

Scientific and Religious Worldviews: Antagonism, Non-antagonistic Incommensurability and Complementarity

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Abstract:

This article reviews three basic ways in which the relationship between Abrahamic religion and science has been construed: as fundamentally antagonistic; as non-antagonistically incommensurable; and as complementary. Unfortunately, while each construal seems to offer benefits to the religious believer, none, as the article demonstrates, is without considerable cost.

Judaism, Christianity and Islam provide their adherents with distinctive conceptual frameworks for understanding the world they inhabit; in other words, each of the Abrahamic monotheisms provides its adherents with a worldview. In the modern era, religious worldviews have been faced with a new competitor: the scientific worldview (or, perhaps more precisely, scientific worldviews). The worldviews of traditional religion and that of modern science are often thought to be irreconcilable because modern science appears to contradict at least some of the core beliefs of each of the Abrahamic faiths. At the very least, the credibility of traditional beliefs concerning the creation of the world,¹ the special place of humans in the created order, and God's ability to act upon the world² all appear, at least *prima facie*, to be at odds with scientific thinking. Moreover, given the emphasis placed on science within modern education and by mainstream western culture, it has been difficult for many to avoid the challenge science seemingly presents to their religious belief system. It should not surprise us, then, that scientific ideas have had a significant transformative impact upon traditional religious worldviews.³

The success enjoyed by many branches of science in the twentieth century is no doubt largely responsible for the role it has come to play in modern intellectual life. Few would deny that one of the most remarkable features of the twentieth century was the unprecedented success of scientific method in providing explanations for many things that had previously seemed inexplicable. The results yielded by scientific method, which primarily involved the

testing of theories by means of empirical experimentation, were often so impressive that many people came to regard science as the only reliable source of knowledge.⁴ A significant number, moreover, would seem to have drawn the further conclusion that religious beliefs should be abandoned in those cases where they conflict with the findings of the natural sciences. Indeed, throughout much of the twentieth century, religion, in contrast to the advance of the sciences, seemed to be making a corresponding forced retreat. As Don Cupitt observes:

the development of an immense body of objective knowledge of the world about us in modern times seems directly connected with the decline of religion. The difference between a medieval bestiary and a modern work of zoology is that symbolic and religious ways of looking at animals have been replaced by cool and intense observation of natural fact.⁵

Not surprisingly, Cupitt argues that scientific knowledge *replaces* religious ways of understanding the world, and that the expansion of the former is thereby directly responsible for the decline of the latter. In support of this view, Cupitt appeals to the undeniable fact that, throughout the modern era, scientific knowledge has caused massive disruption to systems of religious belief, which had survived basically unchanged for centuries. Nevertheless, although traditional religious beliefs have often been retracted as a result of scientific claims,⁶ it may be too hasty simply to assume—as Cupitt clearly does—that a further retreat of religious belief is inevitable in the face of modern science.⁷

Indeed, construals of the purported threat science poses to religion would appear to depend upon how the relationship between them is conceived. By the end of the twentieth century, those who were alert to these issues had come to occupy one of three basic positions. According to those who hold the first position, science and religion are in inevitable competition, and co-exist in a state of outright conflict. In short, science and religion are antagonistic. Those holding the second position aver that science and religion are fundamentally different to a degree that not only rules out genuine conflict but also makes it impossible for them to contribute anything to each other. Put another way, science and religion are non-antagonistically incommensurable. Finally, advocates of the third position hold that science and religion are compatible domains of inquiry—they share some common ground and can influence each other, but serious disagreement between their respective claims should not arise. In other words, science and religion are complementary.

Let us therefore first consider the view that science and religion are competitors locked

within an inevitably conflictual struggle.

The Antagonistic Relationship View

Many people, both religious and non-religious, hold not only that traditional religious beliefs and the claims of modern science are in direct conflict but also that the respective presuppositions of religion and science are fundamentally opposed. One critic of Islam, Ibn Warraq, claims that science

directly conflicts with Muslim religious beliefs on a number of issues. But the more fundamental difference is a question of methodology—Islam relies on blind faith and the uncritical acceptance of texts on which the religion is based, whereas science depends on critical thought, observation, deduction, and results that are internally coherent and correspond to reality.⁸

While many would no doubt object to Warraq's self-avowedly polemical characterisation of Islam, his stance, nevertheless, clearly exemplifies the first position: science and religion are in direct conflict. For religion, Warraq claims, involves 'blind faith' and the 'uncritical acceptance of texts', whereas science is based on 'critical thought', 'observation' and 'deduction', and yields 'results that are internally coherent' and which 'correspond to reality'. The implication, of course, is that religious beliefs are not the product of critical thought, observation or deduction, are mutually incoherent and fail to correspond to reality. When the contrast between science and religion is conceived in this light, it is no surprise that they are thought to be in direct conflict, and that many plump for science.

Despite the fact that many in the twentieth century rejected this implied characterisation of religion, the notion of an irreconcilable conflict between religion and science remained a commonly held one. Moreover, the popular image of the modern scientist who sets at naught traditional religious 'wisdom' in relentless pursuit of 'objective' scientific knowledge⁹ invites the conclusion that science and religion are locked in unremitting conflict. While this image might be thought somewhat of a caricature, it is, nevertheless, reminiscent of those early twentieth-century scientists who—convinced of positivism—held that science is the only reliable source of knowledge, and that all religious claims should be shunned because they are based on groundless superstition. These opinions have commonly been entertained alongside the assumption that fundamental reality is material, and that, consequently, only the objects of science are 'real'—a position usually termed 'scientific materialism',¹⁰ and which constituted

a significant challenge to religion in the twentieth century (as it continues to do in the twenty-first).

Curiously, scientific materialism has a certain affinity with another stance which, at first sight, appears to be very different: namely, scriptural literalism. The latter holds that the claims of some specific set of religious scriptures are true, and that where these claims contradict the purported findings of modern scientists, the claims of the scientists are to be rejected as false. The feature common to both of these stances is to be found in their account of what is required for knowledge. For both assert that knowledge must be based on certain, or indubitable, foundations. Early twentieth-century scientific materialists generally claimed that the foundations of knowledge are logic and sense-data, whereas scriptural literalists tended to hold that the only secure foundation for knowledge is revelation within its scriptures. And both parties tended to assume that there is a direct conflict between their respective claims

Scientific materialism has taken a variety of forms, and has been endorsed by a wide range of thinkers.¹¹ In the late-twentieth century, scientific materialism—principally, in the form of a new discipline called sociobiology—exerted a huge influence on the intellectual life of the West. Sociobiologists, such as Edward O. Wilson, popularised the idea that it is only a matter of time before everything that is as yet unexplained by science will be so explained. Holding that the human sciences (such as sociology and religious studies) will all ultimately be reduced to biology,¹² Wilson predicts that when religion is fully explained in terms of biology, it will lose much of its power. He believes, nevertheless, that ‘[t]he predisposition to religious belief is the most complex and powerful force in the human mind and in all probability an ineradicable part of human nature’.¹³ One conclusion that Wilson draws from this assessment of religious belief is that ‘[r]eligion constitutes the greatest challenge to human sociobiology and its most exciting opportunity to progress as a truly original theoretical discipline.’¹⁴ Wilson’s ambition is, therefore, to explain religion by means of general sociobiological principles. In other words, he aspires to explain religion by providing an account of the function that religious beliefs and practices play in furthering our self-interested biological ends. Hence, he argues that the

highest forms of religious practice, when examined more closely, can be seen to confer biological advantage. Above all they congeal identity. In the midst of the chaotic and potentially disorienting experiences each person undergoes daily, religion classifies him, provides him with unquestioned membership in a group claiming great powers, and by this means gives him a

driving purpose in life compatible with his self interest.¹⁵

Wilson thus sets great store by the claim that a religion confers a biological advantage upon its adherents, insisting that, if this claim can be supported, scientific materialism will have successfully explained religious phenomena, and will thus be established as the superior worldview.¹⁶ Clearly, Wilson assumes that if one can explain some phenomenon as biologically advantageous, then this explanation says all that need be said about that phenomenon. In particular, such an explanation is taken to foreclose the question of whether or not any beliefs underlying the phenomenon in question might be true. The philosopher, theologian and scientist Holmes Rolston III challenges Wilson's assumption by analysing its apparent logical structure:

Premise 1: If B (biologically advantageous), then not T (true).

Premise 2: B.

Conclusion: Therefore not T.¹⁷

As Rolston points out, this argument is formally valid (the conclusion follows from the premises), but we have no reason to judge that it is sound (for we have no reason to assume that both the premises are true). The first premise certainly does not seem to be established so much as assumed by Wilson, given that he fails to provide any compelling argument for the implicit claim that if acting on a certain belief is biologically advantageous, then that belief cannot also be true.

The uncompromising stance of scientific materialists such as Wilson would seem to be motivated by the assumption, mentioned above, that the natural sciences alone are capable of yielding genuine knowledge because they alone study 'real' objects. This assumption is supported by the conviction that only scientific claims can be publicly verified. Scientific experiments are repeatable by anyone who has the correct equipment, the argument might go; and thus the results of science are reliable because they are reproducible. The public and reproducible nature of scientific conclusions might then be contrasted with religious beliefs, which do not seem to be based on the kind of public data which could verify them. Religious beliefs, scientific materialists are keen to point out, are thus not public in the sense that they cannot be checked by empirical investigation whose results could be reproduced, at least in principle, by anyone. Thus, science is thought to be 'objective', whereas religion is considered to be 'subjective'.

In criticising scientific materialism, Keith Ward summarises its basic tenets as follows: ‘the only things that exist are material things in space. There is no purpose or meaning in the universe. Scientific principles are the only proper forms of explanation’.¹⁸ He then argues that, contrary to the impression scientific materialists seek to convey, these tenets ‘are not scientific theories or assertions. They do not belong to physics or chemistry or psychology or biology. They are certainly statements of faith.’¹⁹ This characterisation of the, purportedly, non-scientific foundations of scientific materialism suggests to Ward that it should be regarded as a worldview rather than as a scientific theory. One holds such beliefs, according to Ward, not on the basis of evidence but ‘because they seem to form the basis for a coherent, adequate and consistent description of the world which fits one’s fundamental value-judgements and attitudes’.²⁰ In emphasising the status of scientific materialism as a worldview, Ward hopes that we will regard its adoption, in preference to other candidates, as a choice, and not as inevitable. And once we see this, Ward argues, the next step will be to ask the question: which type of worldview, the scientific materialist one or the theistic one, has the most power to explain the universe we inhabit? Ward further argues that the theistic worldview is the most rational one for us to adopt. Interestingly, Wilson would probably agree with the way that Ward has framed this question. For he, too, holds that scientific materialism is a worldview that we should adopt, or not, on the basis of its explanatory power. His disagreement with Ward concerns which worldview—a scientific materialist one or a religious one—has superior explanatory power, and thus is the rational one to choose. What gives scientific materialism the edge, in Wilson’s view, is that, as mentioned above, its conclusions can be supported by publicly verifiable data, and thus are ‘objective’; whereas religious beliefs are not supported in this way, and are, therefore, ‘subjective’.

Wilson is thus typical of those who hold that science and religion are in conflict because they have nothing in common—the former being founded upon reason, and the latter being founded upon superstition. However, this assumption, although extremely popular in the first half of the twentieth century, was seriously questioned later in the century by many who argued that there is a continuum between science and religion: for science, as Ward insists, involves *both* reason *and* faith, just as religion involves *both* faith *and* reason. The well-known philosopher of religion, Basil Mitchell, for example, argues for such a continuum on the grounds that an element of faith is an essential requirement of all rational enquiry.²¹

In support of this conclusion, Mitchell avers that the conception of reason presupposed by those who contrast rationality with faith implies that, in order to be rational, one must: (i) ‘have sufficient evidence for what one believes’; (ii) ‘be prepared to produce the evidence on

demand'; and (iii) 'proportion one's confidence in the truth of the belief to [the weight of] the evidence as it stands at the time of speaking'.²² In order to demonstrate that it is unlikely that there is any sharp contrast between faith and reason, Mitchell points out that what we ordinarily consider to be instances of rational thought rarely satisfy these criteria. Instead, as Mitchell, borrowing from John Henry Newman, observes: (a) 'much of our reasoning is tacit and informal'; (b) 'most arguments are cumulative in form'; (c) 'in estimating the force of the evidence and in deciding what is to be believed on the strength of it we are rightly influenced by considerations other than those provided by the evidence itself', that is, 'we bring to the evidence assumptions which inevitably' and rightly 'affect our interpretation of it'; and (d) systems of belief require stability over time in order to develop, and, once developed, they tend to persist.²³

Thus, Mitchell hopes to persuade us that the contrast 'between the entirely open-minded approach of the scientist and the committed nature of religious faith is, at the very least, overdrawn'.²⁴ For example, stubbornness, as he notes, can be a virtue with respect to finding truth in science, and this seems to suggest that an element of faith is a requirement of scientific procedure. Hence, Mitchell concludes that faith is not confined to theology, but is a feature of all intellectual endeavours.²⁵ However, 'as one moves from the natural sciences, through the biological to the psychological and social sciences and on to the humanities, the role of faith becomes steadily more apparent'.²⁶ In other words, instead of a sharp divide we have a continuum, in Mitchell's view.

Given these arguments against scientific materialism, with its core assumption that only science can yield 'objective' knowledge of 'real' objects, what might explain its widespread adoption in the early-twentieth century? Clearly, the views of the logical positivists provided a philosophical underpinning for the central ideas of scientific materialism, and persuaded many to adopt its approach. Members of the logical positivist movement were convinced that the only meaningful propositions (analytic propositions of logical form excepted) were synthetic propositions which could be publicly verified through scientific experimentation. All synthetic propositions that could not be verified (metaphysical, ethical and religious 'propositions', for example) were, therefore, said to be meaningless. Thus, all meaningful propositions were thought to belong to the category of what could be expressed in instrumental statements about what experiences we would have were we to perform certain actions.

However, although logical positivism captivated the minds of many philosophers and scientists for at least two decades, it soon became clear that, as a theory of meaning, it was

inadequate as an account of the full spectrum of human experience. Moreover, as many philosophers argued, it also failed to take sufficient account of the interplay between factual and evaluational judgements within our reasoning processes.²⁷ Critics of logical positivism further pointed out that sense-data could not be foundational in the sense which logical positivists and scientific materialists assumed. In fact, it became increasingly apparent to many that sense-data are simply not available in the raw state which the logical positivists and scientific materialists supposed. Rather, the act of gathering information, or of experiencing sense-data, already involves interpretation, because human consciousness does not seem to have access to sense-data that are prior to some preliminary conceptualisation. In short, the case can be made that to experience something is already to interpret it. Later theorists would therefore stress the degree to which sense-data were influenced by prior theory and by the interaction of the observer with the observed. So, despite the undoubted influence which logical positivism had earlier exercised in shoring up the convictions of the scientific materialists, by the end of the twentieth century few believed it justified the view that there is no reliable route to knowledge outside of science. And many critics of scientific materialism agreed that, just as logical positivists have an idealised view of meaning, scientific materialists have an idealised view of science.

Consequently, many religious thinkers came to believe that to conceive the relationship between religion and science as one of direct conflict is to distort the nature of both domains. Hence, some began to explore alternative conceptions of their relationship. Nevertheless, as we shall now see, many, perhaps understandably, remained reluctant to give up the distinction between the two domains.

The Incommensurability View

Those adhering to some version of the second position on the relationship between religion and science—the non-antagonistic incommensurability view—typically argue that science and religion are autonomous domains of human understanding, with each focusing on different objects of enquiry. Stephen Jay Gould, for example, argues that, because science and religion have different subject matter, there could be no genuine conflict between their respective claims. Indeed, the view that science and religion do not make claims about the same aspects of reality is fairly common. One motivation for this view is the widespread conviction that, whereas science is concerned with supposedly value-neutral facts about the objective world, religion is concerned with evaluation. The famous biologist John Maynard

Smith, for example, expresses this conviction when he asserts that scientific theories have nothing to say ‘about the value of human beings’,²⁸ adding that such ‘theories say nothing about what is right but only about what is possible, and we need some other source of values’.²⁹ Mordecai Kaplan, the founder of Reconstructionist Judaism, offers a similar view:

The so-called conflict between religion and science is actually a conflict only between religion, conceived as theurgy [that is, a supernatural means of controlling the world], and science, conceived as a method based upon experience and experiment. There can be no quarrel between religion conceived as a source of values and meanings, and science, as a description of objective reality.³⁰

According to this stance, then, science and religion are concerned with different domains: science with ‘objective reality’; and religion with ‘values and meanings’. Hence, the argument goes, provided that each respects the boundary of the other’s territory, no genuine conflict should arise.

The non-antagonistic incommensurability view has, in fact, an extremely long history. Commonplace in the medieval period was a distinction between ‘revealed knowledge’ and ‘natural knowledge’. The latter was thought to be the product of human discovery through natural as opposed to supernatural means; while the former was thought to have a supernatural origin, and was believed to be discovered in sacred texts and, in some versions of the distinction, in the wisdom inherent within a religious tradition. While earlier proponents of this view, Ibn Rushd and Thomas Aquinas, for example, claimed that there is some overlap in the content of these two types of knowledge,³¹ modern advocates tend to emphasise the complete disjunction between ‘revealed’ and ‘natural’ knowledge. Thus, many modern thinkers, such as Karl Barth, deny that there is any ‘natural knowledge’ of God at all.³² And this entails that discoveries and advances in natural science cannot, even in principle, contribute anything to our knowledge of God. Scientific, or ‘natural’, knowledge is therefore thought to have no relevance whatsoever to religious belief. Likewise, ‘revealed knowledge’—the preserve of faith—is thought to have no bearing on scientific knowledge.

The nineteenth century Danish philosopher, Søren Kierkegaard, was another influential modern thinker who held this position.³³ In his view, if it were the case that reason or empirical investigation, unaided by revelation, successfully proved religious beliefs to be true, then religious faith would be redundant. In other words, he holds not only that ‘natural knowledge’ can contribute nothing of importance to a person’s religious beliefs but also that

if, *per impossible*, it could do so, then it would be a danger to faith. Consequently, he argued that science should stay within the boundaries of its own domain, and not seek to intrude into domains where it can contribute nothing.

However, it is clear that, as science developed, scientific knowledge came to cover more and more ground. Features of the world that had previously been ‘explained’ by religion now seem better explained by scientific theories, for these theories enable us to make reliable predictions that were not facilitated by religious explanations. Hence, religious belief has been obliged to withdraw its claims in the face of the advancing frontier of science—a process that seems to have occurred at an unprecedented pace during the nineteenth and twentieth centuries. Indeed, modern theologians who adopted the non-antagonistic incommensurability view soon found that the only apparently secure domain in which religious knowledge was not threatened by the growth of scientific explanations was that of human subjectivity. Here, at least, or so it seemed, the scientific outlook could not reach. Hence, following Friedrich Schleiermacher, theologians sought to found theology on human feeling. However, the failure of this strategy soon became apparent in the early-twentieth century, when science—in the form of psychology—staked its claim on the domain of human subjectivity.

As a result of the unprecedented advance of science, a variant of the non-antagonistic incommensurability view became prominent in the second half of the twentieth century. Science and religion, according to this modified view, both make claims about the real world, but they do so from radically different and irreducible perspectives. Inspired by the philosophy of Ludwig Wittgenstein, what this view amounts to in practice is the belief that the scientist and the religious believer, in effect, speak different languages. These languages are construed as fulfilling different but equally legitimate functions—and, because the languages are so different, there can be no genuine conflict between their respective claims.

Wittgenstein came to regard human discourse as a series of language games, each with its own rules determining the various meanings of the statements made within them. Moreover, his theory of language games emphasises the way that language is used, and insists that the ‘rules’ of each language game can only be discovered from within the language game itself. Thus, on this view, it would be a mistake to judge the statements made in one language game by the standards of a quite different language game. Applying this to the relationship between science and religion, the implication is that it would be illegitimate to judge religious claims—such as, for example, the claim that God created the world in six days—from a scientific standpoint: for to do so would be to miss the point of the religious claims, and to

confuse the discrete discourses of science and religion.

According to this approach, then, we should examine the different functions of these two language games: the scientific and the religious. And if we do, we shall see that scientific language functions in that particular area of inquiry which deals with natural phenomena, for which it is a useful tool that allows us to describe such phenomena. Likewise, we shall discover that the function of religious language is to promote values and, perhaps, a whole philosophy of life which binds together a human community. On this view, therefore, the dispute between a religious believer and a scientist is not really a disagreement over the nature of reality at all. As Wittgenstein remarks: regarding the denial of the religious belief that illness is a punishment from God, 'you can call it believing the opposite but it is entirely different from what we normally call believing the opposite. I think differently, in a different way, I say different things to myself. I have different pictures.'³⁴ The religious believer and the scientist, then, are engaged in different language games that correspond to, what Wittgenstein calls, their different 'forms of life'.

Wittgenstein's theory of language has been elaborated and applied specifically to the philosophy of religion by D. Z. Phillips. Emphasising the uniqueness and autonomy of the religious form of life, Phillips, like Wittgenstein, claims that each language game has its own internal criteria of truth and falsity, and, therefore, cannot legitimately be evaluated on the basis of external criteria. It follows, according to Phillips, that the meanings of terms such as 'true,' 'false,' 'real,' 'unreal,' 'rational' and 'irrational' differ from context to context. And as religious statements cannot be understood or appraised on the basis of criteria external to the religious language game, such as that of science, then it follows that religious beliefs cannot conflict with scientific claims.³⁵

While this Wittgensteinian strategy for maintaining the distinction between scientific and religious claims is ingenious, it nevertheless incurs difficulties that, some would claim, vitiate its appeal. One problem is that it seems to leave us with a plurality of irreducibly different and unrelated language games, each with its own 'true' claims. Thus, it would seem to rule out the possibility of a monistic, overarching explanation of the diversity of human experiences, which many thinkers, even today, continue to seek. Apparently presupposing the possibility of such a unified theory, one Christian theologian, Harold A. Netland, writes:

[s]ince ultimately there is unity and consistency to truth, we would expect that what is true in religion is consistent with what is true in other domains such as science, history, and archaeology. Glaring inconsistency between what is asserted in a given religious worldview and what has been

established in, say, history indicates that either the religious claim or the conclusion from history is in error.³⁶

Although there may be good reasons in favour of a pluralistic conception of truth (and it may be that the idea of a unified theory is a chimera), this is not a conception that achieved a consensus amongst the majority of twentieth-century religious thinkers. Consequently, many found the Wittgensteinian strategy unpersuasive as an explanation of the relationship between science and religion.

A further difficulty incurred by this approach is that, were it correct, it would seem unlikely that scientific claims and religious claims should have a noticeable impact on one another. However, as we shall shortly see, the facts would appear to be otherwise. A final problem with this view is that it seems inherently conservative. The view that religion is for the philosopher to study and to seek to understand, but not to criticise, and certainly not to seek to change in the light of knowledge acquired from other domains of inquiry, would appear to encourage the intellectual fossilisation of religion.

In light of these difficulties, many thinkers felt unsatisfied with the non-antagonistic incommensurability view in its modified Wittgensteinian form; and this dissatisfaction led some to occupy the third position, to which we now turn. From the perspective offered by this position, religion and science are complementary domains of inquiry. They share some common ground, and are able to influence each other; moreover, serious conflict between their respective claims need not arise.

The Complementarity View

In the eleventh century, Al-Ghazali argued that those who deny the findings of science in an attempt to defend their religious beliefs do religion more harm than good.³⁷ In so arguing, he set a precedent for those twentieth-century thinkers who held that a religion cannot remain credible if it retains beliefs in the face of scientific knowledge which appears to refute them decisively. Many of those who believe that science cannot be safely ignored by religious believers adopt some version of the complementarity view, according to which science and religion will, ideally, form part of an integrated worldview within which each contributes to the other. Clearly, according to this position, scientific theories will not be viewed as alternative accounts of reality that rival religious ones. The claim is not, therefore, that scientific theories are substitutes for religious theories, or *vice versa*. Rather, scientific and

religious theories are regarded as leaving room for (and even requiring) one another. It is no surprise, then, that proponents of this view characteristically focus on what have been called ‘boundary questions’: religious questions that purportedly arise at the boundaries of science.³⁸

The hope of those adopting this particular approach is that the claims of modern science and those of traditional religion can be rendered mutually coherent. Thus, the ambition of those endorsing this position is subtler than that of earlier thinkers who sought to demonstrate that religious doctrines directly support the findings of modern science, or vice versa. Their position is also in sharp contrast to the two positions we have reviewed above. Consider, for example, the religious doctrine that God created the universe and the scientific theory that the universe originated in a Big Bang. Those holding the antagonistic relationship view would regard the religious doctrine and the scientific theory as in deep conflict. In contrast, those holding the non-antagonistic incommensurability view might claim that the religious doctrine concerns the value and meaning of the universe, while the scientific theory explains the objective facts about it. According to the complementarity view, however, one might interpret the religious doctrine not as a theory of cosmogenesis but as a claim about the world’s ultimate dependence on God. God might then be envisaged as providing the conditions under which the Big Bang took place. In such a manner, the claims of scientists and those of religious believers might be rendered mutually coherent. As Ernan McMullin, an advocate of the complementarity view, puts it, the religious person

cannot separate his science from his theology as though they were in principle incapable of interrelation. On the other hand, he has learned to distrust the simpler pathways from one to the other. He has to aim at some sort of coherence of world-view, a coherence to which science and theology...must contribute. He may, indeed *must*, strive to make his theology and his cosmology consonant in the contributions they make to his world-view. But this consonance (as history shows) is a tentative relation, constantly under scrutiny, in constant slight shift.³⁹

This type of position became increasingly popular as the twentieth century approached its close. Indeed, its attractions are easy to identify. For it claims to offer the religious believer a worldview that harmoniously embraces both scientific and religious claims. The pressure of the need to choose one or the other is released, while the cognitive dissonance involved in the effort to keep both within rigidly defined limits is avoided. Furthermore, on the face of it, this position might not require any substantive change to certain religious views. However, as we shall see, this may only be an appearance—an appearance, moreover, which disguises a

serious problem inherent within this position. But, before we consider problems with the complementarity view, let us consider what has contributed to its success.

The complementarity view has received support from new conceptions of the nature of science that emerged in the second half of the twentieth century. Indeed, since the demise of logical positivism in the mid-century, conceptions of science have changed enormously. Few scientists or philosophers of science now endorse an unqualified version of a positivist conception of science. Some, notably Karl Popper, argue that understanding the world scientifically is a creative activity in which the imagination of the scientist plays a crucial role.⁴⁰ Others stress the role of paradigms, models and analogies within scientific thinking.⁴¹ The common factor behind each of these new ways of thinking about science is a re-evaluation of scientific language. Earlier positivist theories were committed to the possibility of pure ‘observation statements’. These were supposed to report what was present to the senses without the aid of theory or interpretation. The goal was to base scientific theories on the indubitable foundation of such statements. As science advanced in the late-twentieth century, however, this goal began to appear increasingly elusive. The theories of quantum mechanics that were so prominent in late twentieth-century science, for example, strained the imagination in an effort to found them on indubitable observation statements which reported basic sensory experiences. It was difficult for many to avoid the conclusion that scientific theories were radically underdetermined by raw observations. Moreover, in an effort to describe the understanding of our world that emerged from increasingly sophisticated experiments, scientists were forced to resort to non-literal language. Indeed, all of the substantial scientific theories of the late-twentieth century relied upon metaphor for their articulation. Scientific language, like religious language, came to be recognised as loaded with imagery and interpretation, rather than just comprising a literally true description of the ‘facts’ grounded in observation.⁴² By the end of the twentieth century, it had become common to emphasise how theory-laden are the data of science. Many theorists argued quite plausibly that what was regarded as scientific data depended to a large extent upon the theory that was assumed. In other words, they claimed that scientific theories determine what one will regard as salient, and hence what one will identify as a potential ‘fact’.

This new perspective on the relationship between theory and interpretation within science suggested further similarities between it and religion. John Polkinghorne, who is both a professionally-trained physicist and an Anglican priest, argues that religion, like science, has data that is shaped by theory.⁴³ Religious doctrines, he claims, both determine what is to count as data and provide a framework for interpreting it, just as scientific theories do within their

domain. And what we can therefore learn from considering the similarities between science and religion, Polkinghorne avers, is that ‘each is corrigible, having to relate theory to experience, and each is essentially concerned with entities whose unpicturable reality is more subtle than that of naive objectivity’.⁴⁴

Religious thinkers have, then, quickly apprised themselves of the new, more flexible views of science and scientific language that flourished in the late-twentieth century. Not everyone who is sympathetic to religion, however, has unreserved confidence in this approach. Ian Barbour, for example, while recognising the advantages of theories like Polkinghorne’s, expresses reservations:

In the attempt to legitimate religion in an age of science, it is tempting to dwell on similarities and pass over differences. Although science is indeed a more theory-laden enterprise than the positivist had recognized, it is clearly more objective than religion.... The kinds of data from which religion draws are radically different from those in science, and the possibility of testing religious beliefs is more limited.⁴⁵

One danger, then, facing those who argue for an alliance of science and religion based on their supposed similarities is that they may overlook important differences between the two domains.

Moreover, those thinkers who emphasise the similarities are, perhaps, motivated by the hope that if science and religion can be shown to be similar in the relevant respects, then the challenges which scientific claims would seem to pose to religious claims need not be regarded as being as devastating as they would have to be if science were thought to be methodologically superior to religion. And if science and religion can be shown to be on a par, then religious believers would no longer be compelled—on pain of irrationality—simply to defer to scientific claims. Scientific claims would need to be made consistent with religious claims no less than the obverse. Nevertheless, most thinker who endorse some version of the complementarity view do not tend to draw attention to, what strikes many as, their devaluation of science. Rather, they primarily strive to show how the claims of science can be rendered consonant with the claims of religion. Some go even further, though, and employ scientific theories to provide new interpretations of traditional religious ideas. Pierre Teilhard de Chardin is one.

Chardin synthesises scientific theory and Christian religious belief with the specific aim of arriving at a comprehensive worldview.⁴⁶ And his understanding of one of the major scientific theories of his day—the theory of evolution—led him to regard God as immanent in a world that, Chardin believes, should be conceived as incomplete—which constitutes a striking

departure from the traditional Christian conception of God. Another example of how Chardin's religious ideas were altered as a result of his scientific views is his theory of the Omega point. Chardin thought that the theory of evolution was somehow parallel to the Christian belief that all things will be fulfilled in Christ. Thus, the culmination of the process of evolution, he believed, was identical with what in traditional Christianity was regarded as the 'Cosmic Christ', the 'Omega' or goal of creation. Needless to say, this view of Christ diverges quite dramatically from that held in traditional Christianity. But such modifications to traditional religious ideas were required, in his view, in order to 'baptise' evolutionary theory by explaining its place within a wider religious worldview.

Another Christian thinker exemplifying the complementarity view is Karl Rahner, who also employs the theory of evolution, but who does so in order to provide a novel interpretation of the Christian doctrine of the incarnation.⁴⁷ Portraying the incarnation as simultaneously the climax of the evolutionary process and the climax of God's self-expression, he regards it as a continuation of the salvific process that was begun in creation. Many Christians object to this reformulation of the doctrine, however, because they believe that, in portraying Christ as emerging naturally from the evolutionary process and not as the result of a unique act of God, it underplays the element of discontinuity with the past that was central to the traditional account. Despite Rahner's claim that his interpretation is faithful to the spirit of the original doctrine, the result is a startling example of the type of doctrinal modification that the complementarity view might demand.

Thus, perhaps the main problem with approaches such as Chardin's and Rahner's lies in the extent to which traditional religious ideas are transformed in the attempt to make them fit within a worldview that is primarily shaped by scientific theories. And religious believers might legitimately fear that if the scientific theories came to be superseded, then the religious beliefs that had been shaped by them would simultaneously be undermined. In short, the religious beliefs may come to appear as indefensible as the superseded scientific ones. To be fair, however, this is not a problem that uniquely afflicts thinkers who adopt the approach exemplified by Chardin and Rahner. It is merely a reformulation of a problem that has been addressed by many religious thinkers, Jewish, Christian and Muslim, throughout the centuries. The problem has arisen whenever a religious thinker has appropriated the concepts of any philosophy in order to articulate his or her religious beliefs. The classic example is the assimilation of Greek philosophy in the medieval period as a vehicle for expressing and clarifying the beliefs of the Abrahamic monotheisms. Given the difficulty of elucidating religious beliefs without the aid of any kind of philosophy whatsoever, the outcome of those

medieval debates was on the side of those who claimed to employ a philosophy (such as Aristotelianism) without allowing it to distort too profoundly the content of their religious beliefs. In the case of Chardin and Rahner, we can readily see that they attempt to elucidate their Christian beliefs by interpreting them with the aid of scientific theory. However, in so doing, they clearly go well beyond what many of their co-religionists would find acceptable, and are thus frequently accused of changing the substance of traditional Christian belief past recognition.⁴⁸

Despite this problem, it does seem that the view that science and religion are complementary has at least one significant advantage over the other positions we have considered: namely, it aspires to provide a unified worldview that is sensitive to the claims of both science and religion. And, surely, such a worldview, if available, would be superior to one in which scientific and religious claims were held despite their obvious contradictions. Given this, it is no surprise that many religious thinkers have been attracted to the view that science and religion are complementary. However, it is difficult to see how regarding religion and science as complementary will not demand continual transformations in religious belief systems when their complement—scientific theories—is in a process of perpetual development.

Conclusion

In conclusion, then, there are three basic ways in which the relationship between religion and modern science can plausibly be construed: as fundamentally antagonistic; as non-antagonistically incommensurable; and as complementary. And while each construal offers benefits to the religious believer, none is without its costs. Nevertheless, it does seem that the third construal—complementarity—offers the best prospect for ongoing, creative religious thought.

Notes

¹For the traditional Hebrew account of creation, see the Book of Genesis, Chapters 1 and 2. For an account of creation in the Qur'ān, see, for example, Sura 41: 9–12.

²Traditionally, each of the monotheisms has assigned great importance to beliefs concerning God's action upon the world on behalf of their respective faith-communities. Miracles (incidents in which God is thought to intervene in the world by breaking natural laws) have been invoked by each tradition in support of its claims.

³This would be more than a little ironic if, as some have argued, the three Abrahamic faiths provided the initial conditions under which modern science developed. For example, Steve Bruce argues that, by reducing a plethora of divinities to one God, and regarding that one God as distant from the universe, the monotheisms encouraged people 'to explore that universe and elaborate theories of its operations that paid only lip-service to the creator'. Steve Bruce, *Fundamentalism* (Cambridge: Polity, 2000), p. 23.

⁴Notwithstanding this popular view, philosophers were well aware that scientific method could not yield absolute certainty. Thus, science fell far short of the standards western philosophers, such as René Descartes, expected knowledge to meet. Some have argued that scientific claims fall short of certainty because they appear to be derived from a reasoning process called induction: after one has seen many swans, and each one seen thus far has been white, one comes to believe that all swans are white. But as David Hume pointed out in the eighteenth century, no matter how many particular observations one has made, one can never be absolutely certain that the next one will be similar. In the twentieth century, Bertrand Russell illustrated the problem of induction thus: the chicken, having been fed every morning, expects the same thing to happen every day—only to have its head chopped off at Christmas time! See Bertrand Russell, *The Problems of Philosophy* (London: Oxford University Press, 1967). Karl Popper, however, has argued that, strictly speaking, the problem is not that of induction. When puppies, for example, sniff a cigarette, they run away from it, and will not return. They do not draw the conclusion from several unpleasant experiences that the next one, too, will be unpleasant. One such experience is quite enough. On Popper's preferred account, one moves from particular observations to the formulation of a general theory that can explain these observations. Good scientific practice, in Popper's view, consists in attempting to refute by experiments the theory that has been proposed to explain the observations. The best theory is the one that withstands such testing. However, in Popper's view, this does not establish that the best theory is therefore true. The experimental data to date will always support both the best theory and some other, conceivable theory. And for all we know, the next set of data will support the alternative theory and not our preferred one. This problem is generally referred to as the 'underdetermination' of scientific theories.

⁵Don Cupitt, *The Worlds of Science and Religion* (London: Sheldon Press, 1976), p. 86.

⁶For example, the religious belief that God created the world in a finished state has, by and large, been retracted in the light of evolutionary theory.

⁷Any such assumption is surely vitiated by the fact that the majority of religious believers in the West seem to have no difficulty in adhering to their faith while having enjoyed an education that prioritises the sciences. Given this situation, the assumption that religion and science are in inevitable conflict begins to seem less plausible.

⁸Ibn Warraq, *Why I Am Not a Muslim* (New York: Prometheus Books, 1995), p. 7.

⁹Epitomised, perhaps, by Mary Shelly's Dr Frankenstein.

¹⁰'Scientific materialism' is alternatively known as 'scientific naturalism'.

¹¹Among the more prominent scientific materialists are numbered: Francis Crick, Stephen Hawking, Richard Dawkins and Jacques Monod, each with a best-selling book to his credit—which is indicative of the considerable interest scientific materialism has stimulated at the level of popular culture.

¹²See Edward O. Wilson, *Sociobiology: The New Synthesis* (Cambridge: Harvard University Press, 1975), Chapter 4. Also, see Edward O. Wilson, *On Human Nature* (Cambridge: Harvard University Press, 1978), Chapters 8 and 9.

¹³*Ibid.*, p. 169.

¹⁴*Ibid.*, p. 175.

¹⁵*Ibid.*, p. 188.

¹⁶Wilson adds that 'theology is unlikely to survive as an independent intellectual discipline'. *Ibid.*, p. 192.

¹⁷Adapted from Holmes Rolston III, *Genes, Genesis and God: Values and Their Origins in Natural and Human History* (Cambridge: Cambridge University Press, 1999), p. 335.

¹⁸Keith Ward, *God, Chance & Necessity* (Oxford: Oneworld, 1996), p. 99.

¹⁹*Ibid.*

²⁰*Ibid.*, p. 100.

²¹See Basil Mitchell, *Faith and Criticism* (Oxford: Clarendon Press, 1994), p.10.

²²*Ibid.*, p. 11.

²³See *ibid.*, pp. 12–17.

²⁴*Ibid.*, p. 19. In a similar vein, Michael Polanyi claims that all knowledge requires the personal participation of the knowing subject, and that the assessment of evidence—in science or in religion—is always, at bottom, an act of personal discretion. Objectivity is secured, he avers, by participation in a community of inquiry, be it scientific or religious. See Michael Polanyi, *Personal Knowledge* (Chicago: University of Chicago Press, 1958).

²⁵Mitchell, *Faith and Criticism*, *op. cit.*, p. 18.

²⁶*Ibid.*, p. 22.

²⁷See, for example, Hilary Putnam, 'The Impact of Science on Modern Conceptions of Rationality', *Synthese* 46 (1981): 365.

²⁸John Maynard Smith, 'Science and Myth', *Natural History* 93, 11 (1984): 11.

²⁹*Ibid.*, p. 24.

³⁰Modercai Kaplan, *Judaism Without Supernaturalism* (New York: The Reconstructionist Press, 1958), p. 48

³¹While the medieval proponents of natural theology maintained that full knowledge of God could only be arrived at by revelation, they also held that there was at least some knowledge of God that could be arrived at by natural means—for example, knowledge of God's existence. Thus, there was thought to be some overlap in what could be learned from the two means of acquiring knowledge.

³²See Karl Barth, *Church Dogmatics* Volume 1/i: *The Doctrine of the Word of God*, edited by G. W. Bromiley and T. F. Torrance (Edinburgh: T. & T. Clark, 1975); and Karl Barth, *Church Dogmatics* Volume 2/i: *The Doctrine of God*, edited by G. W. Bromiley and T. F. Torrance (Edinburgh: T. & T. Clark, 1957).

³³See Søren Kierkegaard, *Concluding Unscientific Postscript*, translated by D. F. Swenson (Princeton, New Jersey: Princeton University Press, 1974).

³⁴Ludwig Wittgenstein, *Lectures and Conversations of Aesthetics, Psychology, and Religious Belief*, edited by C. Barrett (Oxford: Oxford University Press, 1966), p. 55.

³⁵See D. Z. Phillips, *Faith and Philosophical Enquiry* (New York: Schocken Books, 1970).

³⁶Harold A. Netland, *Dissonant Voices: Religious Pluralism and the Question of Truth* (Leicester: Apollos, 1991), p. 187.

³⁷See Sheikh Abu Hamid Al-Ghazali, *The Incoherence of the Philosophers, Tahāfut al-falāsifah: a parallel English-Arabic text*, translated, introduced and annotated by Michael E. Marmura (Provo, Utah: Brigham Young University Press, 1997), pp. 5f.

³⁸The Christian theologian Thomas Torrance, for example, points out that, through scientific enquiry, we can establish exactly what conditions were present when the universe began, although we cannot determine why just those initial conditions obtained. The latter question, according to Torrance, requires a religious answer. See Thomas Torrance, *Divine and Contingent Order* (Oxford: Oxford University Press, 1981).

³⁹Ernan McMullin, 'How Should Cosmology Relate to Theology?' in Arthur Peacocke (ed.), *The Sciences and Theology in the Twentieth Century* (Notre Dame: University of Notre Dame Press, 1981), p. 52.

⁴⁰See Karl Popper, *The Logic of Scientific Discovery* (London: Hutchinson, 1959).

⁴¹See, for example, Thomas Kuhn, *The Structure of Scientific Revolutions* (Chicago: University of Chicago Press, 1962). Kuhn argues that scientific paradigms are highly resistant to falsification.

Religious thinkers have pointed out the apparent parallel with the resistance of core religious beliefs to falsification.

⁴²See, for example, Ian G. Barbour, *Myths, Models and Paradigms* (New York: Harper & Row, 1974); Sallie McFague, *Metaphorical Theology: Models of God in Religious Language* (Philadelphia: Fortress Press, 1982); and Janet Martin Soskice, *Metaphor and Religious Language* (Oxford: Clarendon Press, 1985).

⁴³The data of religion, according to Polkinghorne, are its scriptures and the religious experiences of past and present believers.

⁴⁴John Polkinghorne, *One World: The Interaction of Science and Theology* (Princeton: Princeton University Press, 1987). Quoted in Ian G. Barbour, *Religion in an Age of Science* (London: SCM, 1990), p. 23. For a similar view, see Holmes Rolston III, *Science and Religion: A Critical Survey* (New York: Random House, 1987).

⁴⁵Barbour, *Religion in an Age of Science*, *op. cit.*, p. 23.

⁴⁶See, for example, Pierre Teilhard de Chardin, *The Phenomenon of Man* (New York: Harper & Row, 1959).

⁴⁷See Karl Rahner, *Foundations of Christian Faith: An Introduction to the Idea of Christianity* (London: Darton, Longman and Todd, 1984), Chapter 6.

⁴⁸Another potential problem is that if a religion is identified too closely with a particular scientific theory, or metaphysical system, it becomes susceptible to the undesirable consequences of that theory, or system. Thus, Chardin's position led him to argue for the racial and cultural superiority of Europeans—something that was not implied by traditional Christianity.