Science and faith: boa constrictors and warthogs?

Steve Bishop

Steve Bishop contributed the article "Green Theology and Deep Ecology" in Vol 16 (9), April 1991 issue of the journal Science and Christianity, which he has prepared.

Introduction

The relationship between science and religion, and notably Christianity, is a perennial subject. It has been treated by Ted Peters (cited in Barbour 1990 p. 4) to a fight between a boa constrictor and a warthog. Much debate about science and religion has been created by the boa constrictor and the warthog, many have claimed that science has swallowed Christianity. Between science and religion there has been a prolonged conflict, in which...science has invariably proved victorious. (Russell 1985 p. 7)

The conflict metaphor, which had its origin in the writings of John Draper (1875), became more popular through Andrew Dickson White (1896). The main thesis of White's and Draper's work was based on misinterpretation and half-truths, and many scholars have reviewed the nature of the conflict: Phillips (1979); Lessing and Numbers (1980) and Russell (1986). Nevertheless, the conflict metaphor still prevails. It provides a pertinent example of how worldviews colours perception of reality (Caudill 1985). The combats in the conflicts that did exist were not science and Christianity:

much of the conflict between science and religion turns out to have been between new science and the sanctified science of the previous generation. (taylor 1991 p. 37)

Science and religion are not like boa constrictor and warthog. They are not in conflict — as a discussion of miracles will show. Neither are they totally independent. The fallacious view of science as objective and value-free, and faith as subjective and value-laden, has long been debunked by philosophers of science. Unfortunately, these views are still widely held. Faith is integral to the scientific enterprise. It is in this so, then a distinctively Christian view of science is possible.

A Biblical perspective on science

If conflict is an inadequate way to describe the relationship between Christianity and science, then the relationship is in an attempt to answer this question we shall begin with a brief biblical overview. To do so I will utilize the creation, fall, redemption motif.

Creation

God, through Christ, is the source and sustainer of all things, nuggets of truth!

Finally, remember that theological thinking is not the same thing as theological reading! Some students read too much and think too little. In the words of the author of The Imitation of Christ, on the last chapter or two of a book they have even read. Of course thought can also displace action. But it will never do so while we hold together the great commandment to love God our God with all our mind and to love our neighbour as ourselves.

Redemption

As sin affected every area and aspect of life, so too does redemption. Redemption potentially 'unveils' the fall. Redemp... (rest of the paragraph is not included in the document).

Fall

However, this event is a decisive event is well described by Wallis, K. J.

This event has the character of a fall... of a falling out of the line of the development will led by God. (Eichorst 1972 p. 9)

No area of life is untouched by sin. Consequently all relationships are broken: humanity and God, humanity and the earth, humanity and man, female and humanity, and the animals and animals...Aspects of God's creation are given elevated roles they were not intended to have. This is exemplified in fallen 20th-century humanity's approach to science, technology and economics. They have become the holy trinity of science, technology, and economics. They have become idols, the gods of our age. They are worshipped in place of, or in some cases as well as, God.

Science claims to be omniscient. The only way to reliable knowledge in science is through this. The view is of no less a person than Bertrand Russell.

Whatevery knowledge is attainable, must be obtained by scientific methods; all other methods are fraudulent and are to be distrusted. (Russell 1935 p. 245)

and, more recently, the biologist Richard Dawkins.

In the art of evaluating evidence, science comes into its own. The correct method for evaluating evidence is the scientific method. If a better one emerged, science would embrace it. (Dawkins 1989 p. 10)

Science subserves every aspect of life; we have the science of beauty theory, the science of eating, the science of food and cooking, the science of hair dressing, etc... Even ethical issues will be replaced by science: according to the biologist Edward Wilson in his book Sozology.

The time has come for ethics to be moved temporarily from the hands of philosophers and biologists... (Wilson 1992 p. 201)

Wilson's reply to God's questions to Job (Job 38-39) are revealing:

Yes, we do know and we have told. Jehovah's challenges have been met with faith and not to silence every one of your puzzles. The physical basis of life is known; we understand approximately how and when it started on earth. New species have been created in the laboratory. Salvation comes through science. Even Francis Bacon saw science as undoing the effects of the fall.

The other extreme is that science is the scapegoat for almost all the world's ills. Lynn White Jr. (1967) placed the blame for the 'ecological crisis' on science and Christianity. Many examples illustrate the problems contained within:... with Hiroshima, Bhopal, Love Canal, Chernobyl. The fall has distorted the God-given role and function of science: consequently, it has become both detested and denigrated by different parties.

The myth of neutrality

It is not accurate to say science is an objective, value-free activity. This myth... (rest of the paragraph is not included in the document).

To the scientists and technologists who view their work as neutral, he says:

they are dangerously mistaken in regarding their work as being neutral. Such a naive view was nowhere extensively in the Third Reich as it was in Soviet Russia (the Third Reich). (Dawkins 1989 p. 176)

Science has both an intrinsic and an extrinsic 'non-neutrality'.

Extrinsic values

These are the sociological factors which negate any claim to neutrality. Science is not done in a social, economic, political or cultural vacuum. Leslie Stevenson makes a salient point...

The (scientist) will now have to recognize that the funds for his research will probably be given with a fairly close eye to possible applications, be they military, industrial, medical, or whatever. Such research cannot be said to be value-free. (Stevenson 1989 p. 216)

Intrinsic values

Philosophical factors also reveal neutrality to be a myth. The most obvious of these is the fact-value dualism postulated by the positivists. That definition of science presupposes a distinction between facts and values. Facts are objective and public, values are subjective and personal. This distinction is a facile. Facts are value-laden and are often determined by culture; for Kepler, it was a fact that the earth goes round the sun, and yet for Tycho Brahe, it was a fact that the sun goes around the earth! Our observations are theory-dependent. We see what we want to see. Our worldview affects all that we do. Every human activity is bound to a worldview: science is no exception. Any claims to neutrality are hollow.

A brief philosophy of science

The major school of philosophy that has dominated the philosophy of science in the past is positivism. Inductivism is the scientific world from a series of observations to a hypothesis: from the specific (this block of ice melts at C) to the general (all ice melts at C). This view of science has long been directed by philosophers of science. Yet we have learnt that the philosophy of science still hold an inductivist view of science (Hodges 1986).

The death-blow to inductivism is the recognition that observation is not neutral. Observation is theory-dependent: it is therefore impossible to be a neutral observer. What we see will depend on what we know and what we expect. To see any number of observations to illustrate this point.

If observation is theory dependent then it follows that observation will be governed by any pre-existing theory: in a liquid dislocator we may observe it disintegrating this, that, and the other (Hodges 1986 p. 210). In a similar vein, N. R. Hanson asks, 'Do Kepler and Tycho Brahe see the same thing in the east at dawn?' (Hanson 1958 p. 5).

Deduction is a close relative of inductivism. Instead of moving from the specific (events) to the general (laws, theories), deductivism starts with a law or theory and deduces another event. If all this does not occur then the law or theory may require some modification.

Both inductivism and deduction assume the neutrality and autonomy of science. That is, the assumption that there is a universal scientific method. Recent philosophical developments have undermined the idea of neutrality and have placed more emphasis on the social context of science. They have even gone as far as to question whether anything of any method could be scientific. These developments are associated with Popper, Kahn, Feyerabend and Polanyi, whose ideas we will examine briefly.

Sir Karl R. Popper (1902– )

One of the first to call for demarcation science from pseudoscience. He rejected the positivist idea that verification was decisive; for Popper, scientific theories could not be proved, they could only be falsified. Science could not represent a body of objective truths, it was merely statements, laws and theories that so far had been disproved.

E. S.] The scientist will now have to recognize that the funds for his research will probably be given with a fairly close eye to possible applications, be they military, industrial, medical, or whatever. Such research cannot be said to be value-free. (Stevenson 1989 p. 216)
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Introduction

The relationship between science and religion, and notably Christianity, is a perennial subject. It has been hindered by Ted Peters (cited in Barber 1990 p. 4) to a fight between a boa constrictor and a warthog. Much debate has occurred on this subject. Many have claimed that science has swallowed Christianity: between science and religion there has been a prolonged conflict, in which Christianity has been on the losing side. Science, it is said, has inevitably proved victorious. (Russell 1983 p. 77)

The conflict metaphor, which had its origin in the writings of John Draper (1875), became more popular through Andrew Dickson White (1870). The main thesis of White's and Draper's work was based on misinformation and half-truths, and many scholars have removed the negative elements from the conflict. They have continued to use the metaphor, and some have even directed it to continue the creative work of God. Hence it is here we find the biblical basis for science and Christianity. They can exist as a battle and open up God's good creation, to develop culture. Adam's naming of the animals can perhaps be seen as one of the first scientific tasks, of observation and classification.

Science, then, is a God-given cultural activity which is to be done in dependence on God and His Spirit. It is not an autonomous activity, it is not a body of knowledge independent of God.

Fall

However, this is one of the first events in the biblical development of God. (Eichorst 1972 p. 170)

No area of life is untouched by sin. Consequently all relationships are broken: humanity and God, humanity and the earth, humanity, male and female, humanity and the animals, animals and animals... Aspects of God's creation are given elevated roles they were not intended to have. This is exemplified in fallen 20th-century humanity's approach to science, technology and economics. They have become the unholily trinity of science, technological and economic. They have become idols, the gods of our age. They are worshipped in place of, or in some cases as, God.

Science claims to be objectivemercip. The only way to reliable knowledge is through science. This is the view of less a man than Bertrand Russell.

Whatever knowledge is attainable, must be obtained by scientific methods; and any truth that has been discovered, must be known. (Russell 1935 p. 243)

and, more recently, the biologist Richard Dawkins:

In the art of establishing evidence, science comes into its own. The correct method for evaluating evidence is the scientific method. If a better one emerged, science would embrace it. (Dawkins 1987 p. 51)

Science subsumes every aspect of life; we have the science of beauty therapy, the science of catering, the science of food and cooking, the science of hairdressing... etc. Even ethical issues will be replaced by science: according to the biologist Edward Wilson in his book Sociology.

The time has come for ethics to be moved temporarily from the hands of theologians and biologists. (cited in Middagh 1982 p. 201)

Wilson's reply to God's questions to Job (Job 38-39) are revealing:

Yet, we know and we have told. Jobahv's challenges have been met and not met to arrive at even good puzzles. The physical basis of life is known, we understand approximately how and when it started on earth. New species have been created in the laboratory. Salvation comes through science. Even Francis Bacon saw science as undoing the effects of the fall.

The extreme is that science is the saviour of almost all the image of the universe. Lyman White in 1987 placed the blame for the 'ecological crisis' on science and Christianity. Many examples illustrate the problems inherent in this position. Science has been used in the battle against the fall. Hiroshima, Bhopal, Love Canal, Chernobyl. The fall has distorted the God-given role and function of science; consequently, it has become both debased and demoralized by different parties.

Redemption

As sin affected every area and aspect of life, so too does redemption. Redemption potentially 'undoes' the fall. Redemption, in that it is not hypothetically impossible to accomplish science can be taken as an example; it is not so it can be used wisely and responsibly under God to open up new dimensions. One step to redemption, one step to God's given role is to expose the false claim that science is neutral.

The myth of neutrality

It is claimed that science is an objective, value-free activity. This myth has been promulgated by the school of philosophers known as positivism; it has in part been responsible for the elevation of the scientific method, the acceptance of the scientific community. According to Anne Comte (1798-1857), the positivist position was that all knowledge is built on the sciences. The late Alfred Ayer (1910-1999) was a logical positivist, his 'bestseller', Language, Truth and Logic, popularised this philosophy in the English language post-war period. Ayer's position indicated a position of knowledge. Mary Middagh makes this pertinent observation:

"They (scientists) moved gradually from the traditional Comtian position that all claims are based on the domain of science, to logical positivist positions which put such things outside the positivist arena. The resulting muddled metaphysic still underlies many of our problems today. (Middagh 1982 p. 45)

Science is subjective and value-laden. It is not neutral. This point is poignantly made by an Alternative Nobel Prize winner:

There is now a growing realisation that science has been embodied within it many of the ideological assumptions of the society which has given rise to it. (Cook 1987 p. 90-91)

To the scientists and technologists who view their work as neutral, he has a warning:

they are dangerously mistaken in regarding their work as being neutral. Such a naive view was nowhere seriously entertained in the Third Reich as a significant factor inside the Third Reich. Basically, I expressed the opinion of the technoloic who were self-sufficient and who appeared to be the moral neutrality of technology, these people were without any scruples about their activities. (Cook 1987 p. 90-91)

Science has both an intrinsic and an extrinsic 'non-neutrality'.

Extrinsic values

These are the ideological factors which negate any claim to neutrality. Science is not done in a social, economic, political or cultural vacuum. Leisure Stevenson makes a salient point.

(The scientist) will now have to recognize that the funding for his research will probably be given with a close eye to potential applications, be they military, industrial, medical, or whatever. Such research cannot be said to be value-free. (1989 p. 216)

Intrinsic values

Philosophical factors also reveal neutrality to be a myth. The most obvious of these is the fact-value dualism postulated by the positivist. In a different form it has been postulated by the prescientific paradigm that values presuppose a distinction between facts and values. Facts are objective and public values are subjective and personal. This distinction is a fallacy. Facts are value-laden and are often determined by culture; for Kepler, it was a fact that the earth goes round the sun, and yet for Tycho Brahe, it was a fact that the sun goes around the earth. Our observations are theory-dependent. We see what we want to see. Our worldview affects all that we do. Every human activity is bound to a worldview: science is no exception. Any claims to neutrality are hollow. It is an illusion to think that science can exist in the philosophy of science. It is to a brief and inevitably oversimplified overview of the philosophy of science that we now turn.

A brief philosophy of science

The major school of philosophy of science that has dominated the philosophy of science in the past is inductivism. Inductivism is the scientific method as seen from a series of observations to a hypothesis from the specific (this block of ice melts at C) to the general (all ice melts at C). This view of science has long been directed by philosophers of science, and it remains true that science still hold an inductivist view of science (Hodgen 1986).

The death-blow to inductivism is the recognition that observation is not neutral. Observation is theory-dependent, it is therefore impossible to be a neutral observer. What we see will depend on what we know and what we expect. To see any number of examples illustrate this point.

If observation is theory dependent then it follows that observation will be governed by any pre-existing theory: sugar in a liquid dissolves, we know so we see it dissolving (Hodgen 1986 p. 210)1 in a similar vein, N. R. Hanson asks, 'Do Kepler and Tycho Brahe see the same thing in the east at dawn?' (Hanson 1958 p. 5).

Deduction is a close relative of inductivism. Instead of moving from the specific (events) to the general (laws, theories), deduction starts with a law or theory and deduces another event. If this all that we do then the law or theory may require some modification.

Theory

Observation

Deduction

Prediction

Both inductivism and deductionism assume the neutrality and autonomy of science. They assume that there is a universal scientific method. Recent philosophical developments have undermined this assumption and have placed more emphasis on the social context of science. They have even gone as far as to argue that the result of any method that could be adopted is scientific. These developments are associated with Popper, Kuhn, Feyerabend and Polanyi, whose ideas we will examine briefly.

Sir Karl R. Popper (1902- )

One of the many attempts to demarcate science from pseudoscience. He rejected the positivist idea that verification was decisive; for Popper, scientific theories could not be proved, they could only be falsified. Science could not represent a body of objective truths: it was merely statements, laws and theories that so far had been disproved.
Rejecting an inductive view of science, Popper advocated hypothetico-deductive. Deductions are made on the basis of an hypothesis. If the deductions can be shown to be false then the hypothesis must be rejected. This made it more acceptable for Layak (1970).

Thomas S. Kuhn (b.1922) Origianally trained as a theoretical physicist, Kuhn wrote his major work 'The Structure of Scientific Revolution' after being exposed to a history of science course in 1961. He started the scientific community to explain to myself and friends how I had been driven to a different view of the scientific method by the insight gained from the course. This is a book that I believe to be a model of the power of this view. (p. vii) Kuhn refers to the popular view of science as 'development-by-acumulation', (p. 2) a view popularized in standard histories of science. He introduced the concept of paradigm shifts to explain how he saw the development of science.

For Kuhn, three phases take place in the development of science: normal science, crisis, and revolution. Normal science is what the majority of scientists do. It is like a 'puzzle solving' (p. 30). It provides an articulation of the dominant paradigm. Occasionally in the history of science we have been confronted by crises, where the dominant paradigm does not explain certain phenomena. The crises have point several competing theories vie for dominance: this is the revolutionary phase. Eventually, one of the competing paradigms will become more widely accepted than the others, and consequently it takes over as the dominant paradigm. Revolutionary science becomes normal science and we have a full circle.

A network of kuhn. Knowledge, as well as being personal, also functions within a network of beliefs. This network is not merely about bringing pattern and order to knowledge: it also acts as a vehicle for the transmission of knowledge and its elaboration. (p. 416) Popper's notion of discovery is not so far, far from the astronomer's belief in the horoscope or the fundamentalist's belief in the letter of the Bible. A belief always works in all situations. And this necessity for pattern is a method that for Feyerabend does not exist (Feyerabend 1975).

Michael Polanyi (1891-1976) The Hungarian-born scientist-turned-philosopher, Polanyi, claims that knowledge has what he calls a 'tacit dimension' that is personal in nature. The tacit dimension can be lost (Polanyi 1966 p. 4) perhaps best describes his thesis.

Polanyi has made an important contribution to both the philosophy of science and the social sciences. His world view is a matter of great importance to scientists. Unfortunately, his work is little known because it is not easy to read. But his work is fundamental to the philosophy of science. 


Several factors are integral to knowledge for Polanyi: these include a tacit dimension of belief and commitment. All are interconnected. Commitment can be seen as a network of beliefs and this tacit dimension has a difficult time to Polanyi down at times because he does not provide a systematic exposition, rather manly illustrations and examples.

The personal participation of the knower in the knowledge he believes himself to possess takes place within a flow of passion. We recognize intellectual beauty as a guide to discovery and a mark of truth. (p. 194).

The tacit dimension. Riding a bike, recognizing a face in a crowd, understanding the meaning of a word or a metaphysical dilemma: skills that we have are not always capable of articulating or analyse what we know: we can know more than we can say. The tacit dimension involves, in consequence, involves two parts - one implicit, the other explicit. These, Polanyi called the tacit (or personal) and the explicit (or public) respectively. (p. 195) In other words, the tacit dimension is not as we think it is.

Kuhn places much more on the role of paradigms, and rightly so. This emphasis varies more often to show that science is value (or theory) laden. Paradigms, or worldviews, shape all our thinking. These paradigms are commonly held and commonly held and become the scientific community.

The weakness of Kuhn's position is that science is condemned to a 'perpetual revolution' (Hacking 1983). This is because Kuhn is a relativist. Truth is determined by the dominant paradigm. Kuhn claims that the social dimension of science and consequently distorts reality. Science is reduced to a social construct.

Lakatos, criticizing Kuhn's view, claims that for Kuhn 'scientific changes are a kind of religious revolution' (Lakatos 1970 p. 93). It could be said that the philosophy of science is at present undergoing a Kuhnian revolution; certainly Kuhn's work has caused a paradigm shift to occur in the social sciences.

The difference between Popper (and the positivists) and Kuhn can be seen by how they would respond to the following questions about science: 1. Is it an example of rationality? 2. Is there a distinction between observation and theory? 3. Is it cumulative? 4. Does it have a tight deductive structure? 5. Are scientific concepts precise? 6. Is there a methodological unity of science? 7. Is the control of the world that they have is just an observation? This vision of reality provides a framework of ultimate truths. Kuhn's response is a more critical one: we have to be critically on the basis of commitment, they are irreducible and unprovable.

A scientific enterprise relies upon this tacit framework of beliefs. Hence, Polanyi has shown that faith, not doubt (as Popper held) is a vital aspect of science.

The logical structure of science works so far as not, so far as the astronomer's belief in the horoscope or the fundamentalist's belief in the letter of the Bible. A belief always works in all situations. And this necessity for pattern is a method that for Feyerabend does not exist (Feyerabend 1975).

Among these beliefs is: the belief that there is something there to be understood (1946 p. 30). He goes on to say: This is not the creation of any sort of the great domain of the mind — it is to express a faith which can be upheld only within a community. We realize here the connection between the church and Society adulated in these essays (Polanyi 1964 p. 59).

Covmtinent is another important aspect. It has two poles: a person can be committed to either the one or the other. This prevents Polanyi's epistemology from slipping into subjectivism (1958 p. 260). Knowledge cannot be divorced from personal commitment:

Science is a system of beliefs to which we are committed. Such a system cannot exist without personal commitment. However, Popper has shown that all science can exist without personal commitment: this is because he is the advocate of a U-turn in accepted ways of thinking.

Polanyi has shown that faith is part of science and that this faith cannot exist without personal commitment.

Along with Kuhn, he sees a vital role for the scientific community in the scientific enterprise. Science progresses through faith in the accepted views of science; these views that are determined by the scientific community.

Polanyi's work thus provides us with important insights: science is a human activity, but are both science and philosophy based on a network of beliefs of which we are committed and which cannot be represented in non-social terms (1964 p. 146).

Realism versus relativism One of the major debates in the philosophy of science over the last decade is the realism versus anti-realism debate. For one thing, it was in essence this that characterized the difference in approach between Popper and Kuhn. Kuhn claimed that 'Sir Karl's view of science: Popper acknowledges' that is Kuhn 1970 p. 3). Popper's response is to reject Kuhn's relativism. He sees realism as being the only positive way to proceed. For the Christian, science is a God-given corporate human activity whereby we explore and investigate God's good creation in an attempt to understand its order and structure. By its very nature, science is a human activity and conclusions can only ever be tentative, fallible and provisional: hence a naive realist view of science is untenable. This is the 'naive' idea that scientific laws and theories provide an accurate literal description of an objective world. This is in opposition to the one correspondence between theory and reality. Likewise, a relativist position is flawed because we are dealing with a God-given reality which is not the product or byproducts of the human intellect.

The theoretical physicist Paul Davies has made this revealing statement:

"For scientists would be willing to suppose that the laws of physics are merely human inventions. To be sure they are formulated by humans, but the physicist is motivated by the keen desire to find the simplest, clearest, most straightforward explanation of the facts. Without this connection with reality, science is reduced to a meaningless exercise."

Relativism undermines the very basis of scientific investigation. It denies that there is an objective reality to investigate. I would therefore be so bold as to say that the relativistic world view is more appropriate for a Christian; that is, that science provides us with a fallible description of the external world. This is the position advocated by many writers, including Arthur Peacocke (1979), Ian Barbour (1983), Stanley Jaki and John Polkinghorne. Jaki claims that the major lesson of the history of science is that scientists cannot claim to have an unique or even adequate scientific experience. The only thing they have is their own experiences. This is not to treat science as irrelevant to other disciplines but to recognize that science is one of a number of disciplines that we can use to understand the world. This approach is not only more realistic but also more consistent with the scientist's commitment to the search for a better understanding of the world. For science to be a true science, it must be open to the possibility that other disciplines may offer a more complete or more accurate understanding of the world. This approach is not only more realistic but also more consistent with the scientist's commitment to the search for a better understanding of the world. For science to be a true science, it must be open to the possibility that other disciplines may offer a more complete or more accurate understanding of the world.

Science as a faith activity During the Holy Week of 1992, instead of the usual religious programmes the BBC showed a series of programmes called 'Saw', which dealt with the way science has paved the way for a modern secular society. The programmes were to be followed by a future Holy Week as seen in 1993 will be given a regular diet of science programmes instead of the usual re-run of Joes? Science has become the new religion, it seems.

Polanyi has shown that faith is integral to scientific investigation. Science is a deliberate or religious activity. Professor Coulson has commented:

Science itself must be a religious activity: a fit subset for a Sabbath day's rest as John Ray put it in the eighteenth century. (Coulson 1971 p. 44)

We have already mentioned that science is a human activity and science is concerned with the knowledge of the world. This knowledge of the world is not the product of the human intellect. The answers to these questions cannot be empirically tested: they are the product of faith. Hence, scientific activity is inherently religious.

We can expresse this line of argument as follows:

1. We all have a worldview.
2. We all have a product of faith, shaped by religious commitments.
3. All human activity is shaped by worldview.
4. Religious nature of science is shown in the beliefs that are necessary for the scientific enterprise. These include the following:

Belief in a material world. If the material world is a mere illusion then science is not an activity necessary for the human being. The answers to these questions cannot be empirically tested: they are the product of faith.

Belief that the world is ordered. Thomas Torrance makes an insightful remark.

Belief in the conviction that, whatever may appear to be the contrary in our current or chance events, reality is intuitionally one and indivisible, constitutes one of the ultimate controlling factors of the Christian outlook. (Torrance 1980 p. 158)

The question remains for the scientist, where does this order come from?

Belief that understanding the world is a religious activity. If it were not so, what would be the point of science?

Belief that the world and its order can be known. If it cannot be known then scientific activity would be impossible.

Belief that the world is one. If the scientist did not have faith in colleagues' results published in the scientific journals then from most of their work would be spent confirming all the results, which is a task which is foolish. For any research that builds on previous work. This does not imply that all that is published is accurate.
Rejecting an inductive view of science, Popper advocated hypothetico-deductivism. Deductions are made on the basis of an hypothesis. If the deductions can be shown to be false then the hypothesis must be rejected. This was modified. In Lakatos (1970),

Thomas S. Kuhn (b.1922)

Originally trained as a theoretical physicist, Kuhn wrote his major work "The Structure of Scientific Revolutions" after being exposed to a history of science course in which he was confronted with the need to explain to myself and friends how I had been duped into scientific knowledge. This led him to develop the concept of paradigm shifts to explain how the development of science takes place.

For Kuhn, three phases take place in the development of science: normal science, crisis, and revolutionary science. Normal science is what the majority of scientists do. It involves solving "puzzle solving" problems (p. 30). It provides an articulation of the dominant paradigm. Occasionally in the history of science we have been confronted by crises, where the dominant paradigm does not explain certain phenomena. Kuhn's three phases continue to this point several competing theories vie for dominance: this is the revolutionary phase. Eventually, one of the competing theories will become more widely accepted than the others, and consequently it takes over as the dominant paradigm: revolutionary science becomes normal science and we have come full circle.

Preparadigm period
Normal science
(paradigm shift)
Anomaly
Ignored

Paradigm shift
Evolution of the paradigm
Normal science
(paradigm shift)
Anomaly
Ignored

Kuhn places much emphasis on the role of paradigms, and rightly so. This emphasis comes more now to show that science is value- (or theory-) laden. Paradigms, or worldviews, shape all our thinking. This paradigm shift is necessary if we are to progress and the community held and communally determined by the scientific community.

The weakness of Kuhn's position is that science is condemned to a "perpetual revolution" (Hacking 1983). This is because Kuhn is a relativist: truth is determined by the dominant paradigm. Kuhn seems to discount the social dimension of science and consequently distorts reality. Science is reduced to a social dimension.

Lakatos, criticizing Kuhn's view, claims that for Kuhn "scientific change is a kind of religious revolution" (Lakatos 1970 p. 93). It could be said that the philosophy of science as at present undergoing a Kuhnian revolution; certainly Kuhn's work has caused a paradigm shift to occur in the philosophy of science.

The difference between Popper (and the positivists) and Kuhn can be seen by how they would respond to the following questions about science: Is it an example of rationality? Is there a
distinction between observation and theory? Is it cumulative?
4. Does it have a tight deductive structure?
5. Are scientific concepts precise?
6. Is there a methodological unity of science?
7. Are the concepts of science and the world the same? causing them some observatuons.
8. Is science outside time and history? For Popper, the answer to all questions is no. For Kuhn, no to all questions except the first (Hacking 1983).

Paul Feyerabend (b.1924)

Feyerabend believes that in science there is no such thing as the scientific method; rather, "anything goes" is an anachronic view of the scientific method. He also believes that one reason that Kuhn debunks the superiority of science over other realms of knowledge. We cannot reject other types of knowledge because they are not in the same framework. This is a method that for Feyerabend does not exist (Feyerabend 1975).

Michael Polanyi (1891-1976)

The Hungarian-born scientist-turned-philosopher, Polanyi, claims that knowledge has what he calls a "tacit dimension"; it is personal in nature and cannot be articulated (1966 p. 4) perhaps best describes his thesis.

Polanyi has made a significant contribution to the philosophy of science. He believes that knowledge, and especially that which is tacit, is fundamental to science. In his view, the acts of discovery are not reducible to the methods of science. For Polanyi, science is not something that can be taught (Polanyi 1966 p. 4) perhaps best describes his thesis.

Polanyi's contribution is an important addition to the philosophy of science and to the philosophy of knowledge. His work has had a profound impact on the development of the philosophy of knowledge.

Science is a system of beliefs to which we are committed. Such systems of beliefs are not reducible to the methods of science. Science is not a set of rules, but rather a set of beliefs that can operate outside such a fiduciary network. (Polanyi 1966 p. 260)

Several factors are integral to knowledge for Polanyi: these include tacit, non-empirical, non-verbal, and non-scientific beliefs. These beliefs can be seen as a network of beliefs and that a tacit dimension is too difficult to pinpoint down at times because he does not provide a systematic exposition, rather many illustrations and examples.

Passion: The positivists deny any personal, subjective aspect to science. Popper acknowledges "emotions" that are non-scientific but are still an aspect of science.

Realism versus relativism
One of the major debates in the philosophy of science over the last decade is the realism versus anti-realism controversy. It was in essence this that characterized the difference in approach between Popper and Kuhn. Kuhn claimed that "Sir Karl's view of science": Popper acknowledged "the principle of defeasibility" (Kuhn 1970 p. 1). Popper's response is to reject Kuhn's relativism. He sees realism as being a part of the scientific community.

For the Christian, science is a God-given corporate human activity whereby we explore and investigate God's good creation in an attempt to understand its order and structure. By its very nature, human activities and conclusions are conditioned by the human intellect; fallible and provisional; hence a naive realism view of science is untenable. This is the 'naive' idea that scientific laws and theories provide an accurate literal description of an objective world. Inaccurate per se, it is not consistent with critical thinking. It is inconsistent between theory and reality. Likewise, a relativist position is flawed because our dealing with a God-given reality which is not the product of our thinking.

The theoretical physicist Paul Davies has made this revealing statement:

"For scientists would be willing to suppose that the laws of physics are merely human inventions. To be sure they are formulated by humans, but the physicist is motivated by the knowledge he has acquired about the world. What is a human invention?" (Davies 1986 p. 9)."

Relativism underpins the very basis of scientific investigation. It denies that there is an objective reality to investigate. I would then be forced to question the very fundamentals of the whole view of science more appropriate for a Christian, that is, science provides us with a fallible description of the external world. This is the position advocated by many writers, including Arthur Peacocke (1979), Ian Barbour (1986). Stanley Jaki and John Polkinghorne. Jaki claims that the major lesson of the history of science is that scientists cannot be trusted with complete reliance on the scientific method, and that all interacting things (1978 p. 276). For Polkinghorne, the realist view is not the whole truth but an instrument for efficient science. It is foolish to be considered. He goes on to say: "If realism is prove defensible it has to be critically rational" (1986 p. 22).

The philosophy of the world is fallible and imperfect. This inevitably means that we have to propose tentative and provisional models and that the scientific method must be supplemented with other rational and religious claims. This does not deny that there is any "real world" out there. If we have no access to the real world, then science becomes meaningless. How can we know the truth if there is nothing objective to know? This is where religious faith comes in, which can we judge the truthfulness of our hypotheses, theories, or laws.

Science as a faith activity

During the Holy Week of 1992, instead of the usual "religious" programmes the BBC, showed a series of "professors essay" entitled "Science and Society" which dealt with the way science has paved the way for a moral society. In future Holy Week will be given a regular diet of science programmes instead of the usual re-run of Jesus? Science has become the new religion, it seems.

Polanyi has shown that faith is integral to scientific investigation. It is a "paradigm shift" and is a condition of religious activity. Professor Coulson has commented: Science itself must be a religious activity: a "lit scaffold" for a "knowledge and order" upon which society is built. And science is a human activity; it is an instrument of faith, shape by religious commitments.

We have already mentioned that science is a human activity and science is a product of faith, shaped by religious commitments. A worldview, by definition, rests on certain ultimate questions, such as: What is human? What is this world? The answers to these questions cannot be empirically tested: they are the product of faith. Hence, scientific activity is inherently religious.

We can express this line of argument as follows: 1. We all have a worldview. 2. A worldview is the product of faith, shaped by religious commitments. 3. Human activity is shaped by worldview.

The religious nature of science is shown in the beliefs that are necessary for the scientific enterprise. These include the following: 

Belief in a material world: If the material world is a mere illusion then science is necessarily a blind faith.

Belief that the world is orderly. Thomas Torrance makes an insightful remark: Belief that the conclusion that, whatever may appear to the contrary in so-called random or chance events, reality is inherently ordered, constitutes one of the ultimate controlling factors in the whole of creation, an ultimate reality (1983 p. 10).

The question remains for the scientist, where does this origin come from? 

Belief that understanding the world is a religious act. If we were not so, what would be the point of science?

Belief that the world and its order can be known. If it cannot be known then scientific activity would be impossible.
The five beliefs above are necessary for the scientific enterprise. They are also necessary for the development of a Christian worldview so that it may be integrated to a Christian worldview. It is therefore no accident that a Christian worldview was necessary for the birth and development of modern science.

The birth of science

The major contribution of the Christian-born theologian and Benedictine priest, Stanley Jaki, to the history and philosophy of science has been to show that it was, and could only have been, necessarily related to both the air and conditions for science to flourish. The birth of science came only when the seeds of science were planted in a soil that God had prepared for natural theology and to the epistemology implied in it (Jaki 1979 p. 160).

It was the philosopher M. B. F. Foster (1934) in a seminal paper, who showed that the roots of the ideas and the nature of science owed to Christian theology. He showed that what we now view as 'cause' came to be seen as cause and effect. He also showed that the 'materialist' view of science was produced by a philosophy of science that was the result of a Christian worldview. Jaki (1979) has shown that the development of science is based on these three main factors, and that each one is dependent on the other.

The rational unity of the universe: the source of order is God.

The contingent, i.e. neither natural, nor eternal, rationality or intelligibility of the universe, is a consequence of God’s creation ex nihilo, which included both space and time.

The freedom of the universe. A freedom which is contingent provides a release from the tyranny of Determinism. This freedom is the core of the concept of freedom of the will and the concept of free will is not anathematized in the universe of the 'Infinite Love and Truth upon which it rests and by which it is maintained' (Torrance 1980 pp. 58-59). This is a characteristic of Christianity that has no parallel in any other science.

It was the rule rather than the exception, historically, that the teaching of a new science was a threat to the Church. In the case of Darwinism, for example, it was not just the Church, but the whole of society that was threatened by the 'transgression of the boundary lines' (Russell 1965). The opposition to science, therefore, is not a new phenomenon, but one that has been present throughout human history.

Law, scientific law and miracles

Is there any scientific law that is superior to explanatory statements of miracles? Does God violate his own laws to produce a miracle?

It is an attempt to unravel some of those knotty questions, which we start by examining what is meant by law. Law is one of those Humpty Dumpty words — it can mean whatever we want it to mean. It has a wide range of semantic meaning, depending partly on what language game is being played. We need to make a distinction between the way scientists and theologians use the term law.

Scientists and philosophers of science are not agreed on its meaning. Scientists describe laws as relationships within physical entities. They are descriptions of what is, and they are open to the contingent. Theologians, on the other hand, describe laws as necessary conditions of the possibility of the God-given reality. They are necessary conditions of the possibility of the God-given reality. Theologians are concerned with understanding the nature of reality; they are interested in the actions that are meant by the terms used. They are interested in the actions that represent God's law, and they are concerned with understanding the nature of reality.

Theologians are also interested in the actions that represent God's law, and they are concerned with understanding the nature of reality. They are interested in the actions that are meant by the terms used. They are interested in the actions that represent God's law, and they are concerned with understanding the nature of reality.

Likewise, there is no precision to the meaning of the word 'law' in Scripture. All of this is what some important observations. laws are both (compelling laws of nature) and appealing (incorner), and the range of its validity can be both sweeping (general) and individual (particular). (Wolters 1960 p. 170).

The law is unenlightened: God orders his creation, both human and non-human, through the use of natural laws. (Science and the Gospel, 1973).

Scientific laws are human constructions, although they are bound to the territory of earthly science. Theologians have to demonstrate that laws close they come to the laws by which God orders his creation. They are not, as Kant maintained, human constructions imposed on reality.

Miracle - law, is a slippery concept. The popular conception of a miracle is the violation of a natural law, if it is a violation of an act of a supernatural law. It is also inaccurate.

Swinburne, Mackie and Pusem define a miracle as a violation or transcendence of a law. Theologians, however, define a miracle over from the 18th century when deism was at its peak. Ehricholtz points that it is more likely to be a violation of a law.

J. Dietrich to the deuven Old Testament believer to make a breach in the laws of nature. A sinless one of the miracle is a breach of an act of nature.

God does not violate his own laws. But works with and through them, he is faithful to the creation order, which has its origin in God's providential work. When God's new world, the time of the new covenant, arrived, Augustine was near to the truth when he described a portent (a miracle) as an act of nature, a violation of nature, but contrary to what we know as nature (De Civitate Dei 8.3). Fuller objects to such a definition because it may mean, scientifically advanced understanding of nature, that there will be no place for miracle after all (1963 p. 8). The view is well-founded.

It is likewise a mistake to consider miracles as divine interventions. An intervention implies that the intercessor is absent prior to the intervention. God is present in all of creation. It is therefore illogical to describe his action in a more intervention (Davies 1992).

Can we describe miracles as a supernatural phenomenon? The idea that miracles are supernatural events has its origin in rationalism, not in the scriptures. God is the law of the nature. In the creative act, to work is to create. It is the Creator that works miracles are natural events. Ehricholtz, again, points that even the course of nature itself counts as a miracle (p. 163). Nature non-autonomous: all things are held together by Christ. He is both the source and sustainer of all things. Fallen nature is not neutral, as rationalism assumes, and supernaturalism, with its nature supernatural dualism, need not be involved to explain that which rationalism cannot. As Davies states (p. 54).

The fundamental aspect of supernaturalism is that it begins with a rationalistic and didactic theory of nature in which only a nature form exists in its moralizations and is redefined in relation to nature. As long as rationalism exists, supernaturalism will not disappear. Supernaturalism is a false way of connecting the phenomena.

How then are we to explain miracles? John Polkinghorne suggests that we should consider the following points:

how these strange events can be set within a consistent overall pattern of God's reliable activity; how we can accept them without implying a violation of God's law; if a concept of pantheism is not Christians. (Polkinghorne 1998 p. 177.

Miracles are part of the created order. In performing miracles, Jesus was responding to the needs of his followers. They are the glimpse of the consummated kingdom of God. John's vision of the new heavens and new earth is the fulfillment of the promise of the new covenant. The creation of the new heavens and earth is the fulfillment of the promise of the new covenant. (Polkinghorne 1998 p. 177).

To this we might add: and without subscribing to an unbiological supernaturalism.

Mysteries are part of the created order. In performing miracles, Jesus was responding to the needs of his followers. They are the glimpse of the consummated kingdom of God. John's vision of the new heavens and new earth is the fulfillment of the promise of the new covenant. The creation of the new heavens and earth is the fulfillment of the promise of the new covenant. (Polkinghorne 1998 p. 177).


The five beliefs above are necessary for the scientific enterprise. There is also a sixth belief, that the natural world is open to the study of science to a Christian worldview which is necessary for the birth and development of modern science.

The birth of science

The major contribution of the Christian/human theologian and Benedictine priest, Stanley Jaki, to the history and philosophy of science has been to show that it was, and could only be, 'Christianly'. The key to that, he defined as the right atmosphere and conditions for science to flourish.

The birth of science came only when the seeds of science were planted in a soil made fertile by the teaching of nature to natural theology and to the epistemology implied in it (Jaki 1978 p. 160).

It was the philosopher M.B. Foster (1934), in a seminar paper, who showed that the debt that the origins and the nature of science owes to Christian theology. From this viewpoint came to similar conclusions. Hoykawa sees science as 'more a consequence of the Christian faith than a cause'. (ibid. p. 161; see also J. du Bois-Reymond).

It is true, it is possible to say that the 'possibility of science' is a logical consequence of the freedom of the 'infinite love and truth upon which it rests and by which it is maintained' (Fortran 1980 pp. 58-59). It is these Christian beliefs that made Christianity so important on the development of science.

It was the rule rather than the exception, historically, that the founders of science were Christians. (cf. Russell 1965, 1987). According to Hoykawa, science is not the product of the free will of the human, but the freedom of the 'infinite love of life and truth upon which it rests and by which it is maintained' (Fortran 1980 pp. 58-59).

Theology is the study of God, the knowledge of his essence and attributes. It is through theology that we come to understand the nature of God, his character, his attributes, and his actions. Through the study of theology, we gain a deeper understanding of who God is and how he relates to the world.

Law, scientific law and miracles

The science of God

Scripture is unequivocal: God orders his creation, both human and non-human, throughout the New Testament. Scientific law is in the literal and historical interpretation of God's commands. Scientific laws are human constructions, although they are bound to the creedal foundation of the Christian faith.

The 'miracle', 'law', 'irreplaceable' concept. The popular conception of a miracle is free from the violation of a natural law, it is a supernatural intervention and is a supernatural event. All are inadequate.

Swinburne, Mackie and Hume all define miracles as a violation or transcendent act of a supernatural kind. 'A miracle is an event which is not explicable in terms of natural laws, but contrary to what we know as nature.' (De Civile Dei XI.8). Fullers objects to such a definition because it may mean, scientifically advanced people have a reason to believe in miracles.

The prophet Isaiah paints a picture of the lion and the lamb lying down together in harmony on the new earth. Perhaps too we will see the box corn and warthog coexisting in peace.

An 'excellent analysis of contemporary soteriology is provided by the Christian economist Bob Goodlad. (ibid. p. 161). He says that all are published by Hodder and Stoughton.

The philosophy of science is the subject of science and its methods, especially science. Two other recent critiques of whiteness include Ian Bradley (1964) and Robert Stalnaker (1984).


Presented by Anthony Cline and produced by Angela Taylor, the series on science and faith: science at the cross, science and faith, and science and community. 'I am not concerned here with the historiography of this topic. On this see, for example, E. Eaton and S. Munk (1985).

However, Ehrich thinks that some things do violate the laws that are not known. He cites No. 150: 10.01ff. and 2 K. 20.10-20.11 as examples.

In this and the following discussion see 1. H. Diermier no date and 1987.

Bibliography


Small antelopes and warthogs inhabit this area, and may also be seen in on the paths through the riverine forest leading to the falls. From. Wikipedia. This example is from Wikipedia and may be reused under a CC BY-SA license. The park is very densely vegetated savanna woodland with wildlife populations of elephants, buffaloes, warthog, antelopes and monkeys. From. Wikipedia. Warthogs are charismatic pigs native to Africa. They may not be bringing home any beauty pageant awards, but these spunky creatures are strong and intelligent. Of African wildlife, warthogs are extremely flexible and capable of adapting to change, which is one major reason their populations are stable. Read on to learn about the warthog. Description of the Warthog. These medium-sized members of the pig family look pretty close to the characteristic image of a pig. Their skin is dark colored, and they are stoutly built. Oxpeckers and other birds ride on warthogs and eat insects off their bodies. Warthogs will also wallow in mud to get rid of insects and to cool down on a hot day. Like pigs, warthogs don't have sweat glands to cool themselves. Warthogs also have padding on their knees. They often kneel to eat lower grasses or to slurp up a bug. Additional resources. Pigs Animal Sanctuary. The Humane Society of the United States: Pigs. Woodland Park Zoo: African Warthogs. Sign Up for e-mail newsletters. 2020 The camera captures gorgeous images of elephants, cheetahs and warthogs, and breathtaking shots of the Victoria Falls at the Zambezi River. â€” Brian Truitt, USA TODAY, "What to stream this weekend: Meghan Markle's 'Elephant' documentary, Netflix's 'Coffee & Kareem' and more," 4 Apr. 2020 Included on the tour is an okapi, black rhino, hippo, African wild dog, Masai Giraffe, African elephant, lion, warthog and white rhino â€” which Katelyn says is her favorite.