

Warfare and Wedlock: Redeeming the Faith- Science Relationship

Ian H. Hutchinson

The interaction of science and faith has most popularly been portrayed for over 100 years as warfare. This characterization, perhaps plausible as a competition between worldviews, and certainly a convenient simplification for rabble rousers in both camps, is a travesty of the logical and historical relationships that actually exist between these areas of life. This talk¹ seeks to give a sound intellectual basis for understanding the distinction between science, which grew from the fertile soil of a Christian view of creation, and scientism, the philosophical position that science is all the true knowledge there is. Christianity does indeed repudiate scientism, but a case can be made that science is already meaningfully Christian, recognizing the foundational values that science and faith hold in common.



Ian H. Hutchinson

I think it is fair to say that when the relationship between science and faith is discussed today, the dominant view is that they are in conflict. This is not a new view. It has been an abiding part of the academic scene for at least 100 years. But, contrary to what is widely assumed, it is not historically the view that held sway prior to the mid-1800s.

Warfare

What happened in the late nineteenth and early twentieth centuries in academia was that a myth became widely accepted: that science and faith had always been at war intellectually with one another. Of course, this myth was initially promoted largely by those who felt that this was a war that science was in the process of winning, or had already won. Probably the best known proponent of this position was Andrew Dickson White, who published in 1896 the famous book titled *A History of the Warfare of Science with Theology in Christendom*.² In it, White gathered and recounted numerous historical examples of areas in which the growth of what he called "science" encroached upon traditionally religious intellectual territory, initially meeting with stubborn resistance from the entrenched theological power structures, but eventually from sheer force of evidence and argument overthrowing that

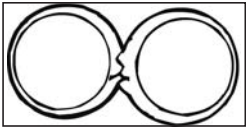
resistance and moving forward into greater knowledge and enlightenment. The theme is repeated over and over in this rather long book, but it is stirring stuff, complete with martyrs, heroes, and villains; intrigues and battles; all the elements that go to make a good story.

The first thing to realize about White's book is that, as White himself emphasized in his introduction, it was part of a much wider campaign.³ White was, for a substantial period, the president of the newly founded Cornell University. He and his patron were determined that Cornell would represent a new model of university in which religious doctrine was to have no place.⁴ His book, much of whose material he had previously published in pamphlets and other articles, was more a compendium of propaganda in support of the campaign than it was a work of scholarship.

Considered simply as a work of history, White's book has over the years been shown

In the late nineteenth and early twentieth centuries in academia ... a myth became widely accepted: that science and faith had always been at war intellectually with one another.

Ian Hutchinson is professor and head of the Department of Nuclear Science and Engineering at MIT. His primary research interest is the magnetic confinement of plasmas: seeking to enable fusion reactions, the energy source of the stars, to be used for practical energy production. He and his MIT team designed, built, and operate the Alcator C-Mod tokamak, whose plasmas, with temperatures reaching beyond 50 million degrees Celsius, are prototypical of a future fusion reactor. Ian is a well-known commentator on the relationship between science and the Christian faith, as well as an enthusiastic choral singer.



Conference Talk

Warfare and Wedlock: Redeeming the Faith-Science Relationship

There is an intellectual confrontation that could reasonably fit the warfare metaphor. It is not between science and theology, however. It is between scientism, the predominant faith of the twentieth century academic, and other faiths, including Christianity.

to be full of errors, misinterpretations, and in some cases apparently, fabrications. For example, talking about the Galileo affair, White says:

Years before, the opponents of Copernicus had said to him, "If your doctrines were true, Venus would show phases like the moon."

Copernicus answered: "You are right; I know not what to say; but God is good, and will in time find an answer to this objection." The God-given answer came when, in 1611, the rude telescope of Galileo showed the phases of Venus.

This is a pure fabrication that can be traced to a textbook of 1718.

Not to leave Protestantism out of the criticism, White cites a condemnation of Copernican cosmology by John Calvin who, according to White, referenced the Ninety-third Psalm ("Thou hast fixed the earth immovable and firm ...") and asked: "Who will venture to place the authority of Copernicus above that of the Holy Spirit?" Owen Gingerich comments: "No doubt White's quotation from Calvin increased the readership of Calvin's works, for it set historians of science off on a frustrated search to find where the Genevan reformer mentioned Copernicus."⁵ He never did. Whatever may be the weaknesses of White's scholarship, there can be no denying that the campaign of which he was a champion ultimately succeeded.

As a modern illustration of the place where this attitude leads, let me give a personal example. I was at my son's graduation from Bates College in May 2002. The speaker was Steven Weinberg, outstanding scientist, Nobel prize-winner in physics, and a highly articulate advocate of secular materialism. The gist of his commencement message was to welcome the students to the enlightenment, explicitly disparage all religions as superstition and medievalism—Islam came in for special criticism, which was at least a change from the usual academic anti-Christian bias—and debunk postmodernism while praising science. Although I think White would probably be horrified at Weinberg's position, it seems to me, and evidently to Weinberg, to be the logical conclusion of White's campaign.

The Challenge of Scientific Truth

Although as I say the warfare myth has some pretty shady roots, I do not want to minimize the fact that there are some serious challenges that we as Christians and scientists need to face up to. I summarize them in this way: If (as I believe) science is discovering deep truths about the natural world, and if (as also seems to be the case) science is constructing a picture of our world in which the God of the Bible is not plainly revealed, why is that so?

I take that to be the heart of the science and faith discussion. We cannot start with details about how this or that biblical incident or doctrine could be consistent with modern science. We must recognize that in so far as there is a confrontation that could be called warfare, it is a confrontation not so much of detailed facts as of worldviews.

The Distinction with Scientism

It is not without significance that White, like many of his contemporaries, used the word science with an enormously wide meaning; so that it encompassed the entirety of liberal scholarship. In addition to astronomy, chemistry, geology, and the other natural sciences, his book has chapters on Egyptology and Assyriology, philology, comparative mythology, economics, and biblical criticism, referring to all as science, and implying that the intellectual methodologies of all are similar.

The intellectual and practical prestige that lends to science the status of a compelling explanation of the world is almost entirely attributable to the natural sciences. In other words, it is in physics, chemistry, biology, geology, astronomy, and similar disciplines that we find the really persuasive scientific explanations. On this Weinberg and I completely agree. Where we profoundly differ, however, is that his position, and White's before him, is essentially that the methods of science, as exemplified by these natural sciences, are the *only* way to obtain rational knowledge of the world. That position is not science. It is a purely philosophical position that I call *scientism*.

Scientism is the belief that the methods of science, by implication modeled on the natural sciences, are the only source of true

knowledge. In more philosophical discussions, aspects of this belief are called Logical Positivism (referring to the method by which the knowledge is to be acquired) and sometimes Materialism (referring rather anachronistically to the assumption that the account of the world in terms of matter is complete), and sometimes Naturalism (which begs lots of other questions that cannot be discussed here).

When White includes various disciplines that are plainly not natural sciences in his polemic about science and religion, he is exemplifying the capitulation and accommodation of these nonscientific disciplines to scientism. For if science is all the rational knowledge there is, then the liberal arts, social studies, and humanities, if they want to retain their intellectual authority, better turn themselves into sciences. And that is what many of them sought to do in the late nineteenth century.

What I conclude, then, is that there *is* an intellectual confrontation that could reasonably fit the warfare metaphor. It is not between science and theology, however. It is between scientism, the predominant faith of the twentieth century academic, and other faiths, including Christianity.

Science without Scientism

Defining Science

A large fraction of the problems of science and faith are generated by misunderstanding or misuse of the word science. Therefore, I need to be explicit that from here on I am using the word science to mean the natural sciences. I believe that there are some characteristics of science and scientific knowledge that distinguish it from other forms of knowing. Modern science starts with the fundamental presupposition that the world can be described by models which are basically invariant as to time or place. If I do an experiment in such a place on such a date, it ought to be possible, by attention to all the relevant factors, to get the same result if someone else does it somewhere else at some other time. Thus *reproducibility* is vital in science. A second characteristic is that science restricts its attention to matters on which it is possible for rational observers to agree on the results of any experiment. The results of a scientific experiment, even if not necessarily its interpretation, have to be in a form that is universally accepted and understood by scientists. I will call this requirement of universal comprehension *clarity*. These two criteria, reproducibility and clarity, are the ground on which all science is built.

Michael Faraday is a fascinating character in the history of science. He was probably the most prolific experimentalist in the first half of the nineteenth century. It was said of him that whenever he heard of some new result or phenomenon which had been discovered in those heady days of nineteenth century discovery, the first thing he would do was to attempt to reproduce the effect in his own laboratory. This was not because he was what might

be thought of as a skeptic. In actual fact, he was a firmly convinced Christian, deacon of a nonconformist evangelical church for most of his adult life. No, the reason he always tried to confirm an effect by his own experiments is, I believe, in part because he understood that science is concerned with reproducible phenomena which can be studied anywhere under controlled conditions and give confirmatory results.

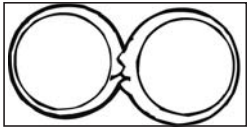
A fascinating episode in the sociology of science occurred more recently. In March 1989, two electrochemists, Stanley Pons and Martin Fleischmann, at the University of Utah, called a press conference to announce that they had achieved controlled fusion at room temperature. Now, my own main research interest is in controlled fusion energy, the energy source of the sun and stars. As I said on a later occasion, it was as if a jet aircraft designer had read one day in the morning paper that others were claiming to have discovered anti-gravity! It was a claim that if true would make obsolete the whole field in which I was working, but a claim contradictory to many principles of physics that we take for granted. Cold fusion experiments are very easy to do; and soon there were thousands of attempts to reproduce the results. Some of these came up with their own puzzles and anomalies, but it quickly became clear that the original claims could not really be reproduced.

This incident is an example of the power of science, that it can produce such a high degree of unanimity so quickly. It is also a classic example of the way in which science relies on the principle of reproducibility to settle matters of dispute. It is precisely because "cold fusion" proved to be incapable of being demonstrated reproducibly that the overwhelming majority of responsible scientists have concluded that there is nothing in it.

Demarcation

At this point I want to interpolate a few philosophical remarks about what is called the problem of demarcation. For much of the twentieth century, philosophers generally and especially philosophers of science struggled with trying to come up with definitions of science. They were looking for general principles that one could point to and say were the things that demarcate the boundaries between science and nonscience. To make a very long story short, the current opinion in philosophical circles is that this program has failed. Every attempt to identify a process by which one could establish what is science and what is not science is judged to have been found wanting.

Now what I have just said is that I think there are two identifiable characteristics of science, repeatability and clarity. If these are sufficient to define science (which is not what I am claiming—I am claiming approximately that they are necessary, not sufficient) then it would seem that I am claiming to have solved the problem of demarcation. Such a claim would call down upon me the wrath of most



Conference Talk

Warfare and Wedlock: Redeeming the Faith-Science Relationship

A large fraction of the problems of science and faith are generated by misunderstanding or misuse of the word science ... I am using the word science to mean the natural sciences. ... I believe that there are some characteristics of science and scientific knowledge that distinguish it from other forms of knowing ... reproducibility and clarity, are the ground on which all science is built.

philosophers of science, since I would appear to be claiming to have solved a problem some of them have spent their professional lives on. So I need to justify myself a bit more. I will make two related arguments that I hope will mitigate, but I am sure will not entirely dissipate, their criticism.

First, I believe that the problem of demarcation is made impossible partly by scientism. What I mean is this. Demarcation between science and nonscience in the context of scientism is equivalent to the demarcation between sense and nonsense, rationality and irrationality, knowledge and superstition. If one accepts scientism, then that demarcation of meaningfulness is what one is trying to solve. I believe that many philosophical arguments are about that demarcation. I claim that the demarcation of meaningfulness is beyond my interests here. I have a much narrower intent which is to identify (some of) those principles which characterize natural science—regarded as a subset, not the totality, of all valid rational knowledge. I think that this problem is solvable, at least in part, and that one should not discount the identifiable characteristics of natural science just because of failures of a wider program.

Second, I am content if necessary to regard the characteristics of repeatability and clarity as partial *definitions* of what I mean by science. In doing so, I might be ruling out some studies that claim to be or perhaps even widely are regarded as science. If so, then I say, so be it. I believe these characteristics are possessed by those sciences which are responsible for the high epistemological prestige and compelling explanations of the natural world that we attribute to science. It is those natural sciences which are being implied in practically all science and faith discussions. So if I have by definition ruled out some disciplines that have a reasonable claim to being scientific, I have ruled out only those that are irrelevant to this particular debate.

Finally, I need to be crystal clear that I have no intention to discount or disparage academic disciplines that I regard as not being science. I do not subscribe to scientism. I believe there is deep meaning, truth, relevance, and insight in nonscientific studies pursued with intelligence and rigor. Indeed I believe that my Christian faith brings

knowledge that is equally as compelling as my science but is nonscientific.

Science and Nonscience

Science, then, operates with systems in which either repeatable tests are possible (laboratory science) or else so many highly similar examples are available for observation that, in effect, repeatable tests are available (observational science, e.g., astronomy). For this reason, history, for example, even though it may use some scientific techniques, cannot rightly be considered a science because it concerns itself with the essentially singular events of the past. Indeed, it is often the most unusual (*least* reproducible) types of events which attract the most historical interest.⁶

The notion of clarity, and the fact that not all topics possess it, may be illustrated by an example. Consider the question, “Do you love your wife?” This is a question that fails as scientific enquiry not because it deals with singular types of events but because it is a type of question that does not lend itself to tests whose results could be universally agreed upon. It might be possible to devise a battery of tests such as: does your heart beat faster when you see her, do you buy her flowers, do you kiss her each morning, do you do the dishes, and so on. However, I think we all suspect that these would fail to go to the heart of the matter and that a concept such as love is too subtle to be quantified and encapsulated into what would be acceptable and universally agreed upon as a scientific test.

The extent to which science insists on these two characteristics, reproducibility and clarity, is often taken for granted. What the two previous examples (history and love) illustrate, however, is that this insistence constitutes a substantial restriction of science’s field of application. It is not obvious that the world has to behave at all so as to provide for results that are reproducible, or that can be agreed upon by observers. What the success of modern science demonstrates is that a vast amount of important knowledge can be gained by taking as a *presupposition* that it does. What science’s success does not demonstrate, however, is that all of the world’s behavior is in fact describable in this way. Science has left out of consideration *a priori* any aspects of the world that do not exhibit these characteristics.

Reductionism

One important element of scientism is ontological reductionism, or, as it has been dubbed by Donald MacKay “nothing buttery.” This is the view that if a scientific explanation of a situation exists, then no other explanation can be valid. For example, we may perhaps concede that “man is a complicated biochemical machine.” The ontological reductionist says “man is *nothing but* a complicated biochemical machine.” The innocuous sounding phrase *nothing but* rules out the possibility of crediting discussions of the nature of what we are considering, at any level other than the most elementary, the most reduced. This aspect of scientism is obviously detrimental to faith, but once identified it is also seen to be inconsistent with any kind of meaning, including the very act of thinking itself. If my brain is nothing but a complicated set of interacting biological components, then there is no justification for attributing any meaning to my thoughts—including the thought I just expressed. You see the self contradiction.

The most extreme form of scientism (Logical Positivism) holds that the only worthwhile knowledge is scientific and testable by scientific approaches, and that anything that does not fall into this scientifically testable domain is meaningless. Let me give you an example from the writing of Carl Sagan. In his book *Broca's Brain*, he calls the question of why the laws of nature are what they are “... a still more fundamental and exotic question, which many scientists would say is essentially untestable and therefore meaningless.” Notice how the doubt he implies here is whether the question is or is not testable; the issue of whether untestability implies meaninglessness appears to be regarded as not in doubt!

I hope it is now clear that this view is untenable because it discounts vast tracts of human knowledge and learning which concern matters that are not susceptible to the scientific approach because they lack repeatability or clarity. There are undoubtedly aspects of history, politics, economics, law, art, literature, and so on that can be discussed scientifically. However, the heart of these topics is not scientific because their subject matter does not lend itself to the methods of science. Nevertheless, and I need to be emphatic here in case you might misunderstand me, we *can* have a vast amount of knowledge in these areas. It is real knowledge; it is worth having. But it is not scientific.

The Two Books and Their Collation

Francis Bacon (1561–1626) is often considered the father of modern science. His emphasis was on obtaining *useful* knowledge, by which he meant the knowledge that can be turned into what today we would call technology. Since technology demands the reproducibility that I have identified as one major characteristic of science, you can see that Bacon could be considered to have brought that characteristic to prominence. Did that make Bacon a believer in scientism? Did Bacon therefore think that the only useful

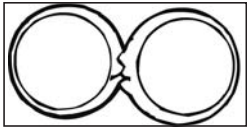
knowledge was science? On the contrary, the way that Bacon expressed his view is “Let no one think or maintain that a person can search too far or be too well studied in either the book of God’s word or the book of God’s works.” In other words, for Bacon there are two ways in which God has expressed himself: his Word, the Bible, and his works, the universe. Both of these are worthy of the most serious study. Bacon made popular the two-book view of science and faith, which I alluded to a few moments ago.

This two-book outlook [the book of God’s word or the book of God’s works] was probably the predominant approach of scientists at least until the 1800s.

As an example of scientists during the scientific revolution, Isaac Newton (1642–1727), who is certainly one of the most celebrated scientists and mathematicians of all time and who can be considered to be a founder of mathematical physics and astronomy, took much the same view. Despite being a prolific writer about optics, mechanics, and, of course, the laws of motion that explain the orbits of the planets, he wrote more about theology and Bible interpretation than he did about science. He obviously spent at least as much time thinking about the Bible as he did about the scientific description of the world.

This two-book outlook was probably the predominant approach of scientists at least until the 1800s. However, there was a difficulty with this approach that led to disillusionment. The common belief grew up that the knowledge gained through science and through revelation were and should be rapidly converging into a complete synthesis. All knowledge is one, the train of thought went, and so as we discover more about the scientific aspects of the world, we will find that these support what we know of God through the Scriptures and the revelation of Jesus and the prophets.

But in the 1800s, that did not seem to be happening. Astronomy had shown that the universe had to be understood in much grander and subtler ways than implied by the worldview of the scripture writers. Geology seemed to be discovering that the world was far older than the Bible implied. The success of mechanical explanations of the world seemed to lead to a deterministic view that left no room for free will. Humankind was “dethroned” from being a supernatural creature in a purposeful world to



Conference Talk

Warfare and Wedlock: Redeeming the Faith-Science Relationship

Faith is not
science ...
*science is not
the only valid
knowledge,
that [is why]
scientism is
a great
intellectual
mistake.
... a
transcendent
God can never
be scientifically
testable, for
otherwise he
would not be
transcendent.
... God's
eternal
changeless
dealings with
his creatures
are the laws
of nature.*

a mere animal, product of purposeless mechanistic processes, and eventually himself seen as merely (nothing but) a biological machine.

It was forgotten that the whole approach was supposed to be *two separate* readings. People found that the two books could not be readily collated together, despite the mighty efforts of the concordists. Many sprang to the false conclusion that one book had to be thrown away.

Spiritual Knowledge

Let me start my discussion of spiritual knowledge, or how we know matters of faith and the spirit, by saying that *faith is not science*. That is why I have taken some trouble to emphasize that science is not the only valid knowledge, that scientism is a great intellectual mistake.

It might be fair to ask then, why not? Why is faith not science? Why, if there is a God, does he not make himself scientifically provable? Why does God seem to be only rather obliquely discoverable in science? A big part of the answer, I maintain, is that a transcendent God can never be scientifically testable, for otherwise he would not be transcendent. Suppose there was some aspect of God which was sufficiently repeatable to allow tests about which all could agree on the results (clarity). For example, if I pray in such and such words, then I will always get such and such an answer. This would hardly be considered a revelation of God. It would actually be more like magic! Or, to put it in the manner of modern science, it would indicate some additional force acting in the world, perhaps hitherto unknown, but now available for scientific study because of its repeatability. Paul said it this way in Rom. 1:20: "Ever since the creation of the world his invisible nature, namely his eternal power and deity, has been clearly perceived in the things that have been made." You see, God's eternal changeless dealings with his creatures *are* the laws of nature.

So then, I would say that science reveals only some aspects of the Creator, ones that we generally do not think of as the key characteristics addressed by our religious teachings and faith. It reveals only those

aspects that are accessible to the methods of science which require the repeatability and clarity of the questions under consideration. This is what we call science. There is a very clear and simple reason why the other aspects of our faith, for example, God's acts in history, his personality, his purposes, and so on, are not proved by science. It is that science is incompetent, because of its choice of method and topic, to address these matters in religion, just as it is incompetent to do so in secular life.

Let me emphasize here, that I do not mean that these are certain aspects of the world about which science gives us the answers and certain others about which it does not and that it is in these latter areas where we find God. In other words, I am emphatically not advocating a "God of the Gaps" approach. No, I believe that the way to make sense of the world and see the scientific and nonscientific descriptions in correct context is to give full credit to the different levels of description.

So, yes, I am an assembly of electrons and quarks interacting through quantum chromodynamics and the electroweak forces; yes, I am a mixture of a wide variety of chemical elements predominantly hydrogen, oxygen, and carbon; yes, I am a wonderful system of biochemical processes guided by genetic codes; yes, I am a vast and astoundingly complex organization of cooperating cells; yes, I am a mammal with hair and warm blood; yes I am a person, husband, lover, father; yes, I am a sinner saved by grace. I am all of these things and not one of them is less true than any other. Not one of these descriptions rules out the others, once we set scientism aside.

The trouble is that it might seem that this is just special pleading on my part. That since science turned out not to confirm the Christian God, Christians like me are obliged to invent excuses for why this must be the case. In other words, is the affirmation of other ways of knowing, and the appeal to explanations at different levels just an ad hoc fall-back position forced on religion by the failure of modern science to validate its doctrines? To illustrate that this is not just a view invented to save religious faith, let's think for a moment about the question of purpose.

Purpose Deliberately Ruled out by Science

Consider this quote from the Nobel Prize winning biologist Jacques Monod:

The cornerstone of the scientific method is the postulate that nature is objective. In other words, the systematic denial that “true” knowledge can be got at by interpreting phenomena in terms of final causes — that is to say, of “purpose.”⁸

I use this quote first because it is a classic example of scientism in populist scientific writing. Monod identifies “true” with what I should call “scientific” because he implicitly assumes that all true knowledge is scientific. I have drawn attention to Carl Sagan and Steven Weinberg, as two other distinguished scientists whose popular writing is also full of this type of implicit assumption.

But secondly, I use this quote because I think it *does* correctly characterize science. Science rules out explanation in terms of personality, and hence rules out purpose, from the beginning, as an operational postulate. Therefore, it should be no surprise that science fails to find personality and purpose in the world. It could not possibly do so because it rules them out from the beginning. There can never be a scientific explanation of personality or purpose as such. There can be a scientific description of the material substrate in which personality is embodied; brain science is at the beginnings of such a description for humans; but this does not prove that there is no such thing as personality. It is mere presumption, not based on scientific results, to suppose that a scientific description “explains away” personality, in the sense of rendering descriptions in personal terms meaningless.

Exodus, a Biblical Example

Moreover, the Bible teaches this multi-level view of the world. It sees God at work, not just in the aspects of nature that were not understood, but also in those that were understood.

The best example I know to illustrate this contention is the biblical description of the founding event of the Hebrew faith, namely the exodus. That dramatic scene, made famous by Charleton Heston, Cecil B. de Mille, and a cast of thousands, where the Red Sea parts and the Israelites go across, tends to make us forget that the original account says that there was a perfectly “natural” explanation of what happened: “Then Moses stretched out his hand over the sea; and the Lord drove the sea back by a strong east wind all night, and made the sea dry land, and the waters were divided” (Exod. 14:21). The fact that there was a natural, in a crude sense a scientific, explanation of the event to which the passage refers — the persistent east wind — does not prevent the writer from seeing God at work. In other words, different levels of explanation are regarded as equally valid.

This incident illustrates that it has always been a characteristic of biblical faith to see God not just in some supposed gaps but in all the events of life, whether they have a scientific explanation or not.⁹ To emphasize that the personal God must be sought in higher level descriptions, which are valid simultaneously with other more reductionistic or scientific ones, is not just a defensive reaction to the progress of science. It is what has always been the case implicitly in religious experience.

Distinctively Christian Science

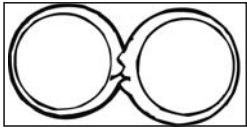
Now I turn explicitly to what I take to be the main thrust of this conference on Redeeming Reason. Is there such a thing as a Christian Science? By this phrase, I mean not the peculiar sect it has unfortunately become associated with, but natural science, within the mainstream of scientific thought (or at least not off in some fantasy land like so-called “Creation Science”) that is distinctively Christian.

In thinking, over the years, about this question with students and other Christians, I soon came to two conclusions. The first is that there are many aspects of science that are obviously the same whether pursued by Christians or atheists. It is not possible, I hold, to solve a differential equation (for example) by techniques that are different for a Christian than for someone else. Some knowledge and thought is truly common, regardless of conviction. Scientific knowledge perhaps more than any other discipline, is common because of its methods of investigation. The second conclusion is that if Christian Science means an approach to natural science that seeks scientific data in the Scriptures or some other religious authority rather than in nature itself, then I am deeply suspicious of it. That would sound too much like a return to the sterile Aristotelian and Scholastic philosophizing that modern science has overthrown. I hold that the book of nature contains different aspects of revelation than the written Word of God. God intends the unwritten book to be read, as he intends the Bible to be read: on its own terms, before all else.

Going further, though, I believe there is a constructive case to be made for the phrase Christian Science.

Christian Pioneers

First, we should recognize that modern science is built upon the foundational work of people who more than anything else were Christians. Christians were the pioneers of the revolution of thought that brought about our modern understanding of the world. MIT (Massachusetts Institute of Technology), my home institution, the high-temple of science and technology in the United States, has a pseudo-Greek temple architecture about its main buildings. The fluted columns are topped not with bacchanalian friezes, but with the names of the historical heroes



Conference Talk

Warfare and Wedlock: Redeeming the Faith-Science Relationship

*I hold
that the
book of nature
contains
different
aspects of
revelation
than the
written
Word of God.
God intends
the unwritten
book to be read,
as he intends
the Bible
to be read:
on its own
terms,
before all else.*

of science (not to mention William Barton Rogers, the founder). A rough assessment was carried out by a few of us some years ago of the fraction of the people listed there who were Christians. The estimate we arrived at was about 50 to 60%.

Any list of the giants of physical science would include Copernicus, Galileo, Kepler, Boyle, Pascal, Newton, Faraday, Maxwell, all of whom, despite denominational and doctrinal differences among them, and opposition that some experienced from church authorities, were deeply committed to Jesus Christ.

Christian Scientists in Modern Academia

Second, I observed over the years in my interactions with Christians in academia, that far from scientists being weakly represented in the ranks of the faithful, as one would expect if science and faith are incompatible, they are strongly over-represented. There are more scientists than nonscientists among Christians in academic communities.

For many years, this was simply a personal observation, and though my friends and colleagues confirmed the observation, the evidence remained anecdotal. However, eventually I discovered that the sociological evidence has been studied systematically, for example, by Robert Wuthnow,¹⁰ who established that while academics undoubtedly tend to be believers in lower proportion than the US population as a whole, among academics, scientists were proportionally *more likely* to be Christians than those in the nonscience disciplines. He cites several studies as follows:

Carnegie data on faculty members showed that 49% of faculty in the social sciences [sic] were indifferent or opposed to religion, compared with 46% in the humanities, 41% in the biological sciences and only 37% in the physical sciences. Another study of faculty members showed similar patterns: 41% of the social scientists did not believe in God, compared with 36% of those in the humanities and 20% in the natural sciences; similarly 48%, 45%, and 34% respectively, said they never attended church.¹¹

If it really were the case that science and faith were inevitably at war with one another, then surely one would expect it to be rarer for [natural] scientists to be Christians than other academics. In fact, the opposite is true. The common misconception that scientists were or are inevitably sundered from the Christian faith by their science is simply false.

Christianity the Fertile Soil in Which Science Grew

Third, the question arises, why did modern science grow up almost entirely in the West, where Christian thinking held sway? There were civilizations of comparable stability, prosperity, and in many cases technology, in China, Japan, and India. Why did they not develop science? It is acknowledged that Arabic countries around the end of the first millennium were more advanced in mathematics, and their libraries kept safe eventually for Christendom much of the Greek wisdom of the ancients. Why did not their learning blossom into the science we now know? More particularly, if Andrew White's portrait of history is true, that the church dogmatically opposed all the "dangerous innovations" of science, and thereby stunted scientific development for hundreds of years, why did science not rapidly evolve in these other cultures?

A case that has been made cogently by Stanley Jaki,¹² amongst others, is that far from being an atmosphere stifling to science, the Christian worldview of the West was the fertile cultural and philosophical soil in which science grew and flourished. He argues that it was precisely the *theology* of Christianity which created that fertile intellectual environment.

The Bible teaches that the world is the *free contingent creation* of a rational Creator and that God had free choices about how the world was to be. Such a teaching implies that the world cannot be understood simply by theoretical philosophy, in the way that the Greeks thought it could and should. We need to do experiments to find out how God chose to create it. Experiments are the foundation of modern science. The Bible teaches that God *declared the Creation "good."* So it is worthy of detailed study and investigation on its own merits. The Bible teaches

that the world is not itself God. That permits Christians to investigate the physical and biological universe without fear of violating the divine.

The Bible teaches that humans have been given a degree of authority and responsibility over the Creation. Therefore it is permissible to probe its secrets, provided we are truly acting as stewards of it, and respecting God's creatures. The Bible teaches that our rationality is in the *image of the Creator*. This gives encouragement and expectation that we are capable of understanding the creation. These are *theological* encouragements to the work of empirical science.

When intermingled with the desire to benefit humankind for Christian charity's sake, and enabled by the printing press to record and communicate results for posterity, the work of science became a force that gathered momentum despite any of the strictures of a sometimes defensive religious hierarchy.

So I suggest that there is a deeper reason why scientists are puzzled about how one might pursue a Christian Science distinguished from what has been the approach developed over the past half millennium. It is that modern science is *already* in a very serious sense Christian. It germinated in and was nurtured by the Christian theology of creation, it was developed and established through the work of largely Christian pioneers, and it continues to draw Christians to its endeavors today.

Wedlock: A Constructive View of Christianity and Science

A church friend of mine, named Dick, who has been married for close to forty years, was asked recently what the secret of a long-lasting marriage is. I suspect the question was provoked partly because he and his wife, both delightful people, seem so totally different that superficially they would seem rather incompatible. Dick is never at a loss for words, but even so, I was impressed that his immediate answer showed that he had thought deeply about this question. His answer was this: in a marriage the couple should have shared fundamental principles and complementary characters.

I have to agree. The essence of marriage is the joining of the different to make a greater unity. At its most basic level, this means physically different, a man and a woman, but often also it means different in skills, in personality, and in interests. I give thanks that my wife brings to our marriage many outstanding attributes that I lack. Of course, her shortcomings in the areas of my strength are sometimes terribly aggravating to me! I am sure that some of you who are married can identify there. But it is often in working out those aggravations that we grow most. We are both stronger, better people because of our marriage to a person with complementary character.

And when it comes to bedrock principles—our common Christian faith, and the moral and ethical values which undergird our outlook—we share an almost complete unity.

I think that the idea of shared principles and complementary characters is what I see most clearly in the relationship between science and faith. I have tried to show that science has a distinctive character which lends itself to important but incomplete understanding of the world. Science is different from faith, and as a result, there is sometimes friction between them. But at those points of friction are signs, I believe, not of conflict but of complementarity. What, though, are the shared core principles? I want to mention just two types: first, the belief in truth; and second, the practice of truth.

Faith, Science, and the Postmodern World

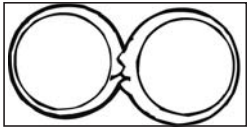
I hope most of you know approximately what I mean in referring to postmodernism.¹³ One can view some of the postmodernist agenda as a justified repudiation of scientism. Unfortunately the baby tends to go out with the bathwater. Whenever someone says "that is true for you," implying that it is not true for them, they are displaying a postmodern spirit. Truth is not universal, the postmodernist says, it is local, or even personal.

Here is revealed, by its contrast with postmodernism, one of the shared fundamental principles of science and the Christian faith. Both believe that there is universal truth. Science says the world is this way, and it is this way there, then, and for that other person, just as it is here, now, and for me. That is a foundational principle of science, the universality of the laws of nature. Christianity very much shares this perspective. "Jesus Christ is the same yesterday, today, and forever" says the writer of the letter to the Hebrews (13:8). Jesus says, "I am the way the truth and the life." St. Paul insists on the objective factual nature of the resurrection when he says:

I delivered to you as of first importance ... that Christ died for our sins in accordance with the scriptures, that he was buried, that he was raised on the third day in accordance with the scriptures, and that he appeared to Cephas, then to the twelve. Then he appeared to more than five hundred brethren at one time ... Then he appeared to James, then to all the apostles (1 Cor. 15:3-13).

These are not seen as local, personal truths. They are universal and in a sense objective.

It should be no surprise that science and Christianity share these principles, because a Christian theological outlook often inspired scientists to think about the world in the way that they did. For example, Faraday, like most of his contemporary scientists, was preoccupied with nature's laws. And he attributes that preoccupation to his Christian perspective. "God has been pleased to work



*Far from being
an atmosphere
stifling to
science,
the Christian
worldview
of the West
was the fertile
cultural and
philosophical
soil in which
science grew
and flourished.
... it was
precisely the
theology of
Christianity
which created
that fertile
intellectual
environment.*

Conference Talk

Warfare and Wedlock: Redeeming the Faith-Science Relationship

in his material creation by laws," he remarked, and "the Creator governs his material works by definite laws resulting from the forces impressed on matter." This is part of the designer's art: "How wonderful is to me the simplicity of nature when we rightly interpret her laws." It was not obvious a priori that consistent laws should govern the natural world, despite the assumption that we tend to make today. For Faraday, God's sovereignty was the basis for his assumption.

Moral Character in Faith and Science

Well, I did not leave enough time to talk in detail about the practice of truth, but let me just outline what I want to get at. There has been much debate and concern in recent years about truth and deception in science. The concern that is voiced about deliberate falsification of data is well justified. Science simply cannot function properly in an atmosphere of suspicion, where we cannot be sure that what a person reports is not deliberately made up. The peer review process that governs scientific publication does not assume that all reports are correct, but it does assume that we do not have to root out deliberate deception.

While I was growing up, this was a topic that was rarely if ever raised. Truthfulness was assumed. I think that was in many ways a legacy from Christianity, from the Christian influence in education and from the norms of society. But today we are seeing that it cannot be assumed that people subscribe to the principle.

So my point is that moral teaching, "thou shalt not bear false witness," is a vital support to the operation of science, which Christianity historically provided, but which today's scientists find, to their dismay, cannot be necessarily assumed. Again, science and faith find they have shared values and principles.

Conclusion

So how may I conclude? There are differences between the ways that science and other disciplines seek knowledge. Science describes the world in so far as it can be described in terms of repeatability and clarity. Not all knowledge is of that type. So science cannot be all the knowledge there is.

Faith is not science, but it can nevertheless be about true knowledge.

I have pointed out that science grew up in the fertile climate of Christian theology, which lent it many of its original motivations and inspired many of its practitioners. Thus it is not stretching the facts of history to suggest that there is a deep sense in which science as we know it is Christian science. During the nineteenth and twentieth centuries, the disappointment of the earlier expectations of immediate convergence and the tactical efforts of the secularizers led to the wide acceptance of a myth: that science is and always has been at war with theology. That myth was associated with the philosophical position of scientism. If there is warfare, it is actually between the competing worldviews of scientism and Christian faith. But while some scientists, and especially science popularizers, do subscribe to and promote scientism, many do not. Among academics, you find more Christians who are scientists than are nonscientists.

And when one views modern science as it really is, rather than through the scientific lens, one sees much in the fundamentals that is consonant with Christian theology and with the Bible. In many ways in the academy today, science and Christianity have more in common with one another than either does with the swirling fashions of postmodern thought. When I consider science and Christian faith then, what I see is shared principles and complementary characters. For me, the closest analogy to this is wedlock. ♦

Notes

¹This talk from the Redeeming Reason Conference is mostly a compression of my Templeton Lectures, first presented in 2004 at Baylor University.

²A. D. White, *A History of the Warfare of Science with Theology in Christendom* (New York: Appleton, 1896).

³White was careful to draw a distinction between *sectarian theology*, meaning broadly doctrinal or confessional Christian faith which his book condemned, and his own vaguer liberal religiosity, which he regarded as enlightened, but which excluded any requirement of Christian orthodoxy.

⁴I use White here as a representative of the much wider forces at work. These have been treated in detail by George Marsden in *The Soul of the American University* (New York: Oxford University Press, 1994).

⁵Owen Gingerich, *The Book Nobody Read* (New York: Walker, 2004).

⁶John Suppe's talk at the Redeeming Reason meeting is a valuable corrective against too narrow an interpretation of repeatability. He rightly emphasizes that scientific techniques *can* give very important information about the past.

⁷<http://www.fbrt.org.uk/pages/quotes/quotes/quotes-divinity-philosophy.html> has several similar quotes. This quote is cited opposite the title page of Darwin's *Origin of Species* and comes from Bacon's 1605 book, *The Advancement of Learning*.

⁸Jacques Monod, *Chance and Necessity* (New York: Vintage Books, 1972), 21.

⁹Do not misunderstand me. I am not saying there are no miracles that "violate the laws of nature," just that such violation is not necessary for us to identify God's hand at work. And by the way, here is a very important biblical one that seems to be "natural."

¹⁰Robert Wuthnow, *The Struggle for America's Soul* (Grand Rapids, MI: Eerdmanns, 1989), 146.

¹¹A more recent, as yet unpublished, study by Elaine Ecklund, finds a somewhat different spectrum of opinion in answer to different questions, but the point remains that survey data do not support the view that scientists are substantially less religious.

¹²Stanley L. Jaki, *The Road of Science and the Ways to God* (Chicago, IL: University of Chicago Press, 1978).

¹³J. Richard Middleton and Brian J. Walsh, *Truth Is Stranger Than It Used to Be* (Downers Grove, IL: InterVarsity Press, 1995), gives a sympathetic account of postmodernism and a Christian response.

Books Available for Review

To request a book for review, please contact:

Richard Ruble
212 Western Hills Drive
Siloam Springs, AR 72761
479-524-6236
richardanne@cox.net

Randall Bezanson, *How Free Can Religion Be?*
University of Illinois Press, 285 pages, 2006

Daniel Cohen, *Equations from God: Pure Mathematics and Victorian Faith*, John Hopkins University Press, 240 pages, 2007

James Fetzer, *Render Unto Darwin: Philosophical Aspects of the Christian Right's Crusade Against Science*, Open Court, 200 pages, 2007

Bernard Haisch, *The God Theory: Universes, Zero-Point Fields, and What's Behind It All*, Weiser, 160 pages, 2006

Muzaffar Iqbal, *Science and Islam*, Greenwood Press, 232 pages, 2007

Anne J. Johnson, *The Scopes "Monkey Trial": Defining Moments*, Omnigraphics, 245 pages, 2007

Bill Kramer, *Unexpected Grace: Stories of Faith, Science, and Altruism*, Templeton Foundation Press, 240 pages, 2007

Woodrow Kroll, *Taking Back the Good Book: How America Forgot the Bible and Why It Matters to You*, Crossway, 218 pages, 2007

Kristine Larsen, *Cosmology 101*, Glenwood Press, 186 pages, 2007

Ervin Laszlo, *Science and the Akashic Field: An Integral Theory of Everything*, Bear and Company, 192 pages, 2007

Brenda Maddox, *Freud's Wizard: The Enigma of Ernest Jones*, Da Capo Press, 354 pages, 2006

Tom Regan, *Defending Animal Rights*, University of Illinois Press, 180 pages, 2007

David Sloan Wilson, *Evolution for Everyone: How Darwin's Theory Can Change the Way We Think About Our Lives*, Delacorte Press, 390 pages, 2007