeavor. To make such a claim solely on scientific authority is to misunderstand the limits of scientific understanding. Therefore, Barbour reasonably concludes that biological entities and theories are not epistemologically or ontologically reducible. Higher levels of organization present us with unique phenomena that are not simply composites of more basic elements.

After surveying the development of evolutionary theory through the end of the twentieth century, Barbour draws the conclusion that, as in physics, biology reveals a genuine openness in nature. He says,

> We have seen the *pervasive role of chance* in evolution, from mutation and genetic combination to unpredictable changes in environments. Evolutionary history is irreversible and unrepeatable. Potentialities that were present at one point were permanently excluded by particular lines of development.[16]

As with indeterminacy at the level of particles, biological organisms, through the process of evolutionary history, present us with a similar situation: novelty is expressed through historical events and are not repeatable simply by returning to a prior state of the system. This conclusion will figure heavily in Barbour's attempts at utilizing Whitehead's metaphysics in order to reconcile the science/religion problem. I will now consider the

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[15] See Alvin Plantinga, 'Methodological Naturalism' in *Facets of Faith and Science* (ed.) Jitse M. Van der Meer (New York: University Publishing Association, 2002).
[16] *Ibid*., 172. emphasis original.

ways in which Barbour develops process thought in light of these more recent scientific developments.

Further Development of Whitehead's View

At the end of his survey of physics and biology, the view of nature which emerges is what Barbour calls 'organicism.' This is an extension of the view which Whitehead provided in the third chapter. According to this view, nature consists of multiple levels of organization. Higher levels are not reducible to lower levels and entities at all levels exist primarily as social beings. I will now consider some specific ways in which Barbour extends Whitehead's original position.

Vitalism and Materialism

We saw earlier that Whitehead contrasted his view with that of the materialists. However, I noted that, in the works under investigation here, Whitehead makes no comment on the relation of his theory to that of the vitalists.[17] On the face of it, it seems that Whitehead might have a good deal in common with such thinkers as Henry More or Ralph Cudworth.[18] Their view was that nature was arranged hierarchically according to increasing degrees of being. At the bottom of the chain was base matter and at the top was God. In between we see something not unlike Whitehead's notion of levels of organization, where each successive group participates more closely in the ideal forms.

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[17] See note 28 from chapter III.

[18] For these thinkers' views, see Henry More, *The Philosophical Writings of Henry More*, (ed.) Flora Isabel Mackinnon. (New York: Oxford University Press, 1925) and Ralph Cudworth, *The True Intellectual System of the Universe*. *4 vols*. (London, 1820).

Vitalism, though, has virtually no current adherents and it has generally been dismissed as a metaphysical system. We might wonder, then, what value we can get from Whitehead's view, if it really is so closely related to that of the vitalists. Barbour takes issue on this point and distinguishes organicism not only from materialism but also from vitalism. In the early Modern era, vitalism was adopted by More and Cudworth largely in response to the dualism of Descartes and materialism of Hobbes. It is interesting, then, to note how Barbour attributes the more recent resurgence of materialism as a response to vitalism. He has this to say:

> *Materialism* among modern biologists is partly a reaction to *vitalism*, in which life was held to be a special nonmaterial principle or agency. In the 1930s, Driesch interpreted experiments in embryology as evidence of a vital agent within the developing embryo, a purposeful "entelechy" which adjusts processes to achieve a future goal in spite of obstacles (for example, a newt can grow a new limb after amputation). But the idea was vague and offered no testable hypotheses for particular cases, so it has been scientifically useless. Moreover, there is no clear line between living and nonliving forms (viruses, for instance, share characteristics with both). Vitalism has almost no advocates today, but the desire to avoid it has swayed many biologists toward a materialistic metaphysic.[19]

Barbour wishes for organicism to cut a line between materialism and vitalism. Materialism offers no hierarchy of being, while vitalism still maintains a limited dualism in as much as it affirms an immaterial formative agency. Barbour's view denies both of these positions. He elaborates as follows:

> *Organicism* seems to be a compromise between materialism and vitalism, organization and activity, not a separate nonmaterial entity or substance. There is no impassable gulf between the living and the nonliving (either in evolutionary history or among present forms), but rather a continuity of interdependent levels. Organicists oppose epistemological reductionism and defend the distinctiveness of biological concepts, but they go further

[19] *Ibid*., 167, 8. emphasis original.

> in asserting that organismic concepts refer to aspects of the real world. If an organism is an integral whole with a hierarchy of levels of organization and activity, one can defend the distinctiveness of biological processes. Processes at one level are not fully determined by those at lower levels, and yet there is no violation of the laws governing processes at lower levels.[20]

Environmental Ethics

Barbour further extends Whitehead's account in a way that the latter may have been unable to foresee at the time he wrote. I am speaking here of Barbour's use of process philosophy to account for an active environmental responsibility. Over the last several decades, this has become one of the greatest issues facing the scientific community. Technological advances have aided and prospered the human race in uncountable ways; however, they have also had serious negative impacts upon human welfare and the environment. Different theories concerning humanity's, and particularly scientists', role in curbing and restoring the harmful effect of technology have been suggested.[21] Barbour uses Whitehead's metaphysics to develop a theory of environmental responsibility which is quite compelling, as it focuses closely on the relatedness of humanity with the environment.

There are two major facets of process thought which have a direct influence on our understanding of and responsibility toward the environment. The first of these concerns the levels of organization present in nature. As we saw above, according to this view, there is no sharp line that distinguishes living from nonliving things.

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[20] *Ibid*., 168. emphasis original.
[21] See for example Bruce V. Foltz and Robert Frodeman *Rethinking Nature: Essays in Environmental Philosophy* (Bloomington: Indiana University Press, 2004).

Whitehead thought, and Barbour concurs, that all entities have some measure of value as 'centers of experience.' Therefore, we should respect all objects, living and nonliving, since they participate in the same process of becoming that we do. Of course, some participate more fully than others and this provides an important check to the level of responsibility, lest it might overextend its proper function. Barbour describes this situation well when he says,

> Process categories can make an important contribution to *environmental ethics*. Human and nonhuman life are not separated by any absolute line. If other creatures are centers of experience, they too are of intrinsic value and not just of instrumental value to humanity. Yet there is a great difference between the richness of experience of a person and that of a mosquito, so they are not of equal intrinsic value.[22]

Second, process philosophy's view of God provides another good reason to respect the environment, not merely as a means for human purposes but as a good in itself. Barbour says, 'process thought leads to an emphasis on divine immanence in nature rather than the traditional emphasis on transcendence; this also encourages respect for nature.'[23] Since God is immanently involved with the processes of nature (some process thinkers even suggest that the world is God's body), respect for the environment should flow naturally from respect for God.

Process Theology

This brings to me to the final major extension that Barbour provides of Whitehead's views. This concerns the nature and activity of God. We saw in the second chapter that

[22] *RIAS*, 228. emphasis original.
[23] *Ibid*. Barbour elaborates further on this theme of environmental responsibility in a second series of Gifford Lecture entitled *Ethics in and Age of Technology* (San Francisco: Harper San Francisco, 1993) which were intended as a sequel to *RIAS*.

Whitehead's view described God as immanent and interdependent in the world. This fits well with the rest of the process metaphysical account; however, we also saw that it raises serious issues concerning the sovereignty and aseity that is associated with the God of orthodox Christian theism. Barbour expands some upon Whitehead's original position, taking into account developments in science and theology over the last eighty years. There are two things that stand out as particularly helpful on this point: Barbour's treatment of God and evil, and his treatment of God's suffering.

The problem of evil has troubled theologians almost since the rise of rational theism itself. There have, however, been a number of attempts at dealing with it. In Christian theism this has usually taken the form of a theodicy. These theodicies, Barbour explains, try to justify God's allowance of evil by reference to three goals God has in the world.[24] The first is that God permits evil in the world because it is a product of human freedom. Augustine argued for this view and it has been taken up more recently by modern philosophers of religion such as Alvin Plantinga.[25] Second, it has been claimed that God allows evil in the world because, even though he could prevent each instance of it through miraculous intervention, to do so would undermine the regularity of natural laws. The effect of this is that we would never be able to understand the world, morally or scientifically, since there would be no way of knowing whether any event was a natural occurrence or a supernatural act of God. Finally, theodicies have been based upon God's desire for human moral development. That is, evil is permitted because without it there would be no means to acquire certain moral

[24] *Ibid*., 239, 40.
[25] See Alvin Plantinga, *God, Freedom, and Evil* (New York: Harper and Row, 1974).

qualities, such as courage, hope, or perseverance. John Hick has provided the most detailed account of this position.[26]

Any or all of these reasons may be given to justify God's permitting evil in the world. Barbour, though, argues that all three are best represented on a process view. Concerning human freedom, Barbour says,

> Human experience is the starting point from which process thought generalizes and extrapolates to develop a set of metaphysical categories that are exemplified by all entities. Self-creativity is part of the momentary present of every entity. It is not surprising, then, that process thought has no difficulty in representing human freedom in relation to both God and causes from the past. … Process theism strongly endorses our responsibility to work creatively to further God's purposes, as well as recognizing human frailty and the constraints imposed by the biological and social structures inherited from the past. We are participants in an unfinished universe and in God's continuing work.[27]

He goes on to say that

> Human sin can be understood as a product of human freedom and insecurity. Suffering in the human and nonhuman world is no longer a divine punishment for sin or an inexplicable anomaly. The capacity for pain is an inescapable concomitant of greater awareness and intensity of experience. Greater capacity to hurt others is a concomitant of the new forms of interdependence present at higher levels of life. In an evolutionary world, struggle and conflicting goals are integral to the realization of greater value.[28]

By basing its fundamental assumptions upon human experience and freedom, process philosophy can easily accommodate a freewill defense or theodicy.

Next, concerning the laws of nature, we have seen that process thought is built up by generalizations made by observation in the material world. The notion of regularity

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[26] See his *Evil and the God of Love*, (New York: Harper and Row, 1977).
[27] *RIAS*, 261.
[28] *Ibid*.

permeates this understanding of nature; indeed, as I noted earlier, even though it causes some philosophical problems concerning persistence of the self, according to process thought endurance is represented simply as a repeating pattern.[29] Barbour also remarks that,

> There must be dependable regularities in the world if we are to make responsible decisions about the consequences of our actions. An orderly world reflects God's rationality and dependability. Moreover, the growth of human knowledge would be impossible without the existence of such regularities. Neither moral character nor scientific knowledge would be possible if God intervened frequently to save us from suffering.[30]

As with freedom, process philosophy has unique access to arguments against the problem of evil which are based upon natural law. This is because the notion of repeating patterns is another fundamental element of the system.

Finally, concerning moral development as a justification of suffering, Barbour notes the similarities between process theism and Hick's theodicy. But he also points out that, with Hick, God's power to prevent sin and suffering is limited only by God's voluntary decision to limit it. On Hick's view, God could prevent evil but he chooses not to because it would hinder our moral development. This is where process theism breaks with this theodicy. Barbour says,

> Process theologians share many of Hick's ideas but go further in *the limitation of God's power*. … Evolution is a long, slow, step-by-step process. Inescapable struggle and conflict have taken place because there has always been a multiplicity of beings with at least some power of their own. … Interdependence allows us to benefit from others but also to be harmed by them. These are metaphysically necessary correlations, which would obtain in any world. Even God could not escape them.[31]

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[29] *Ibid*., 227.
[30] *Ibid*., 239, 40.
[31] *Ibid*., 240, 1. emphasis original.

This, though, brings us to another feature of the process view concerning suffering and development; namely, the idea that God participates in our suffering. While it is common in traditional Christian theism to speak of God as suffering with us and for us, this is usually qualified by the notion that God is impassible. That is, whenever God is depicted as suffering in Scripture, it should be interpreted metaphorically; God, as such, cannot be moved and is impervious to evil, sin, and suffering. The process view is radically different. As we have seen, the God of process theism is a participant in the created order along with us. Though his level of experience is supremely higher than ours, it is still the same sort of experience that is relevant to every entity.

With this view, process theism can take the passages which speak of the suffering of God literally, especially the picture of Christ on the cross. Barbour points out that

> Process thinkers can contribute not only to the theoretical explanation of the existence of suffering but also to the practical question of how we respond to it. One theme in traditional Christian thought is that *God shares in our suffering* and stands with us in it. One meaning of the cross is that God participates in human suffering. Many Christians have felt that God was especially near in time of suffering. Classical theology, however, has said that God is impassible, unaffected by us, and incapable of suffering. At this point the process understanding of God's consequent nature allows a stronger assertion that God suffers with us in our suffering. God is with us and for us, empowering us in or present lives.[32]

For many, this deeply personal view of God as intimately loving and suffering provides great comfort and seems to accord well with Scripture; for many others it presents a

[32] *Ibid*., 241. emphasis original.

conception of God that is drastically inferior to the traditional view. In any case, by promoting it, process theism provides us with an explanation for suffering on several levels, as well as pragmatic understanding of how that suffering relates to our own existence and that of God.

All of this paints a larger picture of the process view and presents us with a greater applicability of its metaphysical categories. Whitehead's original ideas have been adopted and expanded by many later thinkers, particularly concerning our understanding of nature and of God. Barbour has brought these two major themes of process thought together into one coherent view. In the remaining portion of this chapter I will critically evaluate how well Barbour's presentation of process philosophy helps in solving our original dilemma.

Evaluation of Barbour's View

In this section I want to do two things: First, I will see what responses Barbour has to the major objections that were raised against Whitehead's view in the third chapter. Second, in light of these responses, I will draw conclusions concerning Barbour's solution to the present dilemma.

One problem with Whitehead's metaphysical solution to the science/religion question is that his process metaphysic seems to undermine one of the fundamental motivations for seeking a solution in the first place. I am speaking here of the problem of self-identity. One of the goals of this project is to account for the unity of experience across scientific and theological lines. This is primarily in relationship to the life and

mind of the individual believer, both religious and scientific. However, on Whitehead's view, it turns out that, even though he provides a helpful means for unifying these experiences, in doing so the self becomes dissected. This is because the self, like any other entity, is undergoing a process of becoming. As soon as it enters one new field of experience, it has already begun the process of novel development towards another. These processes, though, require a lapse of some measure of time and, as a result, there is a discontinuity in self-identity.

Barbour recognizes this as a problem for Whitehead and makes the following suggestion:

> In process thought, endurance is represented by the repetition of a pattern, not by an enduring substance. For Whitehead, the self comes into being only at the end of the brief moment of unification, by which time it is already perishing. I would question whether human experience has such a fragmentary and episodic character. Perhaps reality at higher levels is more like a continually flowing process, from which temporal moments are abstractions. This might allow for a continuing self-identity without reverting to static or substantive or dualistic categories.[33]

While this response of Barbour's may seem initially plausible, I do not see how it really helps the situation. First, there is no indication in Whitehead that what Barbour describes is actually the case. More important, though, viewing 'higher levels' this way causes problems for process metaphysics in general, and process theism in particular. The whole notion of Whitehead's metaphysics rests on the idea that experience is relevant at all levels of existence. Not only is experience relevant, but a certain sort of experience: namely, temporal, episodic experience. This is the thread that ties all of the levels of being in Whitehead's ontology together; they all participate in this same sort of

[33] *Ibid*., 227.

becoming. To claim, then, that existence at higher levels does not undergo temporal processes but instead only appears to do so by abstraction, drastically separates the higher levels from the lower levels in a way that does not fit with the original assumptions of process thought. Furthermore, it now becomes a battle of intuitions for where we should draw the line between higher and lower forms to distinguish which actually undergo temporal processes and which only appear to do so.

What is more, by taking the route Barbour suggests, we remove God from the natural world in a significant way. As an entity on the higher level, God would also be outside of time. However, process theism claims that God is immanently and intimately involved with the development of the world through natural processes. Given Barbour's suggestion, however, process theism is in a difficult position: it must now answer all of the difficulties that arise for atemporal views of God, but without the resources of traditional theism, such as impassibility and aseity.

Ultimately, while Barbour's suggestion is creative, it cannot provide any genuine relief to the problem of self-identity without raising other problems concerning the fundamental premises of process thought and the nature of God. This, though, brings me to the next issue: Barbour's response to the difficulties raised about Whitehead's notion of God.

Here, I believe Barbour fairs much better. Barbour again recognizes that there is a problem: process thought diverges dramatically from traditional accounts of God. He notes that,

> It has been said that the God of process philosophy lacks the transcendence and power characteristic of the biblical God. One critic

> says that such a weak God would evoke our pity rather than our worship. Transcendence is indeed less emphasized in process theology than in classical Christianity, but it is still strongly represented. God is distinct from the world and not identified with it, as in pantheism. Every entity is radically dependent on God for its existence and the order of possibilities that it can actualize. God's freedom and priority in status are upheld; God alone is everlasting, omniscient, and omnipresent. God is perfect in love and wisdom. God's unchanging purposes for good are not contingent on events in the world.[34]

This provides a more balanced view of the God of process thought; however, the criticisms that were raised in the last chapter still remain. We have seen that the process God fails to satisfy major ascriptions associated with the God of traditional Christian theism. Barbour, though, believes that this divergence is justified and suggests four criteria in its defense. These four criteria are meant to support the move from the traditional view of God to the limited, immanent view on the process model. He gives these criteria as follows: agreement with data, coherence, scope, and fertility.

Concerning the first criterion, he points out that process thought accords well with the view of God as loving and engaged in reconciliation, the nature of religious experience and moral obligation, as well as experience of the created order. 'Coherence' relates both to internal consistency as well as external consistency with, what Barbour calls, the non-auxiliary components of traditional theology. Barbour views 'God as creative love and revealed in Christ' as non-auxiliary theological statements.[35] Omnipotence, though, is considered auxiliary to the fundamental components of theism. 'Scope' refers to the broad applicability of the metaphysical categories used to make up

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[34] *Ibid*., 263, 4. The critic Barbour mentions is Colin Gunon in his *Becoming and Being: The Doctrine of God in Charles Hartshorne and Karl Barth,* (Oxford: Oxford University Press, 1978).
[35] *Ibid*., 266.

the system. One of the benefits of process thought is that its categories are so broad they include virtually everything. Finally, 'fertility' concerns the new ideological ground that the theory opens up. The process view of God and nature have both received considerable interest from researchers in their respective fields. While Barbour admits that no single criterion validates the shift from the traditional view, he believes the aggregate effect of all four is enough to justify it.

I believe that Barbour's argument here is quite good. The most objectionable part of this account concerns where Barbour draws the line between auxiliary and non-auxiliary doctrines; for many theists impassibility, aseity, and omnipotence would all be considered non-auxiliary beliefs about God. There are, however, a number of theologians who have argued on scriptural grounds that God is much closer to the process view than the traditional view.[36] All of this taken together, I believe, provides good reason to adopt some manner of the process account for describing the relationship between science and religion. Perhaps this acceptance could be provisional, primarily as a means of fostering a positive dialogue and mediating a useful working relationship. There are, no doubt, improvements that could be made and future investigations will likely reveal further shortcomings. However, Barbour has provided us with new scientific support for the process view as well as insightful analysis of theological problems and the ways in which process philosophy can address them. Despite the

[36] One of the most influential statements of this position was given in Clark Pinnock's *Most Moved Mover: A Theology of God's Openness* (Authentic Media, 2005). See also, Clark Pinnock, John Sanders, Richard Rice, William Hasker, and David Basinger's *The Openness of God: A Biblical Challenge to the Traditional Understanding of God* (InterVarsity Press, 1994).

difficulties that remain for this view, I believe that it offers us a very good position from which to attempt a reconciliation of science and religion.

CHAPTER V

CONCLUSIONS

Though this search began with a worry, it now ends hopeful that a fruitful reconciliation between science and religion has been approached. Barbour has provided a version of Whitehead's process philosophy which has much to commend it. It satisfactorily accounts for the major scientific and theological developments of the last century; making sense of the difficult principles of quantum mechanics and answering, too, the challenges of biological theory. Following Whitehead, Barbour's view maintains mutual respect between science and religion, recognizing their interrelated methods and purposes. Also, Barbour has given a more thorough account of process theism, making his view more helpful in understanding the connections between metaphysics, science, and religion.

However, whether Barbour's account can actually manage a working synergism between science and religion will depend in large part upon future work. For instance, the problem of identity still looms large for the process view. Barbour's suggestion of continually flowing processes at higher levels causes serious problems for the process position. If this difficulty is to be overcome, another solution must be wrought. Likewise, Barbour's view still faces challenges from many traditional theists. A simple solution to this problem will not soon be found. The opposing theists have tradition and orthodoxy on their side. Despite the gains that Barbour's view makes at the intersection of science and religion, to achieve these it must remove itself a great deal from received conceptions about God.

These things in particular add a cautionary note to Barbour's accomplishments. However, among the three authors represented in this project, Barbour offers the most useful model for solving the science/religion dilemma. Given the concerns that have been raised for his view, I suggest tentatively adopting Barbour's view, as a working hypothesis. It will, no doubt, be improved upon as new experimental results and metaphysical insights come in. However, as it is, Barbour's view points us in the right direction. In fact, this view will foster the sort of interdisciplinary dialogue that is necessary for its own further development. This is what we expect of any good theory and I believe that Barbour's is as good as any we presently have.

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