

# GOD AND SCIENCE

IN CLASSROOM AND PULPIT

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 MOSAIC PRESS

Published in Australia by

Mosaic Press  
508 High St  
Preston Vic. 3072  
Australia

Mosaic Press is an imprint of Mosaic Resources Pty Ltd

ISBN 9781743241370

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First published 2012

Cataloguing-in-Publication entry is available for the National Library of Australia <http://catalogue.nla.gov.au/>.

Printed by Openbook Howden

## Acknowledgements

Several of the chapters of this book arose out of a national lecture series held in March 2012 by the Graeme Clark Research Institute, a part of Tabor Adelaide, and ISCAST (Christians in Science and Technology) a national fellowship of Christians working in or interested in the natural sciences. The lecture series was made possible through the support of a grant from the John Templeton Foundation. The opinions expressed in this publication are those of the authors and do not necessarily reflect those of the John Templeton Foundation.

Two chapters in this book have appeared previously in revised versions. We would like to thank Paternoster Press for permission to use a revised version of chapter 5 of Graham Buxton's book *Celebrating Life: Beyond the Sacred-Secular Divide* (Carlisle, Paternoster 2007), which appears here as 'Science: The Language of God?' We also wish to acknowledge that Mark Worthing's 'Science and Theology: A Brief History' appeared in the *Pacific Journal of Theology and Science* (vol. 1, no. 1) 2000 as 'Science and Theology: An Historical Overview of their Relationship.'

A number of people have been involved in this project in its various phases. We would like especially to thank Richard and Glenys Gijsbers of the Victorian chapter of ISCAST for their help and support, Sue Giacobbe of Tabor Adelaide for her administrative assistance, and the many people in each of the capital cities who have helped to promote and host the individual seminars.

Hugh McGinlay of Mosaic Press has been encouraging and supportive from the beginning and has been very flexible in making it possible to get this volume to press in time for the *God and Science* national lecture series.

the same material in a similar manner? Or worse, what if we all disagreed fundamentally on key points. As it happened, the contributions all address the issues we were asked to cover, but do so in ways that are very different to one another, yet also complement each other very well. No great slabs of material were repeated, nor were there contradictions in our concerns or approach. For that reason, the papers were easily adaptable to appear together in book form.

Also included in this collection are three additional chapters that provide some background resources about such matters as the history of science and faith or the nature of science.

While the chapters may be read separately and in any order, the following observations about the book's structure are worth noting. Graham Buxton's first two chapters are essentially parts of a larger presentation from which his talks to teachers and church workers are drawn. They will be best understood if read together and in sequence. Mark Worthing has included a version of his talks to teachers and pastors, and has also contributed two background chapters on the history of the science and faith relationship and on the nature of science. Chris Mulherin's lead off chapter is aimed at teachers, pastors and church workers and serves as a good general introduction to the topic. Both of his talks will be drawn from various parts of this comprehensive chapter. Finally, a chapter by Graham Buxton that appeared a few years back in his book *Celebrating Life*, has been adapted for this volume and sums up many of the ideas about God and science that previous chapters have explored.

If this volume provides inspiration and resources to assist you in your work of integrating issues of science and faith in your professional and ministry contexts, if it helps you to grow in your own faith and thinking, if it helps you find that little bit of extra courage to tackle some tough issues, then it will have served the purpose for which it was produced.

## **Chapter One: The Marriage of Heaven and Hell?**

### **Faith, the Natural Sciences and Rumours of Divorce**

Chris Mulherin

#### *Introduction*

Like all lasting marriages, faith and the natural sciences have had to work at their relationship over many years. But despite their disagreements, reports of a divorce on the grounds of irreconcilable differences are simply untrue. Science and Christian faith are not only compatible but can look forward to a long and happy marriage as they work together in the pursuit of truth.

The so-called 'conflict thesis' is an old one which has been thoroughly debunked by both historians and philosophers of science.<sup>2</sup> More recently however, the thesis has been given new life by an alignment of special interests: the financial interests of the publishing industry, the media's penchant for conflict stories, and the anti-theistic preaching of a new breed of would-be public intellectuals; people who have little respect for either serious history or rigorous philosophy.

Of course historical conflicts have occurred between people or groups who have been seen as representative of science and religion. However, historical examples of disagreement do not amount to philosophical or theological incompatibility. My wife and I have our differences but we are not incompatible and we are not headed for divorce. So let's get the conflict thesis clear to begin with: differences of opinion do not constitute serious conflict—after all, science itself is rife with differences of opinion. The conflict thesis is about whether there is a necessary and fundamental conflict between science and faith. In this chapter I hope to illuminate aspects of the nature of both

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<sup>2</sup> See chapters three and six in this book for details of the history of the conflict thesis.

science and faith and in the process to show that there is no fundamental conflict.

This chapter is written with both teachers and local church pastors in mind: school teachers, especially those who have the responsibility of teaching science but who want to be able to give an account of the relationship between science and religious belief; and pastors, responsible for Christian education in a parish and who need to have a basic competence in clarifying the connections between a biblical worldview and science. While there are concepts here that will be unfamiliar to some teachers and pastors, I trust that these important ideas will be clear after careful reading and that they will inform discussions of science and faith.

Teachers and pastors share a number of common experiences: they face limitations on their time that mean many of them are unable to do further reading in this field; both pastors and teachers share the challenge of communicating to groups of people who are also unlikely to do in-depth study of the matter; and they both share the burden of responsibility for helping students and congregations to integrate their experience of a world dominated by science with their experience of Christian faith. Given the reality of these challenges that teachers and pastors face, my aim is to outline a number of crucial ideas in a simple and memorable way that will serve them in their roles.

I am aware that I may frustrate the more philosophically-minded reader as I neglect many nuances of the science and religion relationship. Unfortunately, even though more crossing of t's and dotting of i's might make for academic rigour, it will not serve the average teacher and pastor in their task. In the spirit of Paul writing to Timothy I am conscious that I am passing on to faithful people some ideas that they in turn might pass on in their education of others.

So, what are the key aspects of the relationship between the natural sciences and Christian faith that will help teachers and pastors in their calling? I am going to suggest nine ideas that are central to a clear understanding of that relationship. Each of these relates to clarifying the commonly used words and concepts caught up in the oft-repeated idea of a science-religion conflict. Just as in any marriage, so much depends on clear communication. Without clarifying some aspects of the nature of science and without clarifying what we mean by religion there is no possibility of clear-headed discussion and it may appear that there are irreconcilable differences. So, let's start with religion and then turn to science.

It is notoriously difficult to define 'religion'; there are many religions, some theistic, some polytheistic and some which do not have a God or gods. For the sake of discussion in a Western context, and especially amongst Christians, it is important to clarify that it is the relationship between science and orthodox Christian belief that is at stake. So we'll start with Christianity and the first idea worth remembering: Christianity is a worldview; it's about meanings and not mechanisms.

*Christianity is a worldview: It's about meanings, not mechanisms*

One of the dangers of referring to the so-called science-religion relationship is that this very description appears to set up a symmetry between two comparable entities: science on the one hand, and Christian faith on the other. But science and Christian faith are not directly comparable because Christianity is a worldview while science is not and never can be.

A worldview is a set of ideas and beliefs that offers a coherent framework to interpret the universe and the human condition. It's a sketch of the 'big picture.' It answers such questions as: 'How should we live?' 'What happens after death?' 'Does life have a meaning?' 'Does God exist?' 'What

does it mean to be human?' We could say that it answers questions about meaning. Although a worldview may not answer every question, it still tells us where the answers lie and it aims to be coherent in the answers it does give. This means that it cannot contain glaring contradictions within its set of core beliefs.

What sort of beliefs does the Christian worldview consist of? Christian orthodox belief includes a 'supernatural' creator God who made the universe and everything in it. Christianity includes the possibility of miracles, the death and bodily resurrection of Jesus Christ and the linear nature of history from creation through to final consummation. It also includes an understanding of the purposes of humanity, which is shaped in the image of God and made for relationship with God. And Christianity holds that humanity is incapable of knowing and loving God perfectly, so humans are dependent on God for both revelation and for restoring the relationship with their Creator.

One implication of this description of the Christian worldview is that it is answering questions about meaning and not mechanics; it is answering questions about the purposes and not the particles of the universe. But it doesn't answer all possible questions and it would be a mistake to think that it should; just as it would be a mistake to think that science has answers to every type of question. The implications of this are clear: Christianity is not directly comparable to science because science is not a worldview and Christianity is not science.

### *Christianity is not Science*

For the sake of discussion, let's think of science in terms of physics or biology or chemistry or astronomy. These are natural sciences which search for the mechanisms and laws of the universe in the hope of answering the 'how'

questions; they look for the physical causes and constituents of what goes on in our world.

Christianity is different; on the one hand, as a worldview, Christianity is much more encompassing than science because it answers the big questions such as: Why are we here? or Why is there something rather than nothing? But on the other hand Christianity has little interest in other sorts of issues such as the 'how' questions. Think for example of the vexed question of the New Testament model for a perfect church. At my church we wrestle with how best to structure a multi-congregation and multi-site church. We would love a blueprint, but while the Bible tells us the meaning of the Church and offers some general principles, there is no description of the mechanics of setting up the perfect church. In the area of moral guidance too, the Bible offers a general foundation for our thinking and acting, but it does not tell us exactly how to run a country or how to order our finances.

So Christianity is not science and it is a mistake to think that the Bible is a political treatise or a scientific textbook. In the words of Galileo Galilei, the central figure in the most famous so-called conflict between science and religion, 'The Bible teaches how to go to heaven not how the heavens go.'<sup>3</sup>

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<sup>3</sup> Galileo's 'Letter to the Church 1632' deals with the Bible and science and is worth quoting: 'The reason produced for condemning the opinion that the earth moves and the sun stands still is that in many places in the Bible one may read that the sun moves and the earth stands still. Since the Bible cannot err, it follows as a necessary consequence that anyone takes an erroneous and heretical position who maintains that the sun is inherently motionless and the earth movable. With regard to this argument, I think in the first place that it is very pious to say and prudent to affirm that the Holy Bible can never speak untruth—whenever its true meaning is understood. But I believe that nobody will deny that it is often very abstruse, and may say things which are quite different from what its bare words signify. Hence in expounding the Bible if one were always to confine oneself to the unadorned grammatical meaning, one might fall into error ... Thus it would be necessary to assign to God feet, hands and eyes ... It would be a terrible detriment for the souls if people found themselves convinced by proof of something that it was made then a sin to believe.'

*Science is not a worldview: It's about mechanisms, not meanings*

Science for its part is not a worldview. Physics and chemistry do not make claims about the meaning or purposes of particles or molecules. Biology and astronomy do not tell us the meaning of spiny anteaters or spiral galaxies. That's simply not what they're about, and if we look to science to answer such questions we expect more than it can offer.

Perhaps it's time for an illustrative cup of tea to help clarify this difference between a worldview, which answers questions of meaning and purpose, and the pursuit of science, which answers questions about mechanisms and natural causes. If I put the kettle on the stove to boil and ask, 'Why is the water boiling?' how might we answer the question? It depends on how we understood the 'why' in the question: is the 'why' asking about meaning or mechanism? The alert physics student, focusing on the mechanics of the situation, might answer that the water is boiling due to the raised energy levels of the molecules of water induced by the heat from the stove. To which I might reply by putting a tea bag in a cup and suggesting that actually the water is boiling because I want a cup of tea. Both answers are correct, but what they show is that the question, 'Why is the water boiling?' is ambiguous. In fact it is two questions in one. It could be a question about mechanics: 'What causes the water to boil?' or it could be a question about meaning: 'What is the purpose of the water boiling?'

There are many such questions and it is helpful to clarify how we interpret them before we try to answer them. 'Why are we here?' has both a theological and a scientific answer, and 'Why is she crying?' has an answer in terms of brain chemistry and neuronal firings, which is hardly a sufficient answer in a pastoral setting.

So, we have clarified at least two sorts of questions and answers, which, as shorthand, I am referring to as those about *meanings* and those about

*mechanisms*. And if, as I have suggested, science is about mechanisms and not meanings then we can see that there are limits to science imposed by the nature of the sorts of questions it asks and the sorts of answers it expects.

It seems to me that there are two distinct categories of difficulty for science that highlight its limitations. First are the sort of questions that we might imagine science answering one day, and second are the impossible issues which science will never explain because they lie outside its domain. Let's turn first to some of the difficult questions in science which may one day be resolved. After that we will look at the sorts of questions that science by its nature will never be able to answer.

*Science has practical limits: It can't know everything*

While science has been enormously successful there are some questions that make us realise that we are very far from knowing everything about the natural world. I'm thinking of challenges such as the following:

- *How the universe began:* Stephen Hawking, the world's most famous cosmologist, postulates the spontaneous creation of the universe. He says, 'The universe began with the Big Bang, which simply followed the inevitable law of physics. Because there is a law such as gravity, the universe can and will create itself from nothing ... The universe didn't need a God to begin; it was quite capable of launching its existence on its own.'<sup>4</sup> Now this sort of statement is wonderful for newspaper headlines but is a particularly obvious case of passing the explanatory buck from one level of explanation to another. Even if his theory is right, Hawking hasn't explained how the universe comes into existence out of nothing; he has proposed that it comes into existence out of the laws of physics, which existed prior to the universe as we

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<sup>4</sup> Stephen Hawking and Leonard Mlodinow, *The Grand Design*, New York: Bantam Books, 2010.

know it. While Christians are frowned upon by atheists for using God as an explanation, Hawking is allowed to use the laws of physics as if they themselves demand no explanation.

- Speaking of *gravity*: a popular history of science subject at Melbourne University ended last year with the following memorable words: 'After 2500 years of searching for the answer, natural philosophers and scientists still don't know why things fall down.'<sup>5</sup>

- *Dark matter*: according to current theories, most of the universe (about 83%) seems to be made up of 'dark matter' which cannot be seen because it does not reflect or emit light. We have no idea what type of matter it is but its existence is postulated in order to explain observations about the known stars and galaxies.

- *Fine tuning*: the laws of the universe appear to be fine-tuned for the existence of life. There are various fundamental constants of the universe that if they were slightly different would render it impossible for life to have developed at all. Is it coincidence that we live in such a universe? The main proposed explanation extends the bounds of believability. It's called the multiverse theory and postulates myriad parallel universes covering all the possible values of the fundamental constants. Physicist Paul Davies said this about the multiverse theory: 'Invoking an infinity of unseen universes to explain the unusual features of the one we do see is just as ad hoc as invoking an unseen Creator. The multiverse theory may be dressed up in scientific language, but in essence it requires the same leap of faith.'<sup>6</sup>

- *The beginnings of life*: while evolutionary theory postulates that all life is descended from an original life form we seem as far as ever from

<sup>5</sup> The subject is taught by Dr Kristian Camilleri and is called 'From Plato to Einstein.'

<sup>6</sup> Paul Davies, 'A brief history of the multiverse.' *NY Times*, April 12, 2003. See <http://www.nytimes.com/2003/04/12/opinion/a-brief-history-of-the-multiverse.html> last accessed 15.02.12.

seriously answering how a replicating life form could have come into existence from non-life.

- *Consciousness*: the wrestle to understand the subjective aspects of consciousness has recently bridged from philosophy to neuroscience. But while correlations have been revealed between brain states and the feelings and attitudes that we attribute to consciousness, we are still no closer to understanding how any particular brain state can be mapped onto what it is like to be me. As one respected physicist puts it, 'it is the only major question in the sciences that we don't even know how to ask.'<sup>7</sup>

- *Free will*: while we all act as if we have free will, a strictly naturalistic view of human beings seems to lead to the conclusion that everything that we do or say or think is ultimately determined by strict causal laws or by random sub-atomic events. All normal life including science itself assumes and depends on human freedom of choice, yet explaining how a strictly biological view of human beings is compatible with that freedom is scientifically and philosophically out of our reach at present.

These are some of the difficult questions that science faces. Let's turn now from the difficult to the impossible ones; those issues that science can't explain because they lie outside of science altogether. We will particularly focus on the unprovable assumptions that underlie the scientific enterprise.

#### *Science has philosophical limits: It relies on presuppositions*

There are not only practical limits to science, some of which seem impossible to overcome, but there are also philosophical limits; limits imposed on science by the very nature of science itself. As a pursuit of knowledge about the natural world, the natural sciences cannot delve into philosophical or

<sup>7</sup> James Trefil, *One hundred and one things you don't know about science and no one else does either.*, New York: Mariner Books 1997:15.

logical or religious questions. They cannot do so because such questions are not the subject matter of science. But that does not mean that science can leave such issues aside.

The life and breath of science lies in its rigorous approach to uncovering the truth of the natural world based on certain working assumptions, which it does not question. This recognition that science doesn't start from a blank slate, that science must assume some things to even get off the ground, is captured by atheist philosopher Daniel Dennett who warns of the risk of a naïve attitude to science that fails to see its philosophical foundations: 'There is no such thing as philosophy-free science; there is only science whose philosophical baggage is taken on board without examination.'<sup>8</sup> So, as C. S. Lewis explains in his excellent little book *Miracles*, the philosophical question must come first.<sup>9</sup>

One way of thinking about these philosophical assumptions is that they are like tools of the trade that we use to produce results. The carpenter uses a hammer without questioning it in order to drive a nail. The focus is on the nail and the hammer is taken for granted. So too science takes for granted its foundational assumptions but it cannot justify them scientifically; they must come first before science begins its work.

So what are some of these foundational philosophical assumptions of science?

- Science can only be practised by assuming that *the universe is governed by regularity*; that there are laws of nature that result in the possibility of repeatable experiments. This means that in the laboratory, the scientist must assume that the results of an experiment are due to the laws of nature and not to either random or miraculous causes. This assumption governs the scientist's methods of going about science and it is an assumption that cannot be proven.

<sup>8</sup> Daniel Dennett, *Darwin's Dangerous Idea: Evolution and the Meanings of Life*, London: Penguin Books 1995: 21.

<sup>9</sup> C. S. Lewis, *Miracles*, Collins, 1977: 8.

- This regularity or uniformity that science is based on is exhibited in the way *science depends on induction*. Inductive argument is the process of observing repeated events or experience or experimental results and drawing the conclusion that future or unobservable events will follow the same pattern. For example, if I observe a million swans and they are all white I might conclude that all swans are white. But as this case shows, induction is not foolproof; Darwin arrived in Australia and found a black swan. Science simply has no way of justifying its confidence in induction. And if you are tempted to say that induction is obviously valid because it has worked in the past, think again: that would involve an inductive justification of induction, which is the very thing we are seeking to justify. This logical fallacy is what philosophers call 'begging the question.'

- Science must assume both that *there is a world 'out there'* independent of whatever human beings might think or say about it and also that *the world is knowable*. It is notoriously difficult to rigorously prove the existence of the 'external world.' It is simply something we accept as true without question and it seems absurd to demand proofs for what we take to be so obviously true.

- Science must also assume that *human reasoning and memory and sensory functions are sound and lead to truth*. Again, we cannot prove these assumptions because they are assumptions we must make in order to even think about any sort of proofs or argument. The existence of truth and *the validity of basic rules of logic* are also assumptions we must make before we can begin a rational conversation. You can't argue for the reliability of logic without using logic. So, for example, we must take for granted that you cannot assert one thing and its contradiction without falling into incoherence. Either all swans are white or they are not, but you can't have it both ways, and if you think you can then you leave yourself out of rational conversation.



• Meanwhile, talking of rational conversation, another 'pre-scientific' assumption that we rely on, even as your eyes scan the black marks on this page, is that our *language is adequate to describe and to converse about the external world.*

Such are some of the foundational but unprovable beliefs of science. Now we turn to one more limit of science and it's the one that presents the most problems in the science and religion discussion. It's the crucial issue of the relationship of science to naturalism.

#### *Naturalism is a worldview*

Naturalism is the view that there is no God or gods and that the natural world that science investigates is all that there is. According to naturalism reality is only made up of 'natural' components such as matter and energy. Negatively, naturalism claims that the *supernatural* does not exist. In its cruder forms it equates Christianity and other faiths to belief in fairies at the bottom of the garden, celestial teapots, and the Flying Spaghetti Monster. Or in the words of philosopher Friedrich Nietzsche, Christians believe in things that don't exist.<sup>10</sup>

Expressed this way we can see that naturalism is a worldview in competition with other worldviews. It is a belief system that answers (mostly negatively) the questions of meaning we mentioned above. For the sake of clarity we will refer to this worldview as *philosophical* naturalism because it is important to distinguish it from *methodological* naturalism which is not a worldview and is an essential foundation of science.

#### *Science is based on methodological naturalism*

*Methodological* naturalism is simply the assumption that when we do science there is no supernatural intervention taking place. The role of science is quite appropriately to look for natural explanations so supernatural causes are ruled out in the laboratory and in scientific thinking. Like the carpenter's hammer, methodological naturalism is a tool used in order to get on with the job. So although the scientist who uses the tool of methodological naturalism may be a religious believer, their religious belief plays no part in the way they do their experiments.

#### *The success of science does not prove naturalism true*

Now we arrive at the major source of confusion. Much of the claimed conflict between science and faith arises from confusing the tool of *methodological* naturalism with a commitment to the worldview of *philosophical* naturalism (or simply referred to as naturalism). This is particularly evident when people ask a question such as, 'But doesn't science disprove religion?' It seems that what lies behind such thinking is a double-barrelled argument that goes something like this:

#### Part 1

Premise 1A: Science is successful.

Premise 1B: Science is based on naturalism.

Conclusion 1: Naturalism must be true.

Then Part 2 of the argument continues from the conclusion of Part 1:

<sup>10</sup> Friedrich Nietzsche, *Twilight of the Idols* (1888), 'The 'Improvers' of Mankind', Section 1. See: [http://www.lexido.com/ebook\\_texts/Twilight\\_of\\_the\\_Idols\\_.aspx?S=8](http://www.lexido.com/ebook_texts/Twilight_of_the_Idols_.aspx?S=8) last accessed on 15.02.12.

## Part 2

Premise 2A: Naturalism is true.

Premise 2B: Naturalism and Christianity are mutually exclusive worldviews.

Conclusion 2: Christianity must be false.

Now there is a major flaw in this argument and it lies in Part 1 which argues from the success of science to the truth of naturalism. The flaw in Part 1 of the argument is that the word 'naturalism' is used in two different ways. We can see this if we rewrite the argument more clearly as follows:

### Part 1 rewritten

Premise 1A: Science is successful.

Premise 1B: Science is based on *methodological* naturalism ('God does not intervene in our experiments.')

Conclusion 1: *Philosophical* naturalism ('there is no God') must be true.

In simple terms and without the formalities, just because science assumes that God does not intervene in scientific experiments (*methodological* naturalism) does not mean that God does not exist (*philosophical* naturalism). So the success of science can only lead us to conclude, at most, that if God exists then God normally allows the laws of nature to take their course.

In Part 2 of the argument, the fact that Christianity and (philosophical) naturalism are incompatible leads to the conclusion that Christianity must be false. But Part 2 starts from the false conclusion of Part 1 that philosophical naturalism is true.

When taken one step further this sort of thinking leads to what is often called *scientism*. That is, the idea that if naturalism is true and if science is the only access we have to the natural world then the only possible knowledge we can have of anything is scientific knowledge. So science is raised up as the absolute authority in every area of human life and thinking and anything that does not have a scientific basis is literally nonsense. Instead of science being a tool in the search for truth it has become an ideology—even a quasi-religion—that constrains what sort of truths are allowed to exist.

So while science is a human practice seeking truth about the natural world, naturalism is a worldview that easily leads to scientism, which is an ideology. Let's turn now to the very human aspects of science.

### *Science is a human enterprise relying on judgment calls and integrity*

We have seen that science has philosophical limits and that it must take many things for granted without proving them. One corollary of this is that there is no foolproof means of arriving at scientific conclusions. In the words of atheist physicist Richard Feynman, 'scientific knowledge is a body of statements of varying degrees of certainty—some most unsure, some nearly sure, but none absolutely certain.'<sup>11</sup>

Science never 'proves' a theory (except perhaps in mathematics). It is true that some theories become so taken for granted that they become 'laws,' but strictly speaking, they have not been proven so much as rigorously tested and supported by the evidence. The human causes of climate change for example will never be proven or found with certainty to be true. So the skeptics are half right: we cannot prove that anthropogenic climate change is occurring.

<sup>11</sup> Richard Feynman, 'The Value of Science' address to the National Academy of Sciences (Autumn 1955). Published in *The Pleasure of Finding Things Out: The Best Short Works of Richard P. Feynman*, New York: Basic Books, 1999, edited by Jeffrey Robbins. See [http://en.wikiquote.org/wiki/Richard\\_Feynman](http://en.wikiquote.org/wiki/Richard_Feynman) last accessed 14.02.12.

This is because, in the words of scientist and philosopher Michael Polanyi, scientific findings 'could conceivably be false.'<sup>12</sup>

So, despite widespread misunderstanding, there is not a rigid scientific method that guarantees truth. Instead scientists rely on rules of thumb or maxims such as 'Ockham's razor' which says that a simpler theory should be preferred over a complex one if both have the same explanatory power. But in the end, every conclusion of science and every interpretation of experimental results is just that: an interpretation. It is an interpretation—in a sense, subjective—made by a real flesh-and-blood human being about what their senses are telling them and about its significance. And the history of science is full of cases where different scientists have interpreted the same data differently—think of Copernicus who reinterpreted the astronomical data and suggested that the sun and not the earth was at the centre of the solar system—actually, the centre of the universe.

While an idealised view of science (called 'falsificationism') says that theories can be falsified by the results of an experiment, in fact what happens more often than not is that rather than questioning a theory, we assume there is a problem with the experiment or the observations. Do you remember your high school science experiments, which invariably produced aberrant results? If observations contradicted the theory, did you assume you had falsified a long-held truth of science? More likely you did what is standard practice in science: you made a judgment call about where the problem lay, recognising that there could be any number of reasons why your experimental results didn't match the theory.

One reason that you were happy to abandon your high school experimental results was because of the corporate nature of science and because you trusted the integrity of those who had gone before you: your

teacher, the authors of the textbook, the peer reviewers of scientific papers and the authors of those papers, some living, some centuries dead. Isaac Newton was under no illusion about his own dependence on those who had gone before him, and is reputed to have said, 'If I can see further than anyone else, it is only because I am standing on the shoulders of giants.' Every scientist is similarly dependent on the results and judgments and theories of others that together make up the web of science.

To sum up, the practice of science is an intrinsically human pursuit full of the subjective judgments which that implies and it is dependent on a web of trust between scientists who are assumed to share personal moral commitments to truth and integrity.

#### *Conclusion: Conflict? What conflict?*

We have teased out a little of the nature of science and we have highlighted the importance of clarifying what we mean when we speak of religion. We have also seen that there are many differences between science and faith, the most obvious being that they focus on different objects of enquiry and they attempt to answer different sorts of questions. We have seen that by clarifying those sorts of questions, as well as the nature of the underlying assumptions of science, the fear of an inevitable and fundamental conflict recedes.

To any Christian who also has a healthy respect for natural science, this conclusion comes as no surprise. For the Christian, all truth is God's truth and, to use Francis Bacon's metaphor, both the book of God's word and the book of his works reveal something of the creator of all things.

To those convinced that a divorce is imminent, let me suggest that the marriage will endure. Truly 'the church of God is an anvil that has worn out many hammers' and while it is our responsibility to 'be prepared to give an

<sup>12</sup> Michael Polanyi, *Personal Knowledge*, London: Routledge and Kegan Paul, 1958: 214.

answer to everyone who asks the reason for the hope that we have,<sup>13</sup> we need not fret. The universe is in good hands and they are not those of Stephen Hawking or Richard Dawkins.

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<sup>13</sup> 1 Peter 3:15