Natural Science and World Views: An Analysis of the Origin and Development of Natural Science

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Samevatting

In hierdie artikel word oor die verwantskap tussen die beoefening van natuurwetenskap en wêreldbeskouinge besin. Sedert die 16de eeu word natuurwetenskap as 'n direkte empiriese ondersoek van natuurlike verskynsels beoefen. Hierdie wyse van wetenskapsbeoefening het sy ontstaan in die Christelike Weste gehad, en nie in kulture wat panteïsme, politeïsme en animisme aanhang nie. Tans word die natuurwetenskap in 'n raamwerk van materialisme en realisme beoefen, maar daar is mense, ook natuurwetenskaplikes, wat 'n raamwerk van anti-realisme en selfs 'n vergeesteliking van die natuur bepleit.

Die doel met hierdie artikel is om die Bybelse wêreldbeskouing as paradigma vir natuurwetenskap te verdedig. Argumente word aangevoer dat die Bybelse beskouing van die natuur en die menslike verstand uniek is en dat dié beskouing noodsaaklik vir die ontstaan was en dus ook noodsaaklik vir die voortgaande bestaan en ontwikkeling van natuurwetenskap is. Die outeur se argumente berus op die wesenlike aard en limiete van empiriese wetenskapbeoefening. Dié vorm die noodsaaklike agtergrond waarteen die ontstaan van empiriese wetenskap in die Christelike Weste en nie in ander kulture nie wat panteïsme, politeïsme en animisme aanhang, verklaar kan word. Daarbenewens word ook die historiese filosofiese proses wat die Weste eerstens tot materialisme en tans tot anti-realisme en pogings om 'n vergeestelikte natuurbeskouing te vestig in hierdie artikel uiteengesit. Daar word geargumenteer dat beide die materialisme en die anti-realisme filosofiese afleidings is wat op voorveronderstellinge berus wat uiteraard self onbewysbaar is. Daar word ook geargumenteer dat die Bybelse beskouing van die natuur en die

vermoë van die menslike verstand om die natuur te ken en verstaan behoue gebly het in materialistiese wetenskap, en dié verklaar die ooreenkomste tussen wetenskapbeoefening in 'n Bybelse en materialistiese raamwerk. Die verskille tussen die twee wyses van wetenskapbeoefening word ook uitgewys. Deurgaans word die gepastheid van filosofiese raamwerke anders as die Bybelse raamwerk krities ontleed en opgeweeg.

1. Introduction

In the revised National Curriculum Statement the claim is made that: "What is today known as 'Science' has roots in Greek, Chinese, Arabic and African cultures" (Department of Education, 2001:14). However, the actual form in which natural science is practised today, namely, inductive reasoning based on direct experimentation, originated in the Christian West, specifically in 16th century Europe. The science of other cultures and of the European Middle Ages was based on perceptual experience and *a priori*, intuitive reasoning. (Hooykaas, 1972; Jaki, 1974; Jeeves, 1969; Thorson, 1978). This article rests on the contention that the Bible supported and in fact smoothed the way for the scientific quest as inductive reasoning based on the direct empirical study of the physical world. In this article it shall be argued that the Bible's particular view of nature and its view of the abilities and limitations of the human mind provided the necessary fertile soil for the emergence and growth of experimental science.

Experimental science provided insight into the true workings of nature, real knowledge which enabled humanity to change the world. One has only to think of the role that scientific knowledge and its technological application have played in improving the material quality of life, and their part in combatting and even eliminating many diseases, pests and famine. In fact Medawar (cited in MacKenzie, 1998:54) claims that: "science, broadly considered, is incomparably the most successful enterprise human beings have ever engaged in." Experimental science's success in revealing true principles of nature's workings appeared to testify to the ability of science to disclose *all* the mysteries of the universe. By the early 20th century, Western intellectual thought had entered an era of scientism. Henceforth, science was the final authority, and its credo was evolutionary naturalism, in particular, materialism. The West was subsequently dechristianised.

The late 20th century saw a resurgence of religion, but not biblical Christianity. Instead, spiritually hungry westerners were calling for a new world view, a world view in which the natural world is essentially spiritual.

They envisage a scientific paradigm in which the physical and spiritual worlds are viewed as one interconnected whole that together constitute the whole cosmos. The contemporary term for this world view is holism, but the older terms are pantheism and animism.

The purpose of this article is to defend the biblical framework as paradigm for science. The author's defence rests on the essential nature and limits of natural science and on the historical fact that empirical science did not emerge in pagan cultures which uphold pantheism, polytheism and/or animism, but in the Christian West. The aim is to make explicit the prerequisite, *a priori* assumptions that undergird empirical natural science. In this article it will be argued that these assumptions were unique to the biblical world view. This article will also trace the historical philosophical process that took the West to materialism. It shall further be argued that materialism retained the prerequisite assumptions, which explains the similarities that exist together with the differences between biblically based science and materialist science. Thereafter the shift to pantheism and animism (or holism) shall be traced. In both the shift to materialism and the shift to pantheism and animism (or holism) the purported scientific grounding shall be critically assessed.

2. The nature of natural science

Natural science involves finding out about and making sense of the natural world. It is a study of those natural things, processes or events that can be observed and/or measured and that can be reliably repeated and duplicated in a laboratory. Since the 16th century natural science has been practised via direct observation, experimentation and inductive reasoning. The scientific method involves "observation of natural phenomena, formulating hypotheses to account for the phenomena, gathering data to test these hypotheses, and developing an explanatory falsifiable theory" (Schimmrich, 1996:1). The body of knowledge that constitutes natural science consists of facts, theories or models, and natural laws.

The facts are the actual observed and/or measured data whilst scientific theories, or models, are the interpretative explanations of empirical data. These interpretations are usually a matter of the highest degree of probability based on the data available. Theories are "a means of tying observed facts together, and the best theories are those which attain this objective with the least number of inconsistencies" (Gitt, 1997:23). Furthermore, good theories are in principle empirically falsifiable, and the best are those which could very easily be falsified, and when such a theory survives all tests it can be accepted as valid (Gitt, 1997:24 note 3). Thus,

valid theories are theories that have been verified via experimental testing. Such theories describe and correspond with the way the natural world really is, and they can therefore be technologically applied.

A theory's validity does not imply an exhaustive or final description of a physical phenomenon since, first, human theories can never be absolute or perfect. Second, empirical results are never final. The possibility that hitherto unknown counter examples may exist can never be excluded. Thus, despite its validity a scientific theory is provisional and must be modified and/or expanded if new data which demands it becomes available. An example of a valid, but incomplete, scientific theory is that of atomic structure which began with the ancient Greek, Democritus, and which, since the 16th century, continues to be further developed and refined. Another example is Newtonian physics. Einstein's relativity theories did not render Newtonian physics incorrect, but only revealed that its range of applicability was restricted to Euclidean flat space geometry (Zeilik, 1982:144). Einstein may have proceeded further than Newton because in Newton's time only Euclidean geometry was known. By Einstein's time Nikolai Lobachevski (1793-1856) and Georg Riemann (1826-1866) had added hyperbolic and spherical geometry respectively (Zeilik, 1982:128).

If the truth of a scientific theory is verified repeatedly to the extent that it proves itself to be fixed, then we accept that it is a natural law (Gitt, 1997:22). For example, one can accept that the law of conservation of energy (that is, that we can neither destroy nor create energy) is a natural law rather than a mere theory because, despite unceasing efforts, a perpetual motion machine (a contradiction of the law of conservation of energy) shows itself persistently as an impossibility. The laws of nature are not open to modification. In this regard Gitt (1997:131) writes as follows:

> Every technical construction and measuring apparatus is a practical application of the laws of nature. If the laws of nature changed, bridges and tower blocks, calculated correctly taking the laws of nature into account, could collapse. As all physiological processes are also dependent on the laws of nature, then a change in these laws would have catastrophic consequences.

The laws of nature cannot be toppled, and therefore no patent office in any country will accept an invention which offends a law of nature (Gitt, 1997:132).

Like the laws of nature, valid but possibly incomplete theories, for example, atomic and quantum theories, form a body of objective truth. Conclusive evidence for this is found in the fact that the corresponding

technological devices work consistently, bar mechanical failure, in all cultures and at all times. Experimental science and its concomitant technology are among the few cultural products that have crossed all cultural boundaries and are globally practised and applied. (Adler 1990b:34, 74, 123.). Thus, despite the scepticism of postmodernists that denies the existence of objective truth, experimental science is accepted as objective truth by all contemporary cultures, even if such acceptance is not explicit.

Facts, natural laws and valid theories comprise knowledge that has certitude, but natural scientists also proffer theories about natural phenomena that are uncertain and require a measure of faith for their acceptance. Such theories explain natural phenomena in terms of natural processes, but the theory itself cannot or has never been successfully experimentally verified. Facts, natural laws and valid theories comprise strict science whilst uncertain theories comprise loose science (Hoover, 1988:12-13).

With regard to loose science, the possibility always remains that such theories may prove to be totally false. Examples of discarded theories which evidence proved totally false are the flat earth theory; the geocentric theory; the existence of a material medium (dubbed ether) through which electromagnetic waves are conducted in space; and the generation of life from non-living matter (disproved by Louis Pasteur's swan neck jar experiments in 1864).

In both strict and loose science methodological naturalism – explaining natural phenomena solely in terms of natural processes – is an indispensable tool, but it is not an appropriate tool in other areas of inquiry. It can *never* provide answers to questions about the origin, destiny and purpose of the universe and the life that it contains. The theory of evolution is widely accepted as science. Nevertheless, *all* theories about origins are philosophical, metaphysical theories. The actual genesis events were historical, once-off events. The judgement that these were natural events that can be explained in terms of natural processes is a metaphysical, not a scientific, judgement. The exclusion or inclusion of God in explaining how and when the actual genesis events occurred is a subjective, religious decision. The determining factor in *all* explanatory theories is not the data under consideration but the scientist's philosophical, *a priori* assumptions and presuppositions. *In terms of science*, all such theories are speculative and science can only judge them as possibly true or, alternatively, possibly false.

Even if scientists were to succeed in creating life from non-life, or in producing phylic change, the most consistent conclusion would not be natural abiogenesis, or evolutionary phylic change. In the laboratory the new living system, or phylic kind, would not have generated itself. Instead, the scientist who synthesised the new life, or phylic kind, would have applied his *exogenous* intelligent mind to ordering the constituent non-living matter in such a way as to generate life, or to genetically engineering a new phylic kind. Thus, the most consistent conclusion would be that the first life and the various phylic kinds were created by an exogenous Intelligent Mind, the mind of an extra-cosmic God. (Wilder-Smith, 1974:92-93, 1975:32-35, 1981:25ff.)

The fact that the truth of theories concerning the origin, age and destiny of the universe and life cannot be uncontentiously determined by scientific means does not mean that there are no objectively true answers to such questions. It means that the answers must be sought beyond the confines of natural science. Historic, orthodox Christianity believes that such answers were revealed to humans by God in the Bible.

Many contemporary scientists reject historic, orthodox Christianity. Nevertheless, the present experimental form of natural science and the body of truth that strict science represents are specific cultural products of historic, orthodox Christianity, and not of other cultures.

3. Natural science and world views

3.1 Natural science and pagan world views

That experimental natural science is a specific cultural product of Christianity is a matter of historical fact. The experimental form of science known and practised today arose and developed among Christians, and not among other cultures. The 16th century founders of experimental science, for example, Nicholas Copernicus (1473-1543), Sir Francis Bacon (1561-1626) (the father of the experimental scientific method), Galileo Galilei (1564-1642) and Johannes Kepler (1571-1630), were all Christians who believed in the inerrancy of the Bible. Furthermore, the phenomenal technological advancement of the 20th century was made possible by the discoveries of western physical scientists who operated within the biblical, creationist framework up to the late 19th century (Schaeffer, 1982b:161, 1982c:362).

The fact that experimental science was a cultural product of Christianity does not mean that there were no scientific endeavours in other cultures. The ancient Greeks, Arabs and Chinese were brilliant mathematicians, engineers and astronomers, but their scientific quest, as stated in the

Introduction, was restricted to *a priori*, intuitive reasoning based on intuition and sensory, perceptual experience. Direct experimentation and dissection of nature were inconsistent with their pagan world view that professes pantheism, polytheism and/or animism. A pagan world view is a form of naturalism, not materialistic naturalism but a view that conceives of an ultimate oneness between the physical and the spiritual worlds.

In nature religions – pantheism, polytheism and animism – no division is made between the physical and the spiritual. Instead, the powers of nature – powers that humans cannot control, for example, the weather – are perceived as gods and/or spirits, and they are gods and spirits of caprice; lawless powers that must be treated with scrupulous respect (Holmes, 1983:59; Mbiti, 1990:52ff; Stromberg,1966:9; Veith, 1987:22, 108). Nature is thus perceived as a sacred terrain in which caprice and chance, not law, rule. An exception was the ancient Greeks, who had capricious gods but nevertheless believed in an orderly universe. The ancient Greeks shall therefore be discussed separately.

Hindu cultures, in addition to upholding pantheism and polytheism, also uphold a form of philosophical idealism in that they perceive the physical world as an illusion. The latter is also a characteristic of Buddhist cultures. These religions teach escape from the physical world through meditative trance states of altered consciousness. Contemporary pagan, Hindu and Buddhist cultures accept and practise experimental science, but they must necessarily, consciously or unconsciously, maintain a logic-tight division between science and religion, as the following historical exposition shows.

With the exception of ancient Greece, ancient pagan cultures had no notion of physical law, or law of nature. Theirs was a world view of wild, mysterious forces, a world pervaded by a mystical power – which some cultures said was from a Supreme Being (Mbiti, 1990:194, 197) – and thus a world in which science and magic were inseparably intertwined. In ancient pagan cultures nature was studied in terms of omens and portents, but since it was the abode of the gods and spirits experimentation was taboo. Experimentation might irritate the gods and spirits and incur their wrath. (Veith, 1987:22, 108.) Instead of direct experimentation, pagan cultures had magical manipulation. For example, the ancient Egyptians tried to derive pure gold from less precious metals through magical songs and incantations (Frost, 1992:64-65). Instead of scientists, pagan cultures had shamans and diviners who, it was believed, could in a trance state ascend to the sky or descend into the underworld where they communicated with and shared the magical powers of the gods, the nature spirits and the dead (Eliade, 1989:5-6; Mbiti, 1990:167ff).

Although the study of nature in ancient pagan cultures was intermingled with superstition, some reached great heights in abstract, *a priori* reasoning, for example mathematics – especially Euclidean geometry that proceeds from perceptually experiencing the earth as flat – and the achievements of these cultures in fields such as engineering and architecture were highly advanced. Ancient pagan cultures also studied the behaviour of things in the sky and some built up an impressive knowledge of astronomy, but their motive was astrological. They "wanted to know what was going to happen next, and supposed the stars would tell them" (Kitto, 1951: 177). For example, the ancient Babylonians had enough knowledge of astronomy to accurately predict a lunar eclipse, but they also believed that it was a sign from the gods, a portent of doom (Veith, 1987:108). Astrological speculation prevented these ancient astronomers from arriving at the idea of an ordered and law abiding universe. As Jaki (1974:200) points out:

> A chief characteristic of astrology is its thorough inconsistency. Astrology is not so much a system as an ever burgeoning set of capricious aper?us grafted on disconnected observations. Astrology is a revelling in the momentary and in the concrete with no real concern for the causal and unequivocal interconnectedness of things, events and processes.

Astrology was also a prominent feature of Far Eastern cultures. These cultures did not arrive at empirical science because, in addition to their pantheism and polytheism, their perception of the physical world as not real, an illusory mirage, meant that they had neither interest in the physical world nor trust in sensory perception (Veith, 1987:122).

The ancient Greeks were also pantheists and polytheists, but in contrast to other pagan cultures they believed in an orderly, lawful, real and, therefore, knowable universe. They "never doubted for a moment that the universe is not capricious; it obeys Law and is therefore capable of explanation" (Kitto, 1951:176). They regarded the universe as a divine organism, but an ordered organism, and although their gods were beings "of caprice, brutality, amorousness" (Kitto, 1951:195), behind the gods was a universal, impersonal and ordered power – an Order of things – which even the gods could not break (Kitto, 1951:196).

The ancient Greeks' belief in an underlying divine Order imbued them with an overriding sense of the wholeness of things (Kitto, 1951:169) and that "the apparent multiplicity of physical things is only superficial" (Kitto, 1951:179). Their interest was therefore more with philosophical questions of the origin and nature of the universe than with mundane, scientific

questions of how the universe worked. This, said Sir Francis Bacon (quoted in Jaki, 1974:282), acted as "the great arrest and prejudice of further discovery". According to Sir Francis Bacon (quoted in Jaki, 1974:282), the pantheist beliefs that directed ancient Greek thought about final causes turned their theories into "remoras and hindrances to stay and slug the ship [natural science] from further sailing, and have brought this to pass, that the search of the Physical Causes hath been neglected and passed in silence".

Furthermore, the ancient Greeks believed that the human mind was completely adapted to the Order of things. Error in perceptual experience and intuitive ideas was therefore inconceivable. Thus, logical reasoning based solely on intuition and perceptual experience constituted their science, and since they had a firm belief in the power of reason their test for truth was logical consistency. They saw no need whatsoever for doubting their entirely logical theories and testing them against reality. This approach enabled them to construct a model of the world – a flat earth, geocentrism and uniform circular motion of heavenly bodies – that was in isomorphic relation with sensory experience, but in reality incorrect. (Hooykaas, 1972: 29ff; Jeeves, 1969:11ff.)

Although this model of the world is unbiblical, it was appropriated by the Roman Church and unquestioningly accepted until Copernicus tested it against reality, an event which marked the beginning of a new empirical approach to science, an approach that led scientists to discover the true workings of nature. It is an approach that depended on the biblical world view for its inception.

3.2 Natural science and the biblical world view

3.2.1 The biblical world view

The above survey of cultures in which the scientific enterprise never developed or failed to maintain sustained development showed that natural science depends on four presuppositions, each of which is indispensable. The first is a clearcut distinction between the spiritual world and the physical world. The second is confidence in the rational comprehensibility of the universe. The third is the notion of physical law, or law of nature. The fourth is acknowledgement of human fallibilty and thus the need to test theories against reality. The deeds, if not the words, of all the great scientists since the 16th century clearly reveal their acceptance of these four propositions.

The Bible affirms each one of these prerequisite presuppositions. The Bible provided the following base for the Christian founders of empirical science:

The Bible presents a secular view of nature; it neither deifies nor spiritualises nature. The Genesis account of creation is unique in the world's religions (Veith, 1987:119). In pagan accounts "creation" is either emanation, that is, the extending of the divine essence throughout the universe (Sire, 1988:15), or it is a continuity of nature, gods and spirits (Veith, 1987:120). The Genesis account of creation is the only account of creation *ex nihilo* (Venter, 2000:42). It declares nature to be called into existence by God's Word, distinct from Him and in no sense divine or spiritually infused (Holmes, 1983:59; Veith, 1987:22, 122ff).

The Bible guarantees the consistent orderliness and law like behaviour of the world. The Bible teaches that God is not capricious and irrational (as pagan gods are), but that He is a faithful, unchanging and law-giving God. This means that Christians expect to find order, not caprice, in His creation.

The Bible tells us that after each act of creation God was pleased and considered His creation good. This means that the world is worthy of study, and such study is part of the creation mandate given in Genesis 1:27-28.

The Bible provides sufficient confidence in the human mind's ability to read and decode nature's God-ordained order. Because we are created in God's image, we can, within the limits of human fallibility, trust our senses and our reasoning processes (Purtill, 1974:39).

The Bible supports and encourages the correct scientific mental disposition that combines openness (all truth is God's truth) with scepticism (human perception and human theorising are fallible).

The question now arises why experimental science emerged only in the 16th century AD. This question is addressed in the next section.

3.2.2 The emergence of empirical science

The ancient Hebrews and early Christians focussed on theology. Their interest was in knowing God and the will of God rather than understanding the workings of God's creation.

In the early centuries after Christ, Christianity was in mortal conflict with the Gentiles' religions. By the 4th century, Europe was officially Christianised, but pagan superstitions still had a stronghold upon a large part of the population (Robinson, 1946:40). After the fall of the Roman Empire to invading barbarians, everything conspired to discourage learning. The invaders "were ignorant, simple, vigorous people with no

taste for anything except fighting and bodily comfort" (Robinson, 1946:55). Thus they brought nothing but disorder and destruction of the great centres and works of learning. It fell to the Church to keep order, and it was also from the ranks of the Church that Greek learning, which the Romans had adopted, was preserved.

During the course of the Middle Ages, the Roman Church not only preserved the Greek and Roman works, the Church also synthesised Greek cosmology with their ecclesiastical teachings, and the Church brooked no questioning of its teachings. In the 4th century during the rule of Constantine, the first Christian emperor of the Roman Empire, the Roman Church became the only state sanctioned religion. Henceforth the law tolerated no one who disagreed with the particular form of belief which the Church and thus the State sanctioned (Robinson, 1946:32-33). This ultimately issued forth in the Holy Inquisition – established in the 13th century and revived in the 16th century by Queen Isabella of Spain – by means of which innumerable persons suspected of heresy against Church teachings were condemned and punished, by imprisonment and often by burning at the stake.

Dissatisfaction with Church teachings could not, however, be permanently suppressed, and the first successful revolt against the powerful Roman Church was that of Martin Luther (1483-1546). The Renaissance had not been a revolt against Church teachings. The Renaissance was a time of study and imitation of ancient Greek and Roman literature and the Renaissance philosophers paid little attention to theology (Robinson, 1946:321). With regard to the physical world, the Renaissance philosophers accepted Greek cosmology and, in particular, showed a distinct prediliction for Plato and his world of Ideas, of which the physical world is but a shadow. The Renaissance Platonists were less concerned with rational, physical structure, but rather to penetrate and transform the physical image to accord perfectly with the Idea (Churton, 1987:102-103, 122) This attitude is not that of science but of magic, which was, however, upheld as "reformed and learned" (Yates, 1964:17) and it did not spell revolution to the Church.

Luther's revolt was violently, but unsuccessfully, opposed by the Church, and it heralded in the Reformation which broke the stranglehold that the Roman Church had on people's thinking. The Reformers refuted the absolutisation of Papal power and Church teachings. They recognised that the Bible teaches human fallibility, and they were thus "at one ... in ceasing to obey the Pope ... and to accept the Bible as their sole guide" (Robinson, 1934:366). They studied God's Word, the Bible, to determine what it really said.

Like the Reformers the 16th century scientists accepted the Bible, but they studied God's works, the physical world, to determine its real workings. They, too, recognised human fallibility and thus the need for testing theories against reality (Schaeffer 1982c:361-362).

The desire to find truth was the driving force behind both the Reformers and the founding fathers of empirical science. Martin Luther sparked the Reformation. Empirical science was sparked by the Polish astronomer Nicholas Copernicus who discovered that geocentric cosmology was wrong. The earth and the other planets revolved around the sun. Fearing the Inquisition, he was prudent enough to defer the publication of his findings to just before his death (Robinson, 1946:339-340), but Galileo openly declared what he saw through his telescope. He had to answer for this to the Inquisition, but, nevertheless, the idea of empirically testing ideas against reality had taken root.

Influenced by their biblical world view, the Christian founding fathers of empirical science recognised that logical consistency was not enough to determine truth. They recognised that truth lies in consistency with reality (Hooykaas, 1972:40ff; Thorson, 1978:240ff). They argued that reasoning which proceeds from *a priori* ideas and which is not subjected to the test of observation and experimentation fosters pride and an over-confident dogmatism which produces both error and a closed mind (Thorson, 1978:241). This does not imply that they belittled rational logic.

Rational logic is ruled by the principle of non-contradiction. It is often referred to as Aristotelian logic because Aristotle (*Metaphysics*, Book IV, 1989:161ff) formally set out the argument that something cannot simultaneously both *be* and *not be*, that is, the meaning of something cannot include its own contradiction. In doing this Aristotle recognised what was actually an ontological, God-created principle that governs reality and human thought. As the Christian philosopher Gordon Clark (1978:149-150) points out: "One cannot write a book or speak a sentence that means anything without using the law of [non]contradiction. Logic is an innate necessity, not an arbitrary convention that may be discarded at will."

The biblical framework was scientific orthodoxy until the late 19th century (Schaeffer, 1982b:161, 1982c:362). However, almost from the inception of experimental science the data and discoveries were subjected to metaphysical, speculative theorising which did not correspond to biblical content, and which served to shift science into a naturalist framework in the late 19th century. Instrumental, however, in the rejection of the biblical

framework were not the data and discoveries but the philosophical, essentially metaphysical inferences that were drawn from the data and discoveries. The first unbiblical philosophical inference, that of deism in the 18th century, was mainly upheld by philosophers, and not by physical scientists. Nevertheless, it set the stage for the shift to naturalism, specifically materialism, in the late 19th century.

3.3 Natural science and deism

The heliocentric theories of Nicholas Copernicus, Johannes Kepler (the discoverer of the laws of planetary motion) and Galileo Galilei as well as the empirical scientific method which is ascribed to Sir Francis Bacon found expression in the work of Sir Isaac Newton (1642-1727). In Newton's *Philosophia Naturalis Principia Mathematica,* published in 1687, the Copernican Revolution issued into the concept of a vast cosmic mechanism of infinite and absolute space and time, the activities of which obey universal laws capable of mathematical expression. To this mechanistic universe, God the Creator, the First Cause, stood in an external, transcendent relationship (Burkill 1971:294).

Newton was a devout Christian who believed in the inerrancy of the Bible (Lamont, 1995:37ff; Schaefer, 2001:7). In Newton's own words (quoted in Lamont,1995:37): "I have a fundamental belief in the Bible as the Word of God, written by men who were inspired." Newton's God was Creator, Conserver and Sustainer (Randall 1962:593), but it is quite conceivable to deny God's active relationship with the world after He created it. Such denial was subsequently undertaken in the 18th century by the Enlightenment philosophers, and it rested on deist presuppositions.

Deism is the position that affirms the existence of a Creator God but denies biblical revelation. Deism advocates a natural religion discoverable through reasoning alone. It sees no need for the Bible and its "mysterious and incomprehensible body of revelation" (Snyder 1955:36). Averse to the idea of miracles, the deists' god is the creator of the cosmic machine, but an unconcerned creator who, after creation, retired to his heavenly abode. The deist model of the universe is therefore a closed system into which the creator god did not act or communicate with humans. The world view of deism excludes miracles, and is, in effect, a world view of naturalism and materialism. In terms of deist logic, humans were autonomous and equipped with the reasoning power to guide themselves via ever-increasing knowledge to ultimate earthly perfection. (Horn, 1996:79ff.)

Deism was the world view of 18th and 19th century philosophers, but it was not the world view of the physical scientists. The latter still upheld the

biblical world view (Schaeffer, 1982b:161, 1982c:362). Deism, however, prepared the ground for the shift to naturalism that followed after Charles Darwin (1809-1882) published the theory of evolution in his book *The origin of species by means of natural selection or the preservation of favoured races in the struggle for life* in 1859.

3.4 Natural science and naturalism

3.4.1 The shift to naturalism

The atheist biologist Sir Julian Huxley (quoted in Gitt, 1995:35) points out that: "Darwinism removed the idea of a Creator-God from the sphere of rational statements." Thereby Darwin "swept away the logic which had been the basis of a great deal of human reasoning since the dawn of history – that design proves a designer" (Wilder-Smith, 1970:230). It is to this reasoning that Paul refers in Romans 1:19-20. As Psalm 19:1 puts it: "The heavens declare the glory of God. The earth shows His handiwork."

The theory of evolution is currently scientific orthodoxy, but, as explained in section 2, it is a theory which is in itself not science. It is based on factual data, but in explaining the data it moves out of science and into the terrain of philosophy and metaphysics. From the factual evidence of natural selection and variation within a species – the variations, mutations or speciation, that occur both in nature and in the laboratory when a new breed *within* a certain plant or animal species is bred (Hoover, 1988:16) – Darwin concluded that radical changes in phylic kind had occurred in the past and had led to the variety and complexity of life forms that abound on earth (Wilder-Smith 1970:24). But the factual evidence of natural selection and variation within a species can be, and in fact was, used to support *ex nihilo* creation.

Prior to Darwin, the 19th century scientist Edward Blyth had used natural selection to argue that only the fittest survived in order to preserve the created kind. In articles published in 1835 and 1837 Blyth presented the idea of natural selection of which Darwin claimed he had thought. Blyth's conclusion had been that the survival of the strongest in a species was a conservative principle which enabled the transmission of superior qualities to offspring and thereby secured the survival of the species. (Sunderland, 1988:16; Morris, 1989:157-158.)

Darwin ignored the scientist Blyth, but he did refer to the theologian William Paley (1743-1805) who had also inferred phylic stability from the fact of natural selection. According to the historian Benjamin Farrington (cited in Sunderland, 1988:15), Darwin found Paley's logic in his book,

Natural theology or evidence of the existence and attributes of the Deity collected from the appearances of nature (published in 1802), "as cogent as that of Euclid."

Darwin had beliefs that differed from those of Paley and Blyth, and thus argued from different assumptions and presuppositions. Paley and Blyth were theists and their chief burden "was that all nature speaks of the Designer behind it" (Wilder-Smith, 1970:229). Darwin was an agnostic (Brown, 1968:149; Stromberg, 1966:279) and he "attempted to explain the origination of the great diversity of life without the necessity of any divine power" (Sunderland, 1988:16). His central assumption "was that *design by no means proved a designer behind it*. Design *might* be designed as it were, but design might also just as easily arise from randomness" (Wilder-Smith, 1970:230).

Axiomatic to evolution is naturalism which can be subdivided into either:
Materialist naturalism where the origin and development of life forms are reduced to physico-chemical processes; or
Vitalism or spiritual naturalism where the origin and development of life forms are reduced to inevitable, impersonal outworking of indwelling, vital/spiritual properties of matter.

During the 20th century evolutionism, specifically in its materialist form, became scientific orthodoxy. The biblical framework was replaced with a materialist, naturalist framework. At the same time the successes of science in its valid field of enquiry served to establish science as the final authority in *all* questions concerning the natural world. The result was that many people, Christian and non-Christian, came to believe that science has shown that Genesis 1-11 is mythological and conveys only spiritual truths.

Such a state of affairs arose because science was "redefined to mean 'knowledge of the material world as explained with reference to the material world' thus, by definition, eliminating knowledge of non-material entities and truths and prohibiting supernatural explanations" (Harris, 2002:3). It became the rule that "science will consider any naturalistic explanation, no matter how far-fetched, superior to any explanation invoking the actions of a deity" (Schimmrich, 1996:2). Thus, the authority of science was claimed for *all* naturalistic theorising, and the phrase which should precede all untestable theorising, namely, "A certain scientist theorises (speculates) that ... " was replaced with the phrase "Science shows that ... ". Furthermore, the term "scientific" became a synonym for the term "rational" (Boyce, 2002: 2). Consequently, disagreement with the philosophical theories of scientists embedded in the currently orthodox evolutionary paradigm is regarded as irrational, a disagreement with reason itself.

3.4.2 Natural science and materialism

The assumptions undergirding materialist science

Naturalism is the philosophical position that intermingles the physical and spiritual worlds. Thus, nature religions – pantheism, polytheism and animism – are a form of spiritualised naturalism. Materialism is the form of naturalism that denies the spiritual world. Materialism – the view that the physical world is all there is and physical and chemical properties of matter were therefore sufficient to produce life – became the credo of science through the efforts of Darwin and Thomas Huxley in the late 19th century (Wilder-Smith, 1975:10).

Materialist science disallows any mention of God in explaining matters pertaining to the physical world, but to support its scientific endeavours it must necessarily borrow the assumptions and presuppositions that issue forth from biblical theism and which facilitated the rise and sustained development of natural science. That such borrowing is in fact illegitimately done – naturalism cannot support such assumptions – is recognised by the Christian philosopher Greg L Bahnsen and the non-Christian physicist Paul Davies (Samples, 1998:2).

The biologist and spiritual naturalist Rupert Sheldrake (1990:102) too, recognises that the idea of an ordered, law abiding universe is ultimately dependent on biblical theology. Sheldrake (1990:102) points out that the acknowledgement of natural laws is a way of thinking that "bears a strong resemblance to the Christian theology of creation by the word or *logos* of God ... If the mind of God is dissolved away, then we are left with free-floating mathematical laws playing the same role as laws in the mind of God". Fixed laws and evolution are correctly recognised by Sheldrake (1990:103) as logical contradictions, and he recommends that the idea of natural law should be done away with: "If all nature evolves, why should the laws of nature not evolve as well? Why should we go on assuming that they are ... fixed?"

Prof Jaki (1989:19-20) provides a scathing answer to Sheldrake's question, namely, that the dismissal of the idea of natural law leaves "little room for exact science but plenty for unbridled fantasies." History itself (see section 3.1) shows that:

> Great cultures where the scientific enterprise came to a standstill, invariably failed to formulate the notion of physical law, or the law of nature. Theirs was a theology with no belief in a personal, rational, absolutely transcendent Lawgiver, or Creator. Their cosmology

> reflected a pantheistic and animistic view of nature caught in the treadmill of perennial, inexorable returns. (Jaki, 1974:vii.)

Materialist science takes the prerequisite, essentially biblical, assumptions for granted, but as Sheldrake (1990:102) realised, they are then "free-floating" and no reasons exist why they should be accepted. In other words, materialists accept them via a blind act of faith.

Because materialism accepts the prerequisite biblical assumptions it has important similarities with biblically based science.

The similarities between biblically based science and materialist science

The similarities between biblically based science and materialist science are the following:

First, both biblically based science and materialist science accept that the physical world is comprehensible, i.e. that it is not capricious and magical, but it is has an objective, rational and lawful order, and can therefore be known and understood.

Second, both biblically based science and materialist science employ methodological naturalism, a method which cannot address events that could involve the actions of God. It is therefore a method which is, or should be, limited to truly natural phenomena. Biblically based science acknowledges such a limit, materialist science does not.

Third, both biblically based science and materialist science acknowledge, study and apply the same scientific facts, natural laws and valid scientific theories. Both also use the same data to draw conclusions about the origin, destiny and age of the universe, and in doing so *both* are philosophising and not practising science, a fact which materialist science does not acknowledge. Materialist science, by the very nature of materialism, regards the genesis of the universe and the life it contains as natural events, but this is an assumption, a genuinely *a priori,* metaphysical assumption which biblically based science does not make.

The differences between biblically based science and materialist science

The differences between science practised in a biblical and in a materialist framework are the following:

First, biblically based science proceeds from the first statement in the Apostolic Creed: "I believe in the Father Almighty, Maker of heaven and earth." Biblically based science holds therefore to the concept of the

uniformity of natural causes in an *open* universe; it is an open universe because God and the human mind and spirit are outside, and not part of, the uniformity of natural causes (Schaeffer, 1982b:164). Biblically based science avoids therefore mechanistic reductionism, that is, it does not reduce humans to mere parts of the cosmic machinery.

In contrast, materialist science proceeds from the belief that the cosmos is self-generated by physico-chemical processes. Materialist science holds therefore to the concept of the uniformity of natural causes in a *closed* universe which denies the idea of an extra-cosmic God and leaves no place for the human spirit. Humans are reduced to mere parts of the cosmic machinery. (Schaeffer, 1982b:167-168.) Life then becomes essentially meaningless, nothing more than physical survival and the accumulation of material wealth.

Second, biblically based science holds humans accountable to God, which means that human dominion of nature and the use of technology are under God's dominion. In contrast, materialist science holds humans accountable only to themselves, which reduces human dominion of nature and the use of technology to an ethos of pragmatism and utilitarianism.

Third, biblically based science accepts the inerrancy of biblical revelation as epistemological first principle. It upholds therefore the distinction between God's absolute truth and our own scientific pursuits, and acknowledges the limited and imperfect nature of our scientific theories. For the Christian founders of physical science, science was a humble, disciplined search for the level of truth which is accessible to the intellect. To quote Sir Francis Bacon: "To conclude, therefore, let no man out of weak conceit of sobriety, or in ill applied moderation think or maintain, that a man can search too far or be too well studied in the book of God's word, or in the book of God's works" (Schaeffer, 1982b:163).

In contrast, materialist science claims the autonomous self-sufficiency of the human mind as epistemological first principle. It assumes therefore that scientific investigation can, and will eventually, explain *everything* in terms of natural processes. The atheist theoretical physicist Stephen Hawking (1988:175) claims such a complete, absolute theory as "the ultimate triumph of human reason". Materialist science promotes therefore scientism, that is, the triumphalist view of science as being the absolute and final authority.

Fourth, biblically based science stays within the limits of methodological naturalism, and the term "a scientific explanation" retains its original meaning, namely, "an explanation [of a natural event] which is in accord

with all the known facts" (Harris, 2002:3). In contrast, materialist science moves beyond the limits of methodological naturalism, and the term "a scientific explanation" becomes "a naturalistic explanation of *any and all* events which is in accord with facts".

Fifth, biblically based science does not relegate issues that cannot be addressed by means of methodological naturalism, for example, religious and ethical questions, to the mind-dependent, subjective realm. In other words, it has no idealist consequences for religious and moral truth. Idealism is the philosophical and epistemological position that holds that the reality we experience has no existence independent of the perceiving mind. The contemporary term for idealism is constructivism. In contrast to biblically based science, materialist science takes the positivist stance that religious and moral matters are objectively meaningless and empty of objective truth. In such matters materialist science upholds an idealist stance. It accords objective existence only to that which can be scientifically observed and/or measured.

Sixth, biblically based science regards natural laws as God's creation. Humans and nature cannot transcend natural laws, but God created the laws and therefore can, and does, transcend natural laws. Biblically based science denies neither the possibility of miracles nor the factual truth of the miraculous events recorded in the Bible. Biblically based science acknowledges that:

> It is true that the world has an existence *separate* from God – it is not a part of God, as pantheism would maintain – but it has no existence *independent* of God ... He sustains the very *existence* of the universe on a moment-by-moment basis ... We describe what God does in terms of processes and laws ... natural processes and laws are *our* descriptions of God's activity, not independent tools that God makes use of. To perform a miracle, God needs only to act in a manner different from His "regular" or "normal" action; He does not need to suspend natural law to do something "unnatural". The God of the Bible is not a Master Craftsman who adjusts a former creation that exists independently of Him; the God of the Bible is the Creator and Sustainer who holds all things "in the palm of His hand". (Bube, 1978:32.)

In contrast, materialist science regards natural laws as absolute. In terms of materialist science the miraculous events recorded in the Bible are myths that convey spiritual and/or moral truth and they are not meant to be taken literally. This approach to the Bible is reflected in liberal and existential theology which teaches that the Bible is a quarry out of which to mine religious experience, but contains mistakes where it touches that which pertains to the universe (Schaeffer, 1982a:121, 144).

Many Christians adopted liberal and existential theology, which uphold theistic evolutionism, where evolution is ascribed to and directed by God. But evolution is essentially a process that destroys the weak in order to create higher forms of life. But such a method of creation is irreconciliable with the just and loving God of the Bible, the Father of Christ Jesus who preached the Sermon on the Mount (Wilder-Smith, 1974:167ff). Theistic evolution was for many not an option. They chose rather to abandon religion altogether.

The result was the widespread spiritual emptiness of the era of modernism, but since the late 20th century an increasing number of westerners are adopting the pagan idea of a spiritualised nature, not only to fill their personal spiritual void, but as paradigm for science. Evolutionism is retained, but ascribed to indwelling vital, that is, life-giving spiritual forces that drive matter inexorably forward and upward to greater physical complexity, life and consciousness. Thus, in contrast to materialism where evolution is without purpose and directed only by chance factors, spiritual evolutionists recognise purpose and order in life. The appeal of spiritual naturalism for scientifically minded westerners is understandable; it claims scientific validation in evolution and also in relativity and quantum theories. These theories are used to lend the necessary scientific stamp of approval for westerners to engage in pagan spiritual practices without embarrassment.

3.4.3 Natural science, idealism and spiritual naturalism

In the early 20th century, Einstein's theory of relativity dethroned absolute time and length, and "[m]is takenly but perhaps inevitably, relativity became confused with relativism" (Johnson, 1991:4). In the early 1920's the belief became popular that relativity theory inferred the absence of all absolutes, "of good and evil, of knowledge, above all of value" (Johnson, 1991:4). Also in the early 20th century, Einstein, Bohr and others developed quantum physics, from which Bohr inferred what is called the *Copenhagen Interpretation* of quantum physics, namely, that the state of subatomic particles prior to observation is indeterminate which ultimately means that prior to observation the particles are empty of real, objective existence. This promoted ontological relativism, that is, philosophical idealism, anti-realism or, in contemporary terminology, constructivism which holds that reality's existence is relative to the human mind. In other words, reality's objective, independent and structured existence is denied.

Einstein was a realist and he was distressed that his work promoted relativism and anti-realism (Johnson, 1991:4). Such inferences are

genuinely metaphysical inferences that are determined, not by the data, but by pre-assumed relativistic and idealist assumptions.

With regard to relativity theory, the relativity is solely that of *appearances and descriptions*. These are relative to the observer's position, but when the measuring data are converted to four-dimensional space-time measurements they are the same for all observers of the same event. If not, any differing description is false or describes another event. Thus, as Jaki (1978:183ff) says, relativity theory points to philosophical realism and absolutism since it shows that, despite different descriptions, there is ultimately only one true description. This was the philosophical stance of Einstein and Max Planck (1858-1947), the discoverer of the quantum of electromagnetic energy. In a lecture entitled *From the relative to the absolute* Planck drew special attention to what he called the "paradox" of relativity; instead of relativizing everything, it unfolded absolute, objective aspects of the physical world (Jaki 1978:183).

With regard to quantum physics, observation revealed, first, that light and subatomic particles can behave as either a wave or a particle depending on certain *fixed* conditions; conditions which are independent of the observer. Second, observation revealed that measurement of the position of a subatomic particle disturbed its momentum, and vice versa. Observation revealed *only* that the measuring apparatus had disturbing and intrusive influence on the subatomic, quantum particles. Observation did not, and cannot, reveal that quantum particles are in a state of indeterminancy prior to being observed. This was a metaphysical conclusion that Bohr (and his followers) drew, and it may have been influenced by Bohr's propensity for Eastern mysticism (Jaki, 1978:212).

Bohr and his followers relinquished the idea of an objectively structured reality. Their position is that the world receives its apparent structure from the mind. The mind constructs within itself and for itself a subjective world of appearances. Philosophical realism regards such a subjective world of appearances as a mental framework of ideas that may or may not correspond to reality, and realism regards a mental framework as knowledge only if it corresponds to reality. In idealism (anti-realism or constructivism) mental frameworks are both reality *and* knowledge of reality, constituted by and limited to the perceiving subject, who may be an individual person or a social group. In other words, this position equates mental frameworks, knowledge and reality. Thereby it places mental frameworks – which constructivists always regard as knowledge – beyond error, and on reality it imposes the features of subjectivity and relativity that apply, in fact, only to mental frameworks, that is, to how one *thinks* the perceived object is.

The truth of idealism, or constructivism, was questioned by Einstein. His statement that God does not throw dice implied that the *unexamined* subatomic reality is a determinate reality (Adler, 1990a:112-113, 1990b:98-99). The truth of idealism, or constructivism, is also questioned by the great English mathematician G.H. Hardy (1967:130) who writes as follows:

> It may be that modern physics fits best into some framework of idealistic philosophy - I do not believe it, but there are eminent physicists who say so. Pure mathematics, on the other hand, seems to me a rock on which all idealism founders: 317 is a prime, not because we think so, or because our minds are shaped in one way rather than another, but *because it is so*, because mathematical reality is built that way.

Hardy's comment does not imply that all mathematical theorising inheres in the physical world. But those mathematical theories that correspond to and can therefore be applied to physical reality do inhere in reality. Reality does not conform itself to the mathematical formulae; the formulae reflect and express in mathematical form objective features of reality, that is, the theory corresponds to the facts.

A description of reality in mathematical form is at the heart of physics. That such a description reflects the facts about an objectively structured reality free from inherent indeterminancy "is assured ... by the way in which technologically contrived devices work or fail to work. Technology is not magic, as it would be in the world of the philosophical idealist" (Adler 1990b:74). Technological devices – including the vast array that relativity theory and quantum physics made possible – work consistently, bar mechanical failure, because the physics and the mathematical formulae underlying the devices correspond to an objective reality; not because the mind magically wills either the device to work or reality to conform to the device.

Bohr's idealist, constructivist conclusion is in fact the logical result of the positivist epistemology embedded in materialist science, the major premise of which is "what is not observable does not exist" (Lovejoy, 1955:360; see section 3.4.2.3). And from the non-real, illusory world of constructivism the next logical step is to embody and animate the world with mystical, magical, spiritual forces. As Jaki (1978:212) observes: "A world of appearances is most germane to oriental (and pagan) mysticism."

The (logical) step that takes idealism to spiritual naturalism – pantheism, polytheism and animism – has not yet been taken by the natural scientific establishment. If it should be taken, history (see section 3.1) shows that

spiritual naturalism will bring empirical science to a standstill. But the accomplishments of the past, specifically technology and its continued expansion and refinement will not disappear, the reason being that technology has enormous manipulative power, a power that feeds and sustains what Nietzsche rightly called the "Will to Power". The current postmodern era – its denial of objective truth which does away with any sense of obligation and restraint – will in all probabilty compound the risk of persons or governments using technology to control and manipulate society and individuals, as was already done in the despotic "utopias" of the 20th century.

In the move to idealism, or constructivism, and ultimately to a pantheistic and animistic world view, the proponents (for example, Capra, 1990) are logical thinkers. They analyse materialism, but they proceed from the assumption that the definitive characteristic and origin of materialism in the West is not its rejection of the Bible, but its belief in objective reality and truth, and they subsequently find this belief to be the source of all the social and environmental problems of the 20th century. Their recommendation that the idea of and quest for objective truth should be suppressed is, in view of the argument in the previous paragraph, naïve. And the recommendation that nature should be spiritualised is also naïve, the reason being that a belief in a world that is inhabited by capricious and often wrathful spirits and whose power is also subject to human use leads to a life of fear (Mbiti, 1990:80, 193ff; Sibiso, 2001:4).

4. Conclusion

In the final analysis, it appears that there is only one world view that can support scientific enquiry and at the same time unify it with an accountable use of scientific knowledge. That world view is the biblical world view. This world view we must teach our young, and we must equip them with a solid base of scientific knowledge, a base of high academic standard so that they may become able scientists who can witness convincingly in our scientific and technological age and shed biblical light and guidance on the ethical use of scientific knowledge.

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