



Science - friend or foe?

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Summary

This paper examines the contemporary relationship between science and Christianity. The exaggerated claims of secular scientists and Christians concerning the nature and scope of scientific and religious knowledge occasionally lead to conflicts. Overall, however, it is concluded that science and Christianity are mutually supportive. Historically the scientific enterprise has strong Christian roots and Christians have a firm commitment to truth-telling about God's world. Most importantly, both science and Christianity are sceptical about relativistic theories of knowledge, a shared scepticism which has been brought into sharp focus by the rise of post-modernism. The inroads of such relativism into western thought stimulate the provocative question: "Can science survive without Christianity?"

Contemporary western societies are profoundly ambivalent about science. On the one hand science is invested with exaggerated expectations and inflated hopes. The vision is for a high-tech universe in which we manipulate its powers to serve our own ends. At the other extreme a vigorous anti-science lobby perceives science to be the source of all our current woes. Scientists are viewed as dangerous meddlers, wresting secrets from nature that are best left well alone, playing god as they pry into the secrets of the human genetic code and uncover the fundamental forces that hold the universe together. How should Christians respond to these opposing currents?

SCIENCE NOT TECHNOLOGY

One potential confusion in any discussion about science is the modern tendency to fuse the twin concepts of 'science' and 'technology' as if they referred to the same phenomenon. Although it must be admitted that the distinction is not always clear-cut, there are some important differences. 'Science' is an intellectual endeavour to explain the workings of the physical world, informed by empirical investigation and carried out by a community trained in specialised techniques. Its task is to produce testable ideas. In its modern version, complete with experimentation, scientific journals and societies, science has been with us only since the 17th century. In contrast, 'technology' refers to the practical arts with their goal of the production of usable objects and is therefore as old as the earliest human artifacts. Only in the last two centuries has science had a dramatic impact on technology. Today there is even a case for suggesting that if a scientific discovery is made then, sooner or later, for better or for worse, it will find some application. Yet the underlying fatalism inherent in such a view should be treated with some suspicion. In the final analysis it is human societies that choose the technological applications of scientific discoveries.

Christians have a great responsibility to contribute clear biblical thinking to the ethical debate about the myriad applications of modern technology. However, it is science, not technology, which is the focus of this paper, because if science is intrinsically an enemy of Christianity, then clearly its applications in technology will be tarred with the same brush. Conversely if science is at heart an ally, or neutral in its stance towards Christianity, then its technological applications can be assessed dispassionately on their own individual merits without prejudice stemming from hostility to the scientific enterprise *per se*.

SCIENCE AS FOE

There have occasionally been times in the history of science, as also today, of conflict between Christian faith and the scientific enterprise. In most cases such conflicts arise from exaggerated claims about the nature and scope of either scientific or religious knowledge.

Conflicts arising from the secular misuse of science

Ideological and political uses

The use of science for political or professional reasons has been a key factor in generating the 'conflict thesis', the idea that science and faith are innately hostile¹. The *Philosophes* of the French Enlightenment used science as an ideological weapon to attack the power of the Church. Similarly T.H.Huxley and his friends in the X-Club in late Victorian Britain campaigned vigorously for scientists to obtain the degree of financial support and intellectual kudos which society invested in the Church. Whilst the old 'warfare' metaphor to describe the relationship between science and religion has long been discarded for lack of historical support, the use of science in these campaigns of the past has left a lingering feeling in popular culture that science and faith are in conflict, an idea still promoted by a small but vocal group of anti-religious scientists.

Science and scientism

Hostility towards science frequently arises from a confusion between 'science' and 'scientism'. The essence of scientism is the belief that scientific descriptions of reality are the *only* descriptions which matter or which are acceptable as *real* knowledge. Scientism is illustrated well by the zoologist Richard Dawkins when he claims that:

'We are machines for propagating DNA, and the propagation of DNA is a self sustaining process. It is every living objects' sole reason for living'.

The aim of such scientific statements is to exclude other levels of explanation. There is, however, no reason why *methodological reductionism*, a research strategy essential for the scientific enterprise in which the component parts of phenomena are dissected and investigated systematically, should lead to *ontological reductionism*, a fallacious claim that such phenomena are 'nothing but' the descriptions generated by such investigations. As it happens, scientific journals deliberately exclude vast domains of human knowledge and experience. Steve Jones, professor of Genetics at University

College, London, summarised the reasons for this well in his recent Reith lectures:

Science cannot answer the question that philosophers - or children - ask; why are we here, what is the point of being alive, how ought we to behave? Genetics has almost nothing to say about what makes us more than just machines driven by biology, about what makes us human. These questions may be interesting, but scientists are no more qualified to comment on them than is anyone else.

Conflating categories

A further cause of conflict between science and religion comes from the tendency by some scientists to conflate scientific and theological descriptions as if they were offering rival explanations. For example, Stephen Hawking comments in the closing words of *A Brief History of Time* that if we discover a complete theory linking all the fundamental physical forces, then 'it would be the ultimate triumph of human reason - for then we would know the mind of God'². But this mixing of scientific and theological categories is not a triumph of human reason and leads to confusion. Cosmological theories, however elegant and successful, provide complementary explanations to those concerning ultimate meaning and value which are provided by theology. Equations *per se* are not theological. Dawkins falls into the same trap when he states that 'The claim of the existence of God is a purely scientific one'³. Yet if there is one question that science is woefully inadequate to address, it is precisely such a metaphysical question. It is this type of category-confusion which brings science into disrepute and generates unnecessary antagonism.

This is not to imply that God's world can be divided into autonomous 'secular' and 'sacred' spheres, but rather that the appropriateness of different types of explanation is dictated by the context. The stone that was rolled away from the tomb of Jesus was a very significant stone, a significance which is best expounded by the theologian. Yet the properties of stones in general are the province of science and have no particular theological significance. No amount of scientific analysis of stones in general provides insight into

the meaning of that one particular stone, any more than generalisations about human physiology can provide a basis for assessing individual human worth.

Conflicts arising from the Christian misuse of science

Christians, too, are sometimes guilty of generating conflict with science where none need or should exist. The tendency of some Christians to criticise science without being well-informed can be embarrassing. Two areas in particular provide unnecessary sources of conflict.

Conflicts due to a mishandling of Scripture

The Christian natural philosophers who laid the foundations of modern science in the 17th century campaigned to deliver Scripture as well as science from their Aristotelian interpreters, exhorting their contemporaries against the scholastic habit of extracting science from Scripture. John Wilkins, an early member of the Royal Society in England, who repeatedly referred to Calvin's commentaries in his writings, maintained that:

It were happy for us, if we could exempt Scripture from Philosophical controversies: If we could be content to let it be perfect for that end unto which it was intended, for a Rule of our Faith and Obedience, and not to stretch it also to be a Judge of such Natural Truths as are to be found out by our own Industry and Experience.

The early Christian scientists saw their science as a process of truth-telling about how the world *actually* worked, in contrast to the 'ancients' and their rationalistic followers who expounded how the world *ought* to work. Uncovering such natural truths was a matter for 'our own Industry and Experience'.

Unfortunately the 20th century has witnessed a revival of biblical scholasticism in some circles, often alienating the scientific community from the Gospel quite unnecessarily in the process. To take a specific example, following centuries of 'Industry and Experience' the scientific evidence that the earth we inhabit is many millions of years old has become overwhelming. It requires a

deliberate refusal to face the evidence, worthy of an ostrich, to continue to believe that the earth is, for example, only ten thousand years old. An obscurantist clinging to such a belief runs counter to the commitment, common to both science and Christianity, to tell the truth about God's world. Furthermore, the idea that the Bible expounds science is difficult to reconcile with the contemporary understanding of the nature of scientific knowledge, for reasons that will become clearer below.

Conflicts due to an over-dependence on natural theology

The attempt to invest science with secular ideologies which are not intrinsic to the scientific enterprise has already been criticised. On occasions, however, the boot is on the other foot, as Christians try to extract far more theology from their scientific knowledge of the world than it can possibly provide, in the end bringing their faith into disrepute. The biblical perspective on such natural theology is that it has very limited scope in its ability to bring people from unbelief to faith. The maximum information that unbelievers can obtain by looking at the physical world is of 'God's invisible qualities - his eternal power and divine nature' (Romans 1.20). Attempts by Christians to pin their theology to the latest cosmological or quantum mechanical theories have a habit of back-firing; as the scientific model changes (as it inevitably will) so the rationalistic prop for theology is removed. Good theology does not need scientific props.

SCIENCE AS FRIEND

A very wide range of reasons could be cited for the mutually supportive relationship between science and Christianity. For example, Christianity has played a key role in the historical development of modern science⁴. Furthermore, the Christian doctrine of creation, which inspired earlier generations of scientists, continues to provide a strong motivation for empirically-based 'truth-telling' in science. This is not just any old world, but *God's* world.

Critical realism versus post-modernism.

Perhaps the most striking congruence which occurs between Christian and scientific ways of

thinking concerns their common commitment to 'critical realist' views of the world, a congruence stemming from their close historical links and today brought into sharp focus by the rise of post-modernism, a currently popular form of relativism. To appreciate this shared commitment it is first necessary to out-line some of the important changes in our concept of scientific knowledge which have been taking place during the course of this century.

The Nature of Scientific Enquiry

The 'standard view' of science comprises a commonsense inductivist picture of scientific progress that started with Bacon, was continued by the empirical approach of the mechanical philosophers, and was expressed in its most extreme form by the logical positivists. According to this view, the natural world is regarded as real and objective, and the preferences or intentions of its observers make no difference to its characteristics. The task of the scientist is to make a large number of accurate experimental observations, and then induce from such facts a general theory which, providing it is supported by a large body of consistent data, is viewed as an 'immutable law of nature'. Discovering a law, in this view, is like discovering a new continent.

This 'naive realist' view places the authority of science firmly in the techniques involved in the method of enquiry itself. Subjective value-judgments are consigned to a realm outside of science, making science itself the realm of *facts*. The positivists took this approach a step further by defining meaning and rationality using criteria of empirical verifiability. However, this century has witnessed a gradual loss of confidence in the naive realist view. First, Karl Popper launched a frontal attack on one of its key tenets in his *Logic of Scientific Discovery* (1934) by claiming that, far from gaining more credibility as they are buttressed by increasing quantities of empirical evidence, scientific theories are really only useful to science insofar as they can be *disproved*. The difference between scientific knowledge and other kinds of human intellectual and artistic endeavour, according to this view, is that the former is potentially falsifiable. It should be noted that Popper's influential perspective on the nature of scientific knowledge shifts the focus of attention away from the 'facts in the external world' which

force the theory upon us, onto the scientific community, whose logic and expertise generate better theories and methods for testing them. Data thus become 'theory-laden' since they are collected in the context of this attempt to falsify particular theories.

A second major assault on naive realism has come from critics of Popper, in particular Thomas Kuhn in his seminal work *The Structure of Scientific Revolutions* (1962). Kuhn pointed out that the history of science does not support Popper's view that science advances by the systematic refutation of theories. Instead Kuhn introduced the idea of 'paradigm-shifts' to describe the way in which science develops. A paradigm comprises the framework of beliefs which are accepted in common by a community of research scientists. When anomalies accumulate within this framework, science gradually enters into a process of crisis which continues until the revolutionary creation of a new paradigm. In making such a paradigm choice, Kuhn claims, 'there is no higher standard than the assent of the relevant community'. It is this phrase in particular that sets Kuhn's philosophy of science aside from its predecessors. No longer is there a particular set of methods which gives to scientific knowledge its special status. Instead the final scientific authority now lies in the hands of the scientific community itself, which decides between competing paradigms on grounds that go well beyond the mere application of rules. Pressed to an extreme, such a view leads to an anti-realist sociological reductionism which regards scientific knowledge as determined more by the prejudices and foibles of a scientific community than by the properties of the physical world under investigation.

Critical realism in science and faith

'Critical realism' is a view of scientific knowledge which rejects both the naive realism of the older 'standard view' of science as well as the relativism of some of Kuhn's followers, yet also accepts many of the insights that both Popper and Kuhn have provided. Probably most scientists are critical realists in practice. Critical realists believe that their data reflect the properties of the real world 'out there', but also acknowledge the important role of the scientific community in selecting and interpreting data. The 'theory-laden'

nature of data and the processing effects of techniques and instruments are frankly acknowledged. In the critical realist view, far from being immutable laws, good scientific theories provide a series of reliable maps which make the workings of the physical world intelligible and which have predictive powers enabling scientists to explore new territory. Although far from perfect, the maps are nevertheless congruent with the data derived from the physical world as presently understood; they are not mere social constructs, and a strong commitment to the current map is therefore entirely appropriate.

It is this congruence which provides the strongest argument in support of the critical realist position. In the final analysis, science *works*. A major weakness of the more extreme sociological interpretations of the advance of science is that they are unable to explain why science has been so successful. For example, if it is the case that all forms of human knowledge are equally valid social constructs, why is modern medicine more successful than the theories of witch-doctors in curing the sick? And why do those sociologists who believe most fervently in cultural relativism still entrust themselves to the laws of aerodynamics and fly to international conferences at 30,000 feet?

The 'critical realism' espoused by most scientists sits very comfortably with a closely analogous form of critical realism adopted by most Christians. According to biblical theism there is a real world, which is not an illusion, having physical properties which are consistent and reproducible because contingent on God's continued activity. This world can therefore be investigated by the methods of science. At the same time, however, there are 'data' derived from human experience and observations which require a canvas much broader than scientific knowledge alone can provide. These 'data', which are beyond the self-limited horizons of the scientific map, are just as much part of the real world as the data about the physical world generated by the scientist in the laboratory. They include the saving acts of God in history and a whole host of features of human existence and awareness which are rendered more coherent by a theistic than by an atheistic world-view (moral sense, personal relationships, the arts, etc). The Christian theist, however, is a *critical* realist who

is acutely aware of the fallenness of human reason and who realises that our understanding of the world is invariably filtered through all kinds of cultural and philosophical assumptions. Nevertheless, despite such caveats, our observations and experiences of the world, according to this view, are not merely social constructs, but provide data that enable us to evaluate rationally the truth-claims of conflicting world-views.

The beliefs of scientists about the physical world, however incomplete, are in the final analysis shaped by the structure of that world. Similarly the beliefs of Christians, also incomplete, are shaped by what God has said and done in history as described in the Biblical record. In the final analysis both scientists and Christians respond to reality; they do not construct it.

The Challenge of Post-Modernism

The position of the critical realist, whether in science or in religion, is quite incompatible with that of post-modernism. One strand of post-modernism that has proved highly influential argues that language is purely conventional and specific to a particular community. More radically, there is no way of knowing whether a language mirrors reality, since the criteria for its correct use are internal to a particular linguistic community. The suspicion is that all language, and thus all articulations of 'knowledge', are masks for power relationships. The result is a profound scepticism about all claims to objectivity.

If modernism was epitomised by rationality and science, then post-modernism, as Prof. Roger Trigg comments, 'dethrones science by attacking the very human rationality which has produced science'⁵. An expounder of one particular stream of post-modernist thought, Jean-Francois Lyotard, echoes Kuhn when he writes that:

It is recognised that the conditions of truth, in other words the rules of the game of science, are immanent in that game, that they can only be established within the bounds of a debate that is already scientific in nature, and that there is no other proof that the rules are good than the consensus extended to them by the experts.

According to this view, there is no 'grand narrative' which could validate one set of rules or the beliefs of one linguistic community above another. Post-modernism is therefore defined by Lyotard as 'incredulity toward meta-narratives', disbelief in the idea that knowledge can be anything but rooted in a particular historical context and culture. The possibility of universally shared human experiences is excluded. Even were such shared experiences possible, we could not discover them since we have no universal means of communication.

At first sight it might appear that the ideas of post-modernism could provide a fruitful way of re-interpreting the relationship between science and religion. After all, if all forms of constructed knowledge are 'language-games', why should it not be possible for science and religion to busy themselves in isolation with their own 'set of rules'? The draw-back to such a view is that if the post-modernist world-view is valid, then both science and theism must abandon their claims to map objective reality. This probably explains why post-modernism has had some influence in the arts, and is popular amongst enthusiasts for pantheistic mysticism, but has made little impression on scientists, for the very good reason that their profession would cease to exist were the beliefs of post-modernism accurate! For example, science operates on the assumption that the created world is consistent in its properties and therefore that experiments will work in the same way irrespective of the cultural, linguistic or social context in which they are carried out. The reality of gravity means that people fall out of trees with the same acceleration irrespective of their language, although they may interpret their experiences differently. The properties of DNA are not time-bound geography-bound cultural artifacts. And so the 'game of science' is worth playing for the very good reason that its models and maps claim to say something which is true about the physical structure of the universe, something which anyone in the world would be right to believe and wrong to disbelieve. Science *does* have a 'grand narrative' which validates its knowledge, an elegant 'mathematical narrative' written into the structure of the universe which expresses those physical realities which ultimately dictate what will be believed by scientists following a process of investigation and rational argument. Language for the scientist,

therefore, is not what the 'game' is all about, but rather an essential tool through which the character of the world is encountered. Language may be a human construction, but what we talk about is certainly not.

CONCLUSION

The echoes of the late Victorian 'conflict-thesis' relationship between science and Christianity are finally disappearing. They are being replaced by a renewed awareness of the common commitments shared by science and biblical theism. Indeed, the question may now even be: "Can science survive without Christianity?" Strong inroads have been made into western cultures by relativistic modes of thought. At present the scientific enterprise appears to have sufficient momentum to continue on regardless. The 'space-capsule of science' speeds on, apparently no longer needing the 'launching rockets' provided by a Christian world-view. But the day may yet come when the trivialisation of knowledge promoted by post-modernism undermines the motivation to investigate the physical world to such an extent that science will wither away in the absence of a solid metaphysical foundation.

There are strong grounds for believing that science and Christianity are mutual allies, particularly in their shared commitment to a critical realist view of knowledge and their mutual hostility to relativistic modes of thought. If tensions do still occasionally occur, requiring dialogue for their resolution, there will at least be a common conviction that there is something real to argue about.

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NOTES

1.e.g. see C.A.Russell, 'The conflict metaphor and its social origins', *Science & Christian Belief* 1, 3-26, 1989.

2. Bantam Press, 1988, p175.

3. *The Independent*, 16 April 1992.

4. e.g. see J.H.Brooke, *Science and Religion - Some Historical Perspectives*, CUP, 1991; C.A.Russell, *Cross-Currents - Interactions Between Science & Faith*, IVP, 1985.
5. *Rationality & Science*, Blackwell, 1993.