

RELATIONSHIP BETWEEN RELIGION AND SCIENCE: AN OVERVIEW

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Abstract

This paper presents an overview of the relationship between religion and science. It points out that historically religion preceded science, as the limitations of human intelligence in a bizarre world led man very early to postulate a being considered ultimate, supreme and worthy of human obeisance and worship. Like religion and philosophy, science began in wonder: to explore the wonders of nature – of the physical world. Religion and science are related in that both of them have perspectives on cosmic reality, even though there are several differences in their interpretations of reality. It is the different interpretations as well as their methods at arriving at their truths and conclusions that eventuated in conflicts, conflicts that actually came to the fore with the emergence of experimental science in and after the seventeenth century of our era and led to the condemnation by the Catholic Church of Galileo, the acknowledged founder of modern science. Scientific theories such as the evolution theory, quantum physics, and some theories of neuroscience presented challenges to religious doctrines of creation, cosmic order and intelligibility, divine sovereignty, and human nature. However, there are areas of integration, such as natural theology and design, order and regularity of nature, that provide evidence of the existence of God – evidence that is supported by most scientists. The paper concludes that religion and science are different languages that ultimately express the same reality or at least present complementary accounts of reality, and that, given the wonders and mysteries of the created universe and the limitations of human intelligence, religion and science will continue to be bedfellows in the twenty first century and beyond.

1. Introduction

Before science, religion was. This was because the conviction by man of his own limitations in a bizarre world that is full of incomprehensible events or phenomena led him to postulate a being and a cause considered unlimited and ultimate. Even though it is possible for science to throw doubts in the minds of people about the status of religious belief and, thus, lessen the enthusiasm for religion, there is no credible evidence that religious belief or experience will disappear or lose its influence on human beings in the wake of the emergence of science. What seems

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to have happened, however, is that both the religious and scientific enterprises have come to be embraced and are influencing human attitudes to nature or the universe, though not without mutual suspicions or even conflicts, as will be pointed out in detail in this paper.

I define religion as the awareness of the existence of some ultimate supreme being held as the origin and sustainer of this universe and the establishment of constant, generally worshipful, ties with this being. Thus defined, a religion would evolve and maintain a system of beliefs about the totality of human experience. I define science simply as nature study – as the intellectual enterprise concerned with investigations into natural phenomena, into the structures of the physical world.

The two enterprises – religion and science – are related in that they both have perspectives on reality, even though their interpretations of reality differ in several ways. The relationship is based also on the fact that they both affect our attitudes to this complex world differently.

In this paper, I explore the relationship between religion and science. I must state at once that I am not a scientist. I am a philosopher who shows some interest in science. My exploration is based on the statements, views and arguments of scientists, as much of them as I understand. I will confine myself, not to the details of the scientific experiments that gave rise to scientific statements or conclusions, but to the logic of scientific statements. In philosophy of science, philosophers seek to clarify or analyze concepts, statements and arguments of science.

2. Relationship between Religion and Science before the 17th Century A.D.

For many, many centuries the status of religious belief was acknowledged and was unquestioned. Not that observations and inquiries into nature had been lacking in the centuries preceding the seventeenth century of our era, which is often regarded as the starting point of modern science; for, ancient thinkers, particularly the Pre-Socratics, Plato, Aristotle, and Epicurus did make extensive observations about nature or the physical world. Atomism, which is a theory of the origin of the physical world, was in the Western world developed by the philosophers Leucippus (fl. 440 BC) and his disciple Democritus (460-370 BC) and further developed by Epicurus (341-270 BC) and in the Roman world by the poet and philosopher Lucretius in the first century BC. Atomism spread to the medieval Western world largely during the Renaissance, with the work of philosophers such as Nicholas de Cusa (1401-1464), the astronomer and natural philosopher Galileo Galilei (1564-1642), who found atomism to be consistent with his experiments in physics, and others. Let me mention that the atomic doctrine of Democritus contains the

statement: "Nothing can be created out of nothing, nor can it be destroyed and returned to nothing."¹ This statement could have been troubling to religious belief, for it obviously flew in the face of the doctrine of *creatio ex nihilo* ('creation out of nothing'), a basic doctrine of Christianity and other orthodox religions.

Aristotle's work titled *Physics* was widely read and discussed during the medieval period; it became very influential. Among Aristotle's assertions are that the world was uncreated (ungenerated: Greek *ageneton*), indestructible (Greek: *aphtharton*), and eternal (Greek: *aion*), that time and motion are incorruptible: they have no beginning and end. The philosophical ideas of Aristotle reached the Medieval Christian world through translations from the Arabic. Even though they were challenged, they do not, for some curious reasons, seem to have received the official condemnation of the theologians as did the ideas of Galileo or Charles Darwin in subsequent centuries.

The theory of the medieval astronomer Copernicus, that the sun rather than the earth was the centre of the planetary system, appeared to conflict with traditional Christian religious ideas, just as it was in defiance of the astronomy of Ptolemy.

Despite all this, the authority and influence of religion remained largely unscathed in those centuries, i.e., before the 17th Century AD. I think one reason that led to this was that science, then, was not an autonomous intellectual enterprise based on and guided by systematic experimentation. Even though observation was not absent from Aristotelian and medieval science, nevertheless, their theories could not be tested by further experiment. Thus, not having been able to wean itself from its Greek antecedents, medieval science became a branch of philosophy, to all intents and purposes. Lacking a basis in experimentation, it could not discover or arrive at far-reaching significant scientific ideas that could be considered subversive of orthodox religious doctrine. Without a basis in experimentation, medieval science, like its Greek precursor, was essentially deductive rather than inductive; whereas in its method science is essentially or primarily inductive, notwithstanding the deductive features of the scientific method that are manifested particularly in the application of mathematics to the physical sciences. The overall consequence of the interaction between science and religion in the period before the 17th century was a synthesis between them: science was given accommodation and embrace in the house of God, so to speak. The conflicts that characterized the relationship between religion and science in and after the 17th Century did not occur in the period before then.

3. The Emergence of Modern Science

The emergence of modern experimental science later in the 17th Century was to change the previously symbiotic relationship between religion and science; it brought about hostility and conflict in the relationship. The new science of the 17th Century and beyond showed itself as a restless and belligerent spirit, unprepared to make overtures with religion or any kind of metaphysics that stood in its way of arriving at what it saw as the truths about the universe. Galileo, regarded as the father of modern science because of his emphasis on and commitment to experimentation as the new scientific methodology, together with other investigators of the seventeenth century, set science free from the restraining influences of the Church and made it an independent sphere of human thought. Galileo placed himself on a collision course with the Church when he advocated the new Copernican theory which maintained that the earth and the planets revolve around the sun, rather than the accepted Ptolemaic theory in which the sun and the planets revolve around the earth. The Ptolemaic theory was said to be in harmony with scriptural passages that implied that the earth is the centre of the cosmos: the sun and the planets revolve around the earth because the earth is the centre of the cosmos. Galileo was, thus, seen as challenging the authority of the Church and was condemned after he was tried before a panel of cardinals in 1633. He was condemned for violating an injunction sent to him in 1616 requiring him “not to hold, teach, or defend in any way whatsoever that the earth moves.”² We learn, however, that “throughout the controversy, and until his death, Galileo remained a religious man.”³

Galileo gave up his scientific belief and spent the rest of his life under house arrest. He was forbidden to publish his work titled *Discourses on Two New Sciences* but managed to get the work published in Protestant Holland in 1638, four years before his death in 1642. The *Dialogues* of Galileo remained on the *Index of Prohibited Books* until 1822. In 1984 Pope John Paul II appointed a commission to reexamine those events. The commission admitted that “church officials had erred in condemning Galileo.”⁴ In 1992 after reviewing the commission’s findings, the pope said that there are “two realms of knowledge” and that the failure to distinguish them had led theologians “to transpose into the realm of the doctrine of the faith a question that in fact pertained to scientific investigation.”⁵ The pope was, thus, asserting the Independence thesis on the relationship between religion and science. I will explain the thesis shortly.

Even though Galileo’s trial appeared to be episodic and exceptional, it presaged what was ahead in the relationship between religion and science in the decades and centuries to come. There followed long periods of interminable

hostilities, wrangles, disputes, controversies, and disagreements over the relationship between religion and science that have continued to this day and are likely to go beyond this century.

It would be correct to say that conflicts or sharp disagreements between religion and science arise basically because both of them are concerned with the interpretation of reality, with the search for that which is ultimately or absolutely real. The conflict is, thus, grounded on the different perspectives on reality. But the conflict derives also from their methods in arriving at their truths or conclusions. Science requires explanations that can be generalized, facts that are disciplined by experimentation, and experiments that are repeatable and verifiable elsewhere: thus, scientific methods are objective. Science is concerned about causal relations between empirical events. Religion, on the other hand, is subjective and is concerned about meaning and purpose of life. The question arises as to which of them, if either, offers a more credible or satisfying perspective on reality.

Ian Barbour, a professor of physics and religion, has identified four ways in which science and religion may be said to interact.⁶ These ways are: Conflict, Independence, Dialogue, and Integration. Not being a scientist and, thus, not deeply knowledgeable about the really technical or professional details and nuances of scientific arguments, I would avoid such nuanced arguments, even though I hope to say much that will enable us to appreciate the issues involved in the relationship between religion and science as well as the attempts to deal with them. Some scientific theories, such as the evolutionary theories, raise philosophical questions and can be explored from the philosophical point of view.

The Conflict view of the relationship between religion and science simply means that religious doctrine and scientific perspective are incompatible and so cannot in any way be reconciled. It means, therefore, that one cannot logically accept the doctrines or positions of both, for the position of one excludes the other; a person can only choose one or the other, not both. I will in due course provide several instances where religious doctrines are alleged to be in conflict with scientific positions.

According to the Independence thesis, conflicts between religion and science need not arise because religion and science refer to different aspects of reality, employ distinctive methods, serving totally different functions in human life as reflected in their different languages; their objects also are different – science dealing with questions about natural phenomena and, thus, about objective facts, while religion deals with ultimate meaning and purpose and recommends allegiance to particular moral principles and a way of life oriented to the supernatural or the hereafter. Thus, the two are parallel conceptual systems, and because they do not

cross each other's path, there should be no conflict between them, according to the Independence thesis. They are separate and mutually exclusive realms of human thought and experience, each realm having its own distinctive questions, rules and criteria of judgment. The Independence thesis, thus, tries to steer clear of the Scylla of insistent and unyielding theism and the Charybdis of restless and self-assured scientific enterprise.

On the surface, the Independence view may appear attractive particularly to the non-scientist person with religious faith, but not to the scientist with some religious faith. However, the Independence view of the relationship between religion and science prevents any constructive interaction between them, such as the influence one of them could have on the other, the inspiration one of them could derive from the other, and the mutually relevant and valuable questions one of them could raise for the other's attention, and so on.

The assumption of the Dialogue view is that while the differences between the methods of religion and science may be different, there may be similarities which must be acknowledged. Science is interested in the question as to why the universe is orderly and intelligible, for instance, but it is not in a position to answer the question satisfactorily. In this matter, through a dialogue between religion and science, religion might be able to provide some answer that may be of interest to the scientist. Similarly, dialogue may arise when one field employs for its own purposes analogous concepts analyzed in the other field. Thus, analogous concepts in science are used by religion to talk about God's relation to the world. The valuable thing about Dialogue view is that it emphasizes similarities between religion and science such as can be discovered, whereas the Independence view merely emphasizes the differences between them.

The Integration view argues that religion and science can contribute to the development of a metaphysic that has the potential of satisfying the demands and goals of both. This view, however, requires that some of the traditional religious beliefs or doctrines should be reformulated in the light of scientific discoveries or theories.

4. Natural Theology and Design

One example of the Integration view is natural theology, which infers the existence of God from the evidence of design in nature, evidence that is supported or confirmed by most scientists. The founders of modern science, says Barbour, "frequently expressed admiration for the harmonious coordination of nature, which they saw as God's handiwork. Newton said that the eye could not have been contrived without skill in optics, and Robert Boyle extolled the evidences of

benevolent design throughout the natural order.”⁷ Natural religion or theology has empirical basis for, like science, it draws on, or takes off from, natural phenomena and man’s reflections on these phenomena. Natural theology, which also leads to the postulation of the existence of God, results from man’s application of reason to the characteristics of nature as an object. Design or the argument based on design is discovered through man’s rational enterprise. Traditional African religion, not being a revealed religion, is, I have argued elsewhere, a natural religion.⁸ Natural theology, which derives from design, can support revealed theology. It is a conception of design in nature – a design that derives from an act of God – that grounds the orderliness and intelligibility of nature.

It would be correct to say that much, if not the entire, enterprise of science operates from the orderliness of nature and the regularity that characterizes natural events or phenomena. Orderliness and regularity, expressed or manifested in the laws of nature, are fundamental presuppositions of science. It is the orderliness of nature and the regularity that follows from it that make predictability in science possible. But design also implies that the world in which science functions is a determinist world, a world in which events happen according to the laws of nature. Thus, knowledge of all antecedent conditions and laws of nature would make it possible to predict the entire future. This means that determinism excludes chance. The source of determinism in nature must be a Great Intelligence – the God of the theistic religions, a conscious being.

The seventeenth century physics of Sir Isaac Newton upheld the determinism of the world. Newton maintained the idea of a universe rigidly determined by natural laws fixed by an intelligent creator, God. Newton believed that God “keeps the stars from collapsing under gravitational attraction and intervenes periodically to correct planetary perturbations in the solar system.”⁹ Thus, for Newton and his followers, God not only designed the laws of nature but sustains them continually. This act of sustenance is an expression of God’s purpose and sovereignty.

In a determinist world there is no place for chance or contingency; determinism and chance are incompatible. Contingency subverts regularity, orderliness and determinism. Albert Einstein, undoubtedly the greatest of the twentieth-century scientists, strongly believed in the order and predictability of the universe, which, like Isaac Newton, he maintained was a determinist universe. He considered contingency a threat to belief in the rationality or intelligibility of the world, a feature of the world which he thought is central in science. Science merely assumes the intelligibility of the world; but this feature of the world is an aspect of the creative act of God, the creator. Einstein noted: “A conviction, akin

to religious feeling, of the rationality or intelligibility of the world lies behind all scientific work of a high order."¹⁰ He expressed "a deep faith in the rationality of the world."¹¹ And, in searching for unified laws in cosmology, the physicist James Trefil writes:

But who created those laws? ...Who made the laws of logic? ... No matter how far the boundaries are pushed back, there will always be room both for religious faith and a religious interpretation of the physical world. For myself, I feel much comfortable with the concept of a God who is clever enough to devise the laws of physics that make the existence of our marvelous universe inevitable.¹²

5. Quantum Physics and Religion

Physics, the study of the basic structures and processes of change in matter, was undoubtedly the first science that was systematic. Its Greek root, *phusis*, means 'nature', i.e., the material or sensible world of our everyday experience. Thus, the earliest Greek thinkers who paid attention to inquiries about nature, such as the atomists, were called *physikoi* ('physicists') or *physiologoi* ('physical speculators', 'speculators of nature', 'philosophers of nature'). It would be correct, in my view, to say that, among the sciences, physics has exerted the greatest influence on philosophy and theology.

Classical physics upheld the deterministic character of the world and, so, did not present any challenge to religious beliefs. However, deism, the belief that God created the universe and left it to run by itself, thus restricting God's role to that of a clockmaker, was developed in the eighteenth century.¹³ In implying that God does not intervene or operate continuously in the affairs of the world after having created it, deism proposed a doctrine that was at odds with fundamental religious beliefs. Classical physics affirmed the certainties of prediction. By contrast, quantum physics, developed in the 1920s and was about atomic and subatomic phenomena, maintained that there were inherent uncertainties in the predictions of events. Quantum physics was a rejection of determinism on one hand and an acknowledgement of the openness of the future and its consequent indeterminacy on the other hand. (I must confess that I do not understand the intricacies and nuances of the quantum theory of physics, just a little enough to enable me to relate some aspects of it to religious beliefs.)¹⁴

It is the indeterminacy in nature itself that gives rise to the uncertainties in the predictions made by quantum theory. The consequence of the rejection by quantum theory of determinism is that quantum events occur by chance. The notion of chance in quantum phenomena challenges ideas of divine purpose and

sovereignty or control. Chance, like indeterminacy, limits the power of God. It is known, however, that a minority of physicists, including Einstein and Max Planck, have stuck to the deterministic theory, maintaining that the uncertainties of quantum theory are to be attributed to temporary human ignorance and that someday appropriate physical laws will be found that will make accurate predictions possible. Einstein wrote: "The great initial success of quantum theory cannot convert me to believe in that fundamental game of dice.... I am absolutely convinced that one will eventually arrive at a theory in which the objects connected by laws are not probabilities but conceived facts."¹⁵ And, in a famous statement that rejects the element of chance, he said: "God does not play dice."¹⁶ To this famous statement of Einstein's Niels Bohr, a Danish physicist considered the founder of modern atomic physics, responded, "Nor is it our business to prescribe to God how He should run the world."¹⁷ Bohr's point, I think, is that we should remain agnostic with regard to God's attitude to the world: we do not know, so would Bohr say, whether God plays dice with the world or not. Einstein expressed his confidence in the order and predictability of the universe, which he thought would be damaged by any element of chance that derives from indeterminism – from quantum physics.

We must note, however, that a number of physicists deny that uncertainty is the result of temporary ignorance but that it is a fundamental limitation that hinders the achievement of exact knowledge of the atomic world. And, I have learned that the French physicist Alan Aspect and his group have "in a series of elegant experiments confirmed the correctness of the quantum mechanical prediction."¹⁸ The logic of the arguments of anti-Einstein physicists (who may be referred to as 'the indeterminists'), then, is that it is possible to reject determinism, install chance, and yet believe in scientific predictions. What I still find mind-boggling, in the wake of the quantum rejection of determinism, is the possibility of scientific predictions being based on chance, on randomness, on irregularity! Quantum theory seems to present a paradox.

It would be correct to say, however, that even though quantum physics' notions of indetermination and chance must originally have been perceived as in conflict with religious doctrine, nevertheless, the logic of quantum physics appears, at least in part, compatible with religious belief. First, the notion of the openness of the future, which is a logical feature of indetermination, suggests that the human mind or human knowledge is limited and so cannot see far into the future. Beliefs in the limitations of human knowledge are compatible with Biblical ideas. Second, some theologians have argued that the notion of quantum indeterminacy allows room for divine intervention and action: thus, that God determines the

indeterminacies left open by the laws of quantum physics.¹⁹ If, indeed, God controls or determines all indeterminacies, then it would follow that the traditional idea of predestination could be preserved. Chance would, consequently, have been eliminated. What appears to us human beings as chance must be held as really determined by God. In connection with this, let me say that for Akan thinkers, as for Aristotle, a chance event as such would, in fact, be an event whose cause is unknown, not one lacking a cause and occurring randomly.²⁰

The logical implications of quantum indeterminacy chime in with the religious doctrine that God controls all the events that appear to human beings as chance events.

As part of the development of the quantum theory, Niels Bohr proposed the principle of complementarity, which asserts that there can be two complementary descriptions of the same reality and that for a full account and comprehension of reality both perspectives are, or would be, needed. I do not claim to comprehend the details of the principle as applied to wave picture and particle picture. But I believe that the principle can be extended and applied to the relation between religion and science, compelling us to recognize that reality is a complex phenomenon that can be grasped from different approaches, which taken together help us to understand man's holistic experience in the world. Religion and science are different languages that *ultimately* express the same reality.

6. Evolution and Creation

One of the central pillars of the orthodox religions is the doctrine that God created the world. And, according to the Genesis story, God created the world in seven days. The doctrine of creation has been challenged by the theory of evolution. Because the evolutionary change takes place over a very long period of time, it conflicts with the seven days of creation. The theory of evolution, which challenges the idea of creation, also challenges other religious doctrines related to creation. For instance, it eliminates design; it affirms a world without design and, thus, a world without purpose. Thus, it was not surprising that, when Charles Darwin proposed the evolutionary theory in his famous work titled *On the Origin of Species* (1859), he was met with vehement opposition from theologians; the latter of course maintained that evolution and religious beliefs were incompatible.

It must be noted, however, that Darwin believed that God designed the whole evolutionary process but not the detailed structure of particular organisms, that the laws of evolution, not individual species, were the product of design. In his own words: "I am inclined to look at everything as resulting from designed laws, with the details, whether good or bad, left to the working out of what we may call chance...."

I cannot think that the world as we see it is the result of chance; yet I cannot look at each separate thing as the result of Design."²¹ Darwin's position on design vis-à-vis chance, as presented in this quote, is not very transparent; in fact there is some confusion here. It is not clear whether he fully supports design or fully supports chance. But can both be really jointly supported? Not really. Perhaps what Darwin means is that God designed the entire evolutionary process by creating the *basic* laws of evolution and that inherent in the designed world were potentialities that would be actualized in due course, the actualization occurring by chance, without God having anything to do with it.

The implications here fly in the face of religious doctrine. First, if my interpretation of the quotation from Darwin is correct, it makes God's act of creation tentative and incomplete, whereas the story of the Genesis says that 'God saw everything that he had made, and, behold, it was very good' (Genesis 1: 31). Second, it suggests that after creating the so-called evolutionary laws God left the theatre of human affairs – the affairs of the physical world, without further divine intervention in the affairs of that world: a position that is inconsistent with the Biblical view of God's sovereignty, his unrelenting love for man and his unflagging interest in man's aspirations and well-being. Third, it makes the wrong suggestion that the perfect God would leave anything to chance.

Evolution merely denies that our complex world was created by God; but it cannot deny that the simplest particles from which the complex world evolved were created. The question, "who created the original infinitesimal particles from which the complex world emerged?" would always be asked. To this question the response of evolutionary science in terms of chance would not be satisfactory, for it would make every event or phenomenon that occurs in the world a chance event, a position that would make the scientific enterprise *itself* well-nigh impossible. A former professor of physics at the University of Ghana who had been an agnostic for several years later admitted that the foundational particles out of which this complex world would have emerged could not have come about by chance but could only have been brought into being by a Great Intelligence and that, if this Great Intelligence was that identified with God, then he would believe in God.²²

In short, the evolutionary theory presented several challenges to the Christian religion. Among these are: a challenge to the Biblical doctrine that God directly created the world and did so in seven days; a challenge to the doctrine that God designed the world; a challenge to the religious belief that God directly created all humanity and endowed man with a nature; and a challenge to the status of ethical values. As regards the status of ethical values, evolutionary theory would lead to the relativity or subjectivity of ethical values and would, consequently,

reject the objectivity of values, for on the evolutionary theory values would be in a flux. Yet, the notion of the objectivity of values is very essential for the stability and smooth running of the human society. Religious belief, on the other hand, would generally affirm the objectivity and universality of ethical values.

7. Evolution and Human Nature

According to religious doctrine, God created man directly and “in His own image” and endowed him with intelligence and moral will to be able to respond to the demands of righteousness and justice. Man is, thus, *not* the result of an evolutionary process, but of a creative act. The Creator must have determined certain essential or intrinsic characteristics about man. In this way, God endowed man with a nature: human nature or human essence, with its complex and ramifying implications for human behavior. Evolutionary science, however, being essentially atheistic, denies the reality of human nature, for there would be no God to have a conception of it; that is, there would be no God to have fixed or determined it. Charles Darwin’s view, already referred to, that the whole process of evolution was designed by God implied that the human soul, among other entities, was *not* directly or immediately created by God, a position that was in conflict with a crucial religious view of human nature.

8. Neuroscience and Human Nature

The Christian religion, perhaps like other religions, maintains the body/soul dualism, that is, that a human being consists of two distinct entities or substances – body and soul (mind). They are distinct in that their natures are essentially different: while the body is a material, spatial, and mortal substance, the soul is an immaterial, non-spatial, and immortal substance. The soul is often identified with the self. (The terms mind and consciousness are used by dualist metaphysicians as equivalent to the soul or self.) The Christian dualist conception of human nature, which is anchored in the Bible, has been rejected by *some* neuroscientists (i.e., scientists who investigate the human brain) and by materialist philosophers influenced by the investigations of neuroscience. These brain scientists and materialist philosophers reject the body/soul or mind/body or brain/mind dualism by rejecting the nonphysical attributions of the soul or mind or self and reducing mental states or mental events to brain states or brain events. They, thus, identify mental states with brain states. In their terms, then, statements about the mind are to be translated as statements about the brain or the central nervous system, which is a physical system.

Thus, for some neuroscientists and scientific materialists matter (or, the physical substance) is the fundamental reality. Mind or self is not held by them as real, certainly not as primarily real. And, consciousness may even be part of

matter. But such a view is not convincing, for science cannot really account for the presence of conscious beings in the world. The reason is that no amount of subatomic particles will give rise to consciousness. Something outside the complex of physical laws is required to explain the rise of consciousness.

However, the researches, explanations and arguments of some other neuroscientists have led to the affirmation of the doctrine of the body/soul or mind/brain dualism. This doctrine has a long history behind it, as it goes back to Socrates, Plato, Saint Augustine, the Church Fathers, Saint Thomas Aquinas, Rene Descartes, and many other contemporary scientists and philosophers. In their recent most detailed book titled *The Self and Its Brain: An Argument for Interactionism*²³, the neurophysiologist Sir John Eccles (of Cambridge University, who was awarded the Nobel Prize for Neurophysiology in 1962) and the famous philosopher of science Sir Karl Popper (of London University) deploy detailed but complex explanations and arguments to defend dualism and the interaction of consciousness (i.e., soul) and the brain. It is stated in the book that Eccles, the brain scientist, is “a believer in God and the supernatural”, while Popper is “an agnostic”. Thus, in Eccles, as in many other scientists, science and religion meet.

Notwithstanding what has been said in the foregoing paragraph, Barbour thinks that “most scientists today do not accept either a body/soul or a brain/mind dualism.”²⁴ Even so, it would be correct to assert that scientists who are Christians or hold some religious faith would affirm the body/soul dualism as an aspect of their faith, for it is the religious or metaphysical doctrine of dualism that constitutes the entire basis for beliefs in personal survival following the demise of the body.

9. The Conception of Man as a Unity

A conception of man as a unity derives from Aristotle’s discussion of the soul in his *De Anima*. But Aristotle realizes that a conception of man as a unity of soul and body subverts the notion of personal survival after death, for, if the soul and the body are united, the disintegration of the soul concomitantly follows the disintegration of the body at death. This makes the soul a mortal – not immortal – substance. Realizing that the conclusion was fundamentally in conflict with the conceptions of the soul held in Greek thought long before him, Aristotle recoils from the idea of the unity of man.

However, some contemporary scholars, according to Barbour, interpret the Bible as holding “a view of man as holistic, not dualistic.”²⁵ He says that “many theologians today have tried to reclaim the biblical view of the self as a unified activity of thinking, feeling, willing, and acting.”²⁶ Thus, it is claimed that the Bible holds that man is a unity – a unity of body and soul. I doubt very much that the unity of man can really be said to be a perspective of the Bible in the

light of the logical implications of this notion. One such implication, as already alluded to, is that it destroys the Biblical doctrine of the immortality of the soul and life after death. The contemporary notion of the unity of man is most probably influenced by neuroscience – the science of the brain – which generally sees the brain as that which is primarily real and to which, for some neuroscientists, mental phenomena are (to be) reduced.

At this juncture, I would like to say something about the relationship between religion and science in Islam based on my knowledge of Arabic philosophy. It would be correct to say, I think, that in Islam the relationship between culture – of which science is a part – and religion has historically been an integrative and cohesive relationship; the two are intertwined, not separable. In consequence of this relationship, conflicts and disagreements between scientists and theologians do not seem to have arisen in the history of Islam, certainly not the type of interminable conflicts one can read of in Christendom. There does not appear to be much of a debate arising out of possible conflicts between science and doctrines espoused in the Qur'an (the Islamic religious book). Thus, there were no real endless, inter-generational internal conflicts as such. Conflicts that may have preoccupied the attention of Muslim theologians were scientific statements made by Western or Christian scientists that posed challenges to the doctrines of Islam. Thus, such possible challenges to Islamic religious belief were externally – not internally – induced. And attempts were made by Muslim theologians to denigrate such challenges and stem any damage they might do to Islamic belief.

One example was the elaborate and complex arguments deployed by the Muslim philosophical theologian al-Ghazali (d. AD 1111) to refute some of the scientific or physical ideas of Aristotle and his adherents that had found their way into the Islamic intellectual culture through the translation of Aristotle's works into Arabic in and after the tenth century AD. Such ideas include: the world as uncreated; the eternity and indestructibility of the world; the indestructibility (eternity) of time and motion – for they have no beginning or end; the notion of the necessary causal connection between natural events – a notion that subverts the doctrine not only of divine intervention in mundane matters but also of the existence of miracles which interrupt the usual course of nature; and other Aristotelian ideas about nature (Greek: *phusis*). Al-Ghazali refuted these ideas about nature in his famous work titled *Tahafut al-Falasifa* (translated as *The Incoherence of the Philosophers*). This work, which was translated into Latin and given the title of *Destructio Philosophorum* ('*The Destruction of the Philosophers*'), was in the course of the twelfth century in turn refuted by another Muslim philosopher, Averroes (Ibn Rushd, d. 1198), in a work titled *Destructio Destructionis* ('*The*

Destruction of the Destruction'). (Averroes was a contemporary of St. Thomas Aquinas). However, Averroes's refutation of Al-Ghazali and, thus, his defence of the physical ideas of Aristotle, did not receive much philosophical or theological attention in the Muslim world. It was Al-Ghazali's refutation that gained theological currency and ascendancy in the subsequent decades.

Now, the reason why the scientific or physical ideas of Aristotle did not attract continuous debate or discourse among Muslim scholars was because in the Islamic religious world the Word of Allah as contained in the Qur'an was held supreme and overriding, taking precedence over all other sources of knowledge: it was, thus, not subject to questioning and debate. Thus, any simmering controversy about ideas or theories of the natural world was submerged under the waves of the relentless pursuit of doctrinal orthodoxy. In this way, internally-induced conflicts that affected religious belief could not – and did not – arise within the ambience of Islamic religious doctrine. Moreover, free thinking that often results in subverting tradition and religious orthodoxy does not appear to have been a permanent and outstanding feature of intellectual life in Islam.

10. Summary

At this point, I would like to summarize the issues so far and then draw some conclusions on the relationship between religion and science:

- i. Both religion and science are concerned about our understanding and interpretation of reality, even though their interpretations generally differ.
- ii. Many of the assertions and arguments of the scientists and philosophers of nature before the 17th Century of our era conflicted with religious beliefs, but they were not met with the kind of the theological belligerency that descended on the assertions and arguments of subsequent, i.e., modern scientists. The relationship between religion and science in those times was symbiotic.
- iii. The emergence of modern experimental science, with its far-reaching and significant discoveries and conclusions, disrupted the hitherto somewhat cozy relationship between religion and science.
- iv. Natural theology proceeds from human reflections on their experiences of the natural world, reflections that led them to a conviction of the existence

of a supreme being that created the world; thus, natural religion, like science, has an empirical and rational foundation.

- v. While classical physics affirmed determinism and the certainties of prediction, quantum physics rejected determinism and rather affirmed indeterminacy in nature, the notion of chance, and the uncertainties of prediction. The notion of chance in quantum physics does violence to the concept of divine purpose and control. Quantum physics subverted the order and regularity of the universe upon which the scientific enterprise itself depends and operates. However, the logic of quantum indeterminacy casts doubts on the seriousness of its consequences for divine control and intervention.
- vi. The Biblical doctrine of creation has been challenged by the theory of evolution that maintains that the world was not directly created by God but evolved gradually from infinitesimal particles. Evolutionary theory eliminates design and affirms chance and randomness. It challenges Christian doctrine in several ways and rejects the objectivity of ethical values. But the evolutionary theory itself bristles with problems.
- vii. Evolutionary science rejects the notion of human nature fixed by God beforehand. This means that the human soul was not directly created by God, a position that is antithetical to religious belief.
- viii. The dualist – i.e., soul/body – conception of human nature, affirmed by all religions, is rejected by some neuroscientists (or, brain scientists) who maintain that mental states or events are brain states or events. But some other neuroscientists not only accept the soul/body dualism but defend the interaction of consciousness (soul) and brain.
- ix. Aristotle had argued for a conception of man as a unity, but later had to abandon it because of its consequences on the notion of personal survival at death. The claim by a number of theologians that the Bible maintains the unity of body and soul cannot be defended in view of its logical implications for the immortality of the soul. In contemporary times, the idea derives from, or is influenced by, neuroscience.

11. Conclusion

Let me try, in conclusion, to articulate or bring into focus the nature of the relationship between religion and science.

Several attempts have been proposed that allow for interaction rather than conflict between religion and science. The interaction stems basically – and ultimately – from the fact that both religion and science are concerned fundamentally about reality. For this reason, the immediate assumption is that there must be areas of belief and goal that overlap. For this reason, religion and science must be seen as presenting complementary accounts of reality. Before the emergence of science, religion had established certain notions or doctrines about the physical world: these, or at least some of them, constituted a challenge to science and set scientists to explore them. Thus, religion may, in some way, be said to have been an important factor in the rise of science. Accordingly, Albert Einstein stated in 1948:

While it is true that scientific results are entirely independent from religious or moral considerations, those individuals to whom we owe the great creative achievements of science were all of them imbued with the truly religious conviction that this universe of ours is something perfect and susceptible to the rational striving for knowledge.²⁷

Earlier, in an article published in *New York Times Magazine* in 1930, Einstein wrote:

The cosmic religious feeling is the strongest and noblest motive for scientific research.²⁸

And, in a Symposium on Science, Philosophy and Religion (1941), Einstein said:

Science can only be created by those who are thoroughly imbued with aspirations toward truth and understanding. This source of feeling, however, springs from the sphere of religion.²⁹

The reason for the order and intelligibility of the cosmos (universe) cannot be answered within science itself. Science will have to depend on religious belief in asserting the origin of cosmic order and intelligibility.

In the phenomenon of natural theology there is a common ground between religion and science, as both of them depend on empirical experience for their rational arguments and conclusions.

Scientific knowledge can be utilized to tease out religious doctrines, i.e., to clarify and help remove obscure points in religious doctrine, as in the complementarity principle of Niels Bohr. That the world is based on design by a supreme intelligence – God – is a proposition accepted largely by both science and religion, though with necessary adjustments. Nature as a law-abiding machine expressed in fixed natural laws constitutes the basis of the order and regularity of the universe, which make scientific prediction possible and generally accurate. God cannot be swept away by the natural laws he established. God might be conceived to act in ways consistent with scientific theories, even though it is possible for Him, by virtue of divine sovereignty and omnipotence, to act in ways that disestablish the established laws of nature

Even though quantum physics appears to reject the determinism of natural laws and, thus, affirms indeterminacy and chance in nature as well as the uncertainties of scientific predictions, nevertheless, it appears – from the positions of Einstein, Max Planck, Laplace, and others – that the assertions of quantum physics must be regarded as tentative and that further detailed work will confirm that even the subatomic world is deterministic: it may be concluded that all this, together with the logical implications of quantum indeterminacy, brings quantum physics into the embrace of religious doctrine.

Scientists do not all agree and at all times on particular scientific statements or conclusions, which should have been the case *if* scientific methods and statements were absolutely objective. The disagreement among scientists themselves stems either from the *philosophical* character of a number of scientific statements, or from the fact that scientific statements raise *philosophical* questions, which generate responses that may differ among individual scientists. This means that there is some subjectivity in scientific discourse as there is in religious discourse, though the degree of subjectivity is much higher in the latter. This makes the relationship between religion and science one of a closer integration.

The fact that there have been innumerable distinguished scientists since the beginning of modern science and even before (such as Copernicus, Galileo, Kepler, Newton, Boyle, John Eccles, John Polkinghorne, Daniel Akyeamong, Francis Allotey) that have had religious faith gives the lie, it seems to me, to the putative conflict or incompatibility between religion and science, or exaggerates the depth and seriousness of the conflict. In these great scientists, religion and science meet; in these great scientists there can be a dialogue – a constructive relationship – between religion and science; in these great scientists there can be an integration of religion and science.

It is this foregoing statement that constitutes the foundation for the

confident assertion that religion and science will continue to be bed-fellows in the twenty first century and beyond. The reason for this confident assertion is twofold. One reason derives from the wonders of nature. Aristotle asserted that ‘philosophy began in wonder’ (Greek: *ek tou thaumazein*).³⁰ We can assert, similarly, that religion and science also begin in wonder: in the wonders and mysteries of the created universe that will not cease, in the enigmas and puzzles that constantly beset human life; in the human capacity and the restless spirit of man to wonder, speculate and imagine and, thus, seek to know and apprehend that which is beyond or behind the cloistered walls of man’s limited vision.

The other reason for the ever-presence of religion and its unrelenting influence is anchored in man’s awareness of his own limitations – limitations which will ever lead him to search for – and postulate – an unlimited being and seek to do obeisance to this being.

Science is a progressive intellectual enterprise and, thus, produces cumulative knowledge and is expected to produce more significant and startling results in the decades to come. I stated at the very beginning of this paper that before science, religion was. I conclude the paper by stating that, in spite of science with its anticipated discoveries in the future, religion will continue to exist, influence and shape the lives of the inhabitants of the world, including scientists, in this century and beyond.

NOTES

1. S. Sambursky. *The Physical World of the Greeks*. New York: Colier Books, 1962, p.131.
2. Ian G. Barbour. *Religion and Science: Historical and Contemporary Issues*. San Francisco: Harper Collins Publishers, 1997, p.15. Here and in the next paragraph I have drawn on accounts provided in this book.
3. John Polkinghorne. *Science and Theology: An Introduction*. London: SPCK/Fortress Press, 1998, p. 6
4. Ian G. Barbour. *Religion and Science*, loc. cit.
5. Ian G. Barbour. *Religion and Science*, loc. cit.
6. Ian G. Barbour. *When Science Meets Religion: Enemies, Strangers, Or Partners?* San Francisco: Harper Collins Publishers, 2000, pp.2 -4.
7. Ian G. Barbour. *When Science Meets Religion*. p. 28.
8. Kwame Gyekye. *African Cultural Values: An Introduction*. Philadelphia, PA.:Sankofa Publishing Company, 1997, p. 9.
9. Ian G. Barbour. *When Science Meets Religion*, p. 70
10. Ian G. Barbour. *When Science Meets Religion*, P.53
11. Ian G. Barbour. *When Science Meets Religion*, p. 53.
12. James Trefil. *The Moment of Creation*. New York: Collier Books, 1983, p. 223.
13. Daniel A. Akyeampong, Professor of Mathematics at the University of Ghana called my attention to beliefs in deism that arose in the eighteenth century and its implications for religious beliefs.
14. The little I know of quantum physics is from Ian G. Barbour's two books referred to above.
15. Ian G. Barbour. *When Science Meets Religion*, pp.67-68.
16. Ian G. Barbour. *When Science Meets Religion*, p. 68.
17. Daniel A. Akyeampong. *The Two Cultures Revisited: Interactions of Science and Culture*. J. B. Danquah Memorial Lectures Series 25, February 1992, Accra: Ghana Academy of Arts and Sciences, 1993, p.20.
18. Daniel A. Akyeampong. *The Two Cultures Revisited*, p. 20.
19. Ian G. Barbour. *When Science Meets Religion*, pp. xiii and 86-87.
20. Kwame Gyekye. *An Essay on African Philosophical Thought. The Akan Conceptual Scheme*. New York: Cambridge University Press, 1987; rev. edition. Philadelphia, PA.: Temple University Press, 1995, 9.82.
21. Charles Darwin, quoted in Ian G. Barbour. *When Science Meets Religion*, p. 10.

22. Personal communication from two of the Physics Professor's British colleagues in the Physics Department of the University of Ghana some years ago.
23. Karl R. Popper and John C. Eccles. *The Self and Its Brain*. Berlin and London: Verlag Springer International, 1977, p. viii
24. Ian G. Barbour. *When Science Meets Religion*, p. 132.
25. Ian G. Barbour. *When Science Meets Religion*, p. 130.
26. Ian G. Barbour. *When Science Meets Religion*, p.135.
27. Albert Einstein. "Religion and Science: Irreconcilable?" *The Christian Register*, June 1948; reprinted in www.google.com: "Religion and Science" p. 9
28. Albert Einstein. "Religion and Science." *New York Times Magazine*, 9 November 1930; reprinted in *Albert Einstein: The World as I See It.* New York: Philosophical Library, 1949, pp.24—28. See www.google.com: "Religion and Science." p. 2
29. Albert Einstein: "Science and Religion." In *Einstein's Ideas and Opinions*. New York: Crown Publishers, Inc. 1954, pp.36—40; originally delivered in May 1939. See www.google.com: "Religion and Science", p.5.
30. Aristotle. *Metaphysics*, 982b12

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