

THE “TWO BOOKS” METAPHOR

Faith and Science

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General Issues of Faith and Science:

The “Two Books” Metaphor

The chronicling of the evolution of the relational status of theology and science spans that time of humanity which started with the oral tradition of the Bible, even before any words of God were committed to a slab, to the present 21st century. The very first story, that of Adam and Eve, deals with creation and so the dialogue between theology and science begins. In fact, the teleology of the Christian universe, the doctrine that all things in nature were made to fulfill a plan or design, allows scientists to communicate with one another. Hence it is stated that science is a natural outgrowth of the doctrine of creation, or as Dr. Loren Haarsma states, “science arises naturally from a Christian world view.”¹

This paper will examine the history of this relationship between the Book of Scripture and the Book of Nature. This investigation will consider theological, philosophical, historical and hermeneutical influences on scriptural and scientific revelations.

The Bible presents us with many references to beauty, nature and creation. The Bible begins with the creation story...”In the beginning when God created”. God is revealed to us through His creation. God, like an artist, fashioned a universe humanity has been struggling to grasp, represent and explain the concomitant grandeur and the natural physical relationships which exist to hold everything in place. Psalm 19 declares God’s glory in creation and the law. The first 6 verses describe the skies as a reflection of God’s glory. The remaining verses, 7-14, reveals God’s law. God is speaking directly to His people. God takes delight in His creation. Psalm 104 presents ecology as God’s work. Here the Psalmist presents the complexity and beauty of nature as God’s work. God has an intimate relationship with His creation and watches over everything, the animals, their food, the wind, everything. This psalm ends with God’s wish to cleanse the world of sinners as sinners are a dark blot on the perfection of God’s handiwork.

The wisdom of God is revealed in Proverbs 8, 18-36, and denotes wisdom’s part in creation. Wisdom, that fundamental tool for living, is found in God’s creation.

The Christian theme of creation thus demonstrates God’s ordering of the world and His consequent mastery of chaos.² So, the natural world, this orderliness has been studied from the

time before Jesus, grew into a steady stream of “natural study” and continues to this day. The theme of God the Creator is of major importance in the Old Testament. This Doctrine of Creation is a recurring theme in the study of faith and science. The field of natural science grew out of this doctrine in that it is the fundamental orderliness, the regularity and intelligibility of the natural world which makes scientific inquiry possible.³

The scientific and Christian traditions have often been allied. As example, in about 1865, an Augustinian monk by the name of Gregor Mendel conjectured “units of inheritance” from his study of pea plants in his monastery’s garden. It wasn’t until 1953 that Watson and Crick recognized that these “units of inheritance” were the DNA of the pea plant.⁴ The term “science” first developed from the Latin “scientia” and meant any rigorous and assured system of belief.⁵ Science has developed into particular bodies of knowledge but the main purpose of any body of science has remained constant: Science tries to understand how the physical world works.

The first scientists were called “natural philosophers” and focused on observing and understanding their surrounding physical world. They taught at the first universities of the late medieval period, with their housing and salary provided by the church. In fact, these universities were founded by the church in order to prepare these scholars to serve the church. Natural philosophy was a recognized way of discovering more about God and God’s world.⁶ In fact, the rise of modern and post modern science may not have happened without this support of the church. These first scientists still had to eat and so the largesse of the church made it possible for them to study rather than be pre-occupied with putting food on their table.

At this time, scientific endeavour, or ‘natural philosophy’, involved a discussion of God’s relationship to nature. This foundation of attitudes framed within a Christian context informed attitudes of new conceptions of nature and influenced the process of theory selection.

This connection between the Christian tradition and the study of nature has continued through the succeeding centuries. The development of the scientific method within the Christian tradition thrived. Where science and the Christian tradition most differ is in sources of data about reality. The Christian tradition is convinced that God has revealed a great deal through scripture,

reason, tradition and experience. Science limits its investigation to observations about the material world and puts forth hypotheses about material causation in the world.

The development of the scientific method within the Christian tradition has been molded and affected by many philosophers, theologians and scientists throughout its history, dependant upon their own historical context.⁷ In addition, McGrath states that “religious beliefs have influenced and continue to influence scientific thinking, irrespective of whether this is considered to be a proper or improper influence.”⁸

Natural philosophy, as pursued by the ancient Greeks sought to determine the realities of the natural world through the use of reasoned argument and logic. Such philosophical endeavour was possible in the rich and successful trading society of Ancient Greece.

The foundation of the development of modern science from Ancient Greece forward, is the assumption of an ordered world created by God. Since this ordered world is static in the sense that orderliness does not change, philosophers, theologians and eventually scientists, used this precept as the foundation or beginning point upon which their observations were constructed. The Bible teaches that an “unchanging God both created and continually upholds the universe”.⁹ From this precept it is assumed that the universe will follow a series of unchanging principles. This assumption has allowed for the evolution and development of science. The development of modern physics would have been very difficult without this foundation of an unchanging world.

God’s unchanging world then allowed Plato to teach that the universe is harmonious and governed by a natural law. Plato also argued that every human had reason with which the truth of the universe could be discovered. Out of this grew the “Two Book” theory, whereby God is said to have provided us with two books: The Bible and The Book of Nature. This view promoted natural philosophy as it promised scientists the ability to make good models AND the ability to discover the truth.¹⁰ This Christian worldview has provided philosophers, theologians and scientists with the construct within which their studies can take place, be recorded and to be built upon. Polkinghorne seems to agree with this when he states that “such an intellectual setting (sic, the Western Christian tradition) was the necessary matrix for the development of modern science, thus making it intelligible why science first arose in Europe rather than, say, China”.¹¹

A proper understanding of the evolution of the natural science espoused by Plato, through the Reformation, Enlightenment and on to current post modern scientific precepts requires a constant consideration of the context of the scientific endeavour. During the Patristic era, when Plato was writing *Timaeus*, medicine and mathematics were the only scientific disciplines. The branches of modern science such as physics, chemistry, geology, zoology and astronomy were not distinct scientific disciplines. There was an “intellectual unity” at that time in that the natural philosopher would often be the same person as the mathematician.¹² And, these teachers lived and worked in a Christian / pagan atmosphere at a time when Christianity was struggling for survival to become known and accepted. It is clear that even during the time of the patristics, this tension between believers and non-believers existed, but the foundation of their studies was constant, the orderliness of the natural world.

Augustine (354-430) viewed faith as the necessary condition which would make genuine rational activity possible.¹³ One’s faith provided the framework, the orderliness necessary to find the answers put forth by questions asked of the natural world in which one lives. Finally, Lindberg states that Christian doctrine and Greek natural philosophy need to be viewed as “interacting and mutually transforming views of the world”.¹⁴ This view is required in order to gain an understanding of the ensuing evolution of Western theology, philosophy and science.¹⁵

Theology and science enjoyed a mostly harmonious relationship during the Middle Ages in Western Europe. Through much of this period, science was known as a “handmaiden to theology” in that science was not pursued for its own scientific endeavours but when such pursuit was required it was necessary to understand and interpret Holy Scripture.¹⁶ In this way, the glorification of God was the ultimate goal of the scientific study of nature.

A profound shift in this attitude begins by the 12th century in that scientists began to examine nature for its own sake, rather than for the glorification of God. Hence, philosophy, rather than Holy Scripture, was looked to for explanations around natural phenomena. In this way, science began to encroach upon theology and the foundation of the science / faith dissent was established.

Also at this time, the scientific works of Aristotle entered the western Christian sphere of learning and overtook the heretofore teachings of Plato's *Timaeus*. Aristotle's writings on physics, metaphysics, logic, cosmology, the elements, epistemology and that nature of change provided the Middle Ages with its view of the structure and operation of the natural, physical world.¹⁷ The timing of Aristotle's introduction to the Christian Western European culture coincided with the establishment of the university. From 1200 – 1650, the world according to Aristotle was paramount. A fundamental divide occurred then between adherents to the teachings of Aristotle and traditional theologians.

Nicolaus Copernicus (1473 – 1543) was concerned about the accurate placement of holy days such as Easter and Christmas.¹⁸ Thus began advances in astronomy which challenged the status quo at that time. Copernicus holds a difficult honour; he straddled the "old" way of thinking in astronomical terms and a "new" approach, specifically a heliocentric theory of the earth's movements. Copernicus proposed a system whereby the earth both orbited the sun and rotated on its axis, conflicting with the accepted physics theory that an object could have only one motion. And, this theory contradicted biblical theology and the literal interpretation of Old Testament passages. The hermeneutical strategy of "accommodation" was used to explain this natural phenomena from a biblical perspective. Those scholars who upheld the theory of Copernicus were called "Copernicans".

Galileo had the telescope available to him in 1609, giving him confidence that the Copernican system could be proven. Galileo persisted in his theory that the sun was the centre of the universe and the earth moved around it. Galileo also persisted in his belief in God. The Roman Catholic church condemned Galileo and his theory, claiming heresy and resulting in scientific advances being thwarted in Catholic countries.

The development of mathematical physics has been identified as the moment of progression from ancient to modern science. The application of mathematical methods to the physical world is the single most important change made by the 17th century.¹⁹ This resulted in a new view of the world, the ancient philosophy being revised and expanded into a mechanistic conception of nature.

Concurrently, 'Reformation Theology' was being developed, the work of Luther and Calvin figure prominently. Very little of the reformers' work would count as natural philosophy and did not offer a systematic or detailed view of nature.

The doctrine of justification was the focus of these theologians. Luther wrote that "the article of justification is master and head, lord, governor and judge over all the various branches of doctrines".²⁰ His theme of justification by faith meant that humanity only needed to have faith in Jesus Christ as Lord and Saviour to be righteous. Luther proposed the (then) radical idea that individuals could have a personal relationship with God and did not require a priest to intercede on their personal behalf. This shift has important ramifications for the birth of modern science as now individuals could use their own personal faculty of reason to find truth in God's word, thus rendering them better placed to find the truth of the natural world.

At the same time, Calvin formulated a systematic view of God's relation to the natural world. God's activity in nature is ever present and that nothing in nature can be attributed to natural causes alone.²¹ Natural things are God's instruments, their behaviour dependent upon God. Calvin's teachings solidified and named the "Two Book Tradition". This approach draws on Calvin's theology that "The knowledge of God, which is clearly shown in the ordering of the world and in all creatures, is still more clearly and familiarly explained in the Word".²² So, a knowledge of God the creator may be availed both through nature and through revelation. The "two books" approach then allowed Christian theology to maintain a connection with the emerging scientific advances. Of course, the acceptance of the "two books" tradition is not ubiquitous and objections to natural theology have been raised in theological, philosophical and historical terms.

Natural theology offers a point of contact between religion and science. The "anthropic principle" has emerged from this discussion. The term is generally used to refer to the remarkable degree of "fine tuning" found within the natural order.²³ The anthropic principle describes how most natural scales, especially the mass and length scales, are determined by a few physical constants. Carr and Rees in their study report that the significant constants are the electromagnetic fine structure constant, the gravitational fine structure constant and the electron-to-proton mass ratio.²⁴

The anthropic principle is consistent with a Christian world view. The “fine-tuning” of the universe certainly lends itself well to the doctrine of creation as such a careful and loving world construct is certainly consistent with the existence of a careful and loving creator God. Very small variations in any of these constants would have made life on earth as we know it impossible. Natural theology understands anthropic potentiality to be the gift of the Creator to creation.²⁵

The Western European period of the Enlightenment during the 1700’s emphasized rationalism, intellectual freedom and freedom from prejudice and superstition.²⁶ In fact, between 1660 and 1793, more than 70 official scientific societies were established from St. Petersburg to Philadelphia.²⁷ This meant that traditional church bodies felt themselves to be under attack. The Enlightenment is considered one of the most significant intellectual movements to have affected Western culture. The quest for liberation and enlightenment led to a desire to undermine the authority of the church and the natural sciences were deemed as a potential weapon for this assault.²⁸ It is important to note the substantial and close links between Christianity and the political and social establishment in western Europe at this time. The “war fare” metaphor grew out of this milieu as the natural sciences were promoted. This model of conflict has remained significant to the present post-modernity, even if its influence has declined, the “war fare” shadow remains. This, in spite of the fact that 40% of active natural scientists profess religious beliefs of some sort.²⁹

Darwin (1809 – 1882) employed an analogical form of reasoning in his development of “natural selection” as a means of making sense of the vast array of plants and animals presented in the natural world.³⁰ The publication of Darwin’s “Origin of the Species” occurred in 1859. His theory of natural selection proposed that “in changed conditions of life some organisms will be better adapted than others because of random variations, and they will leave more offspring in the next generation”.³¹ This theory was revolutionary in terms of the way scientists thought about biology and challenged an implicit framework of shared assumptions of the scientific community.

The scientific community was divided; one group converting to Darwinism completely, some scientists resisting Darwin vigorously, others adopting a hybrid approach, accepting some of Darwin’s theory scientifically but not adopting a complete conversion. There occurred a shift of

opinion within science AND a shift in opinion as to the meaning of Darwin for religion.³² The warfare metaphor between faith and science continued. The doctrine of creation again is front and centre for arguments of natural theology. As Lindberg states, “the arguments of natural theology shaped in the eighteenth century had put the story of creation into sharp relief as the one symbol necessary for all order in nature and all beneficence and moral structure in the universe”.³³

The idea of a Creator and His natural creations combines with Darwin’s natural selection theory indicated the existence of God. God’s creation, so finely tuned as to be able to adapt where necessary. This was a credible explanation of biological diversity and adaptation. Natural theology provided Christians a construct whereby the God-provided evidence from nature was on the same plane as that evidence provided by Scripture. The Book of Nature and The Book of Scripture once again metaphorically making sense of God’s world, natural, metaphysical and relevatory.³⁴

The “Big Bang” theory of origin began with the general theory of relativity proposed by Albert Einstein (1879 – 1955). Without getting into the ‘meat’ of Einstein’s theory of relativity, Einstein’s view of the reality which scientific theories describe is important. Albert Einstein referred to “reality” meaning a world which exists independent of human thought, and which is accessible to scientific investigation and interpretation.³⁵ “Reality”, therefore, is not presented to us directly.³⁶ McGrath further states that one cannot conclude a reality does not exist if we have not manifested ‘sense-experience’. Reality can exist independent of our minds.³⁷ This similar line of thought is found within the classical theistic tradition and is the basis of Christian faith. God exists for Christians even though we can’t know Him through a sense-experience. God cannot be known directly. Hence, we have analogical, accommodating, liberation and process theologies to mention only a few hermeneutical methods developed to assist in our understanding of scripture. Add to this, never ending hermeneutical discussions, feminist and post colonial for example, all in an attempt to make the Bible, the word of God, meaningful within our human capacity to understand. Now, the doctrine of creation has had to respond to a history of a universe which evolved over billions of years, rather than the six day account of creation a few thousand years ago.³⁸

At the turn of the twentieth century, a social shift has occurred. Theologians, once held in the highest esteem as natural scientists and philosophers, are now relegated to the lower rungs of the social strata. Scientists in their well-defined areas of expertise are now at the top of the academic pecking order. The warfare metaphor persists.

Scientific advancement has continued and accelerated in the 20th and 21st centuries. The current scientific revolution have provided the impetus to renew the dialogue between scientists and theologians. The revolution in physics, the development of subatomic physics, promoted a new understanding of science. The new physics challenged a central assumption of classical physics. The classical physicist would construct mechanical models and the related mathematical equations by which the external world could be explained.³⁹ The classical physicist was ultimately a spectator. Further, the resulting physical explanation was deterministic and often reductionist (the tendency to reduce differences, especially in themes and ideas, to a single unifying principle, especially in science).⁴⁰

Einstein introduced the dilemma presented by new physics, using light as the example. In its propagation, light behaves like a wave; in its interaction with matter, it looks like a particle. During the 1920's it became clear that electrons and photons exhibited characteristics of both waves and particles,⁴¹ or the wave-particle duality of light. Theories of classical physics could not accommodate such varied behaviour. The concept of 'complementarity' was presented by Bohr. He developed the notion of 'complementarity' in order to describe aspects of quantum physics which could not be accounted for within the framework of classical theory.⁴² 'Complementarity' describes "the bringing together of mutually exclusive ideas" and "a completeness of description", both integral to Bohr's understanding of the concept.⁴³ This is how Bohr explained the wave/particle duality of light; two pictures are needed, one when light acts as a wave, and one when light acts as a particle. These two pictures are necessary in order to present the entirety of the concept and mutually exclusive because only one of these pictures can apply at any one time.⁴⁴ Einstein did not agree with this two mutually exclusive ways of presenting what was happening.

Taken further, Bohr's complementarity is directly related to an understanding of the way in which this new quantum reality is depicted. The theory of complementarity allowed for a complete description of natural behaviours at the quantum level. Classical concepts could still be used to represent the more abstract notions of quantum theory.⁴⁵ Here again, Bohr illustrates how classical models can be used to help visualize non-classical phenomena. This type of thinking held importance for both philosophy and theology, especially the doctrine of Christology, the bringing together of the two natures of Christ, divine and human.

Hard on the heels of Bohr's complementarity is the evolution of post-modernism, the origins of which can be traced to the early 1970's. McGrath states that "it may be regarded as a conscious and deliberate reaction against the totalization of the Enlightenment".⁴⁶ Further, that characteristics of post-modernism is that claims to truth "often represent disguised attempts to justify the power, status or vested interests of the claimants".⁴⁷ Post modernity challenges definition due to its complexity. Lyotard defines post modernity as "incredulity toward metanarratives".⁴⁸ Post modernity seeks to reject the Enlightenment principles of positivism and universal rationalism and views Enlightenment paradigms of knowledge, its appeal to "universal and necessary" truths as oppressive or illusory.⁴⁹ Post modernity seeks to disparage and toss out the notion of a pseudo-scientific view of a closed universe.

The present 21st century scientists, sociologists, philosophers and theologians are dealing with the result of a plethora of different contexts being brought together, sometimes assimilated and sometimes rejected. Scientific advances have been layered upon each other through the centuries with such advances being dependent upon previous discoveries. The very freedom awarded human kind through God's gracious gift of free will and the ability to reason has allowed scientific advancement to flourish within the Western Christian world view. These scientific advances, created within a sociological, economic, historical and theological context, concurrently affects and modifies these factors. These factors shape how we reason. But science has generated ethical issues it is powerless to resolve.⁵⁰ Similarly, the post modern global economy has produced economic issues and problems it simply doesn't know how to resolve. Sound foundational values have always been required and this has not changed.

Science and faith each continue to present a legitimate magisterium or domain of teaching authority. Stephen Jay Gould states that “The net of science covers the empirical universe: what it is made of (fact) and why does it work this way (theory). The net of religion extends over questions of moral meaning and value”.⁵¹

The ‘two book’ metaphor remains useful and necessary and provides a Christian framework for dealing with specific conflicts.⁵² Science continues to challenge, bringing forward new ethical issues and underscores the growing realization of “the insecurity of the inherited assumptions on which prevailing understandings rest”.⁵³ The traditional Christian model of God remains fundamental for theological reflection, but may require re-interpretations in view of scientific advancement. Take for example, the onset of ‘synthetic biology’. This is a new area of biological research and technology that combines science and engineering.⁵⁴ Once again the doctrine of creation looms large as these scientists approach the creation of a new biological system and focus on finding how life works or, the origin of life. These scientists have the potential to profoundly change the nature of life forms as we know it.⁵⁵ These scientists are building upon genome and DNA research to reach this exhilarating plateau. How do we ensure that this exciting new science moves forward in a manner which will benefit and not harm the public good?

In the fall of 2010, a report titled “New Directions: The Ethics of Synthetic Biology and Emerging Technologies” was released. It lists recommendations on how new technology growth should be regulated to minimize harm. The panel which produced this report consists of 13 scientists, ethicists and public policy experts. Their resultant recommendations are based on five ethical principles;

- To ensure the public benefit with as little harm;
- Responsibility for the well-being of the environment and its future generations;
- To protect intellectual freedom;
- That democracy is the key to making decisions;
- That fairness is maintained.⁵⁶

In spite of the fact that there is not a theologian on the above noted panel, the foundations of the Christian worldview are represented in these ethical principles. These principles also show us that Christianity is not a separate realm from science but provides the foundation for how and why we do science.

The doctrine of creation continues to be present and is represented in the responsibility for the well-being of the environment. Humankind's free will is represented by the protection of intellectual freedom. Democracy and fairness are Christian tenets and imply that philosophical, cultural and historical contexts will be recognized and considered.

Dialogue between scientists and their philosophical counterparts are necessary. Science will continue to expand into new disciplines, the 'two books' metaphor will remain the constant. This foundation provided by a Christian worldview is necessary and prudent as scientists delve into the unknown. Respect for the doctrine of creation continues to be required. The Christian theme of creation, representing God's glory, God's delight, God's laws, God's wisdom and His over-arching love and caring for His creation has not changed. This is the foundation upon which science can continue to develop and better the lives of humankind.

Post modern dialogue between science and faith must take account of reality as it is. The instrumentation and results of scientific inquiry may evolve and change, our Christian worldview remains constant. The search for intelligibility of our universe will not stop. Faith can have a positive impact on science and can help guide the practical applications of scientific discoveries. Christianity and other religions provide the foundation and media for the moral standards necessary to the appropriate use of science and technology.⁵⁷

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