III. Science & Theology

1. Introduction

What is the relation between science and theology? In contemporary discussions of this issue, one can find three distinct views. At one extreme is the view that science and theology are mutually irrelevant. At the other extreme is the view that they are inconsistent alternatives, that there is an inherent conflict between the two. Between these two extreme views lies the view that the two are neither mutually irrelevant nor inconsistent, but are somehow connected. Which of these best describes the relationship between the disciplines of science and theology, and between the activities, science and religion, in which they are imbedded?

2. Mutual Irrelevant Accounts?

Any view that science and theology are mutually irrelevant must be grounded in an account of the nature of science and theology. If, for example, one of the two describes the world and the other does only something else, then they are, in a sense, mutually irrelevant, however much each might be necessary to human flourishing. This view can be found in many places. Ian Barbour offers as examples of such a view the Neo-Orthodoxy of Karl Barth, the existentialist theology of Rudolf Bultmann, and the philosophy of religion grounded in the linguistic analysis of Ludwig Wittgenstein. In this lecture, I will say a few words about two other versions. One is what philosophers of science have come to call scientific anti-realism and in what one might call non-descriptivist theology.

a. Scientific Anti-realism

Scientific anti-realism, the view that science does not attempt to give a description of the world but is limited to establishing useful predictive mechanisms is a view that has had intermittent popularity throughout the history of science. The tension between Ptolemaic astronomy, with its equants and epicycles, and Aristotelian physics gave it some appeal in the pre-Copernican Middle Ages. The apparent impossibility of giving any kind of realistic model for quantum mechanics has led certain physicists to offer anti-realist accounts of science today. This view has always seemed to me to have appeal to those philosophers of science who think too much about quarks and not enough about dinosaurs and I will say no more about it here.

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1 A similar, but not identical, taxonomy was suggested by Ian Barbour in his Gifford Lectures *Religion in an Age of Science* (Harper & Row, 1990), and elsewhere.
b. Non-descriptivist Theology

I will spend rather more time on the recently expressed views of Stephen Jay Gould. Gould is, by profession, a paleontologist. He has made interesting and important contributions both to evolutionary theory and to the history of science. In addition, he has written, every month for many years, popular science articles for *Natural History*. His family religious background is in Judaism. While he himself is an agnostic, he maintains a certain respect for the place of religion in human life.

In his latest book *Rocks of Ages: Science & Religion in the Fullness of Life*, Gould explicates and defends what he calls the Non-Overlapping Magisteria Principle, namely, that science and religion are independent magisteria or “domains where one form of teaching holds the appropriate tools for discourse and resolution.” These two magisteria, he continues, have equal status but separate subject matters. Science has, as its domain, matters of fact; the domain of religion is matters of value. Gould suggests that this solution is not only “a proper and principled solution—based on sound philosophy” but is “humane, sensible, and wonderfully workable.” He argues that this view of the relation between science and religion can be found in the writings of the most careful scientists and theologians ranging from Charles Darwin to John Paul II.

I have learned much from Gould’s writings and admire his determination to give a careful hearing even to those with whom he is in deep disagreement, but, as the saying goes, *Magis amicus veritas*. As much as I appreciate the irenicist spirit of his book, I cannot agree with his thesis.

First, although he claims that there are two domains and thus implicitly two sets of appropriate tools, it is never clear exactly what the religious tools are. There is a clear negative heuristic—don’t look to nature is said to be his principle’s chief piece of advice for theologians. The positive heuristic, by contrast, is very vague—look within oneself. Indeed, although Gould in one passage refers to the logic of religious arguments, more often he suggests that this is merely the realm of taste. It is, he says at one point, a realm where resolution relies upon “compromise and consensus.” In sum, Gould acknowledges no real teaching authority in religion and has little to say about

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3 P. 5; see also pp. 52-3.
4 P. 92
5 I also do not believe that the thesis is found in all the authors to whom he attributes it, but have no space for a response on that point here.
6 P. 162; see also p. 184.
7 Pp. 197 & 204.
8 P. 210.
9 P. 62.
the tools by which we can arrive at the truth in religious matters. It is unclear how he can acknowledge a religious magisterium at all.

Second, his account of religion is surely too narrow. Sometimes it seems as though Gould should have subtitled his book “Science and Ethics....” Christianity does, of course, make claims about matters of value, i.e., about what is good and what bad, about how we should act and what we should avoid doing. But it makes claims about matters of fact as well—about the existence of God, about the creation of the world and of each human soul by God, about the immortality of the soul and the resurrection of the body, about the Virgin Birth and the bodily Resurrection of Christ, and about the Real Presence. Without these, Christianity is not Christianity—“If Christ has not risen from the dead, then vain is ... your faith,” says St. Paul. Gould’s characterization of the proper domain of religion readily accommodates deism, but judges Christianity (though Gould does not acknowledge this) to be inherently a trespasser into an alien domain

Gould does not seem to see this problem. He avoids it by including many of those facts within the domain of values. My final objection to his work is that he is that the clear line of demarcation of the opening passages of the book becomes obscure in its application. In certain passages, the domain of religion is extended to values and meaning. Elsewhere in the book, he broadens his characterizations yet further. There, the existence of God is also a value claim, not a factual one. At another point he says that claims about “the origin and constitution of the human soul” are not factual matters. Neither, he says yet elsewhere, is discussion of the ultimate beginning of all material things. It is hard to see how these are not matters of fact. One wonders where the claims about free will or the occurrence of miracles lie. Are they factual matters for science to resolve or matters of value which can be left to religion?

c. Descriptivist Theology & the Fittingness of Revelation

Whether a descriptive component is a generic component of religion or whether it is merely a fact about Christianity that Christianity does have such a component is beyond the scope of this paper. Christianity does make at least three kinds of claims about the way the world is. The first is contained in the doctrine of creation, discussed in the first lecture. The second concerns the origins of the human race in a single couple. The third kind of claim is historical claims about the people of Israel and the life of Jesus.

The second fairly clearly overlaps the domain of science, in particular evolutionary biology and genetics. The third fairly clearly overlaps the domain of history and archaeology. The first is widely perceived as overlapping the domain of various sciences, but if the claim is only that God directly created

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10 E.g., p. 62.
11 P. 75.
12 P. 217-8.
the world and human souls, and not that God directly created, say, new kinds of animals, then the overlap is only with philosophy, not with the natural sciences.

To say that there is an overlap between theology (here in the sense of revealed theology) and science, history, or philosophy is to say that God has revealed to us some things which we might have found out for ourselves. St. Thomas Aquinas gives us an account of why it was fitting for God to have done so:\textsuperscript{13}

Even as regards those truths about God which human reason could have discovered, it was necessary that man should be taught by divine revelation because the truth about God such as reason could discover would only be known by a few and that after a long period of time and with the admixture of many errors, whereas man’s whole salvation which is in God depends on the knowledge of this truth. Therefore, in order that the salvation of man might be brought about more fitly and more surely, it was necessary that they should be taught divine truth by divine revelation. It was therefore necessary that besides philosophical sciences built up by reason, there should be a sacred science learned through revelation.

3. Inconsistent Methodologies?

In stark contrast to the view that science and theology have nothing to do with one another is the view that they are by their very nature inconsistent, that they are inevitably at war with one another. Sometimes this thesis is advanced as a thesis about the methodology of science. Sometimes it is advanced as an historical claim. In this section, I will consider the methodological issues; in the next, I will discuss intellectual history.

a. Strong Methodological Naturalism

Science is often said to be inherently naturalistic. Is it? We cannot answer that question before we have a clear definition of naturalism, a name which covers several distinct views.

For some, “naturalism” is the name for an ontological thesis. Alan Lacey, for example characterizes it as asserting that:

the world of nature … form[s] a single sphere without incursion from outside by souls or spirits, divine or human

\textsuperscript{13} Summa Theologiae 1a, Q. 1.
and without having to accommodate strange entities like non-natural values or substantive abstract universals.\textsuperscript{14}

For others, it is merely the methodological claim that natural explanations always be preferred to supernatural ones. This strong version of methodological naturalism is sometimes said to be necessary to the scientific method and is coupled with the thesis that the scientific method is the only reliable route to knowledge. Richard C. Lewontin, for example, writes:

Whatever the desire to reconcile science and religion may be, there is no escape from the fundamental contradiction between evolution and creationism. They are irreconcilable world views. Either the world of phenomena is a consequence of the regular operation of repeatable causes and their repeatable effects … or else at every instant all physical regularities may be ruptured and a totally unforeseeable set of events may occur. One must take sides on the issue of whether the sun is sure to rise tomorrow. We cannot live simultaneously in a world of natural causation and of miracles, for if one miracle can occur, then there is no limit.\textsuperscript{15}

Although Lewontin begins with a concern about “creationism,” his concern, as he recognizes, ultimately rules out any form of the doctrine of special providence. If he is correct, Christianity and scientific practice are irreconcilably opposed.

Naturalists can hardly be serious in their claim that the only way of gaining knowledge is by the scientific method. Anyone who took such a view would have to go on to believe either that mathematicians use the scientific method or that mathematics does not produce knowledge. Are they at least correct that the scientific method, complete with a presupposition of strong methodological naturalism, is the only route to knowledge about the natural world?

\textbf{b. Modest Methodological Naturalism}

In fact, scientific research does not depend for its prospect of success on scientists adopting the kind of strong methodological naturalism characterized above. For some events, explanation by appeal to natural agency is easy and (relatively) obvious. The sky is blue because the atmosphere scatters blue sunlight, causing it to reach our eyes from all directions. For other events, such explanation continues to be a problem. The source of the energy emitted


by quasars is a good example. Some events, such as the recovery of the incurably ill, seem quite beyond the possibility of scientific explanation. Christians sometimes, but not always, consider these events miraculous.

It seems to be somewhat of a commonplace in discussions of science and religion to claim that although science subjects proposed explanations to rigorous testing, Christian appeals to supernatural agency are made on a “take it or leave it” basis. They may be based on faith, but they are not based on argument. Sheldon F. Gottlieb, in a response to a journalistic religious critique of evolution, wrote:

In the world of the supernatural, anything goes, and the only limitation is the extent of one’s imagination. No evidence is required to substantiate any claims.16

Similarly, Marvin Mueller wrote that if appeal to supernatural agency is made “all scientific discussion and all rational discourse must perforce cease.”17 That in fact is not the case. The institutional practice of the Catholic Church includes evaluation of miracle claims (ultimately by the Congregation for the Causes of Saints in Rome) and of putative visions when public notice requires it (usually by the bishop in whose diocese the vision occurs).

Scientific practice requires only a modest version of methodological naturalism, one which grants only a strong presumption in favor of appeal to natural causes in the attempt to understand the natural world. The mere fact that God could have acted directly is not sufficient to make supernatural explanation a good explanation. The presumption can be overridden only for events that are not only inexplicable on the basis of our knowledge of nature, but that meet some of the following criteria:

1. the event must be consistent with divine wisdom and providence,
2. the event was the object of prayer, and
3. the event is the kind of intervention for which there is precedent in Scripture and Tradition

Thus, inexplicable healings in response to prayer might plausibly be attributed to supernatural agency. The power output of quasars and improbable coincidences not plausibly so attributed. This modest version of

18 I am interested in the norms laid down by the Church for judging such matters. I am not concerned with whether institutional practice always lives up to the standards set by the norms, any more than I am concerned with the extent to which scientists fail to live up to the standards set by the scientific method.
methodological naturalism is entirely sufficient for the practice of science. At the same time it does not undermine the theologically most plausible claims for supernatural agency. Further, it discourages early resort to supernatural agency.

A secular case can be made for modest methodological naturalism along the following lines. The goal of natural science is to provide an account of how the natural world works, i.e., explanations of how the natures (or structures) of things cause the natural phenomena we observe. Beginning inquiry with a strong presumption that all events in the natural world have natural causes encourages investigators to pursue natural explanations of even very peculiar phenomena, rather than to write them off as inexplicable on the basis of natural causes. The advantage of this is that explanations which appeal to natural causes can be followed up using the scientific method. That method, conscientiously applied, gives us a good prospect of recognizing the inadequacies of wrong explanations. Appeals to supernatural causes, by contrast, cannot be followed up in the same way.

Beginning inquiry with only a presumption that all events in the natural world have natural causes is sufficient to attain the objective of science. That objective is to give an account of the natures of things, not to explain everything that happens to natural objects. Whether all events are completely determined by law is a philosophical position which is held by some, but denied by others. Aristotle and C. S. Peirce denied it for reasons that have nothing to do with religious belief. Christians deny it because it is inconsistent with revelation. The natural scientist, as such, need not commit himself on this matter. Acceptance of the merely presumptive character of the claim that natural events have natural causes helps keep natural science free of the anti-theistic polemics with which it is sometimes entangled.

A Christian case for modest methodological naturalism would depend, by its very nature, on the facts of revelation. The relevant Christian considerations are that God does act in the world, but that He generally accomplishes His will through secondary causes. Why else make secondary causes in the first place? The fact that the preference for natural explanations is merely presumptive gives adequate room for appeal to supernatural agency in the case of well-evidenced inexplicabilia.

Modest methodological naturalism allows the practice of science without interference with such other projects as understanding God’s relation to the world and praying, even for miracles.

Furthermore, it does so without giving any encouragement to the bad habit of premature resort to supernatural agency. It cautions against, for example, Isaac Newton’s suggestion to Richard Bentley that intelligent design was the only possible explanation for the structure of the solar system (and

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hence was evidence for the existence of God). It cautions as well against William Paley’s appeal to direct supernatural agency in creating plants and animals that were marvelously adapted to their environments. In the first instance, Pierre-Simon Laplace was able to offer a plausible natural account for the origin of the solar system. In the second, Charles Darwin was able to show that there were other ways of explaining adaptation. The scandal that such appeals caused was well characterized by Stephen Toulmin, who wrote:

From the year 1700 on, religious–minded men in the Protestant world … had always hoped and expected that the new science would eventually confirm and reinforce the fundamental doctrines of Christianity; and they were correspondingly ready to see in their observations of Nature evidences of ‘wisdom,’ ‘foresight,’ and ‘design.’ … All the hitherto unsolved problems of geology, astronomy, physiology and natural history were presented as demonstrating that the world of Nature had been created as we now find it ‘by the Counsel of an intelligent Agent’ …. The result of this enthusiasm for the teleological argument from design was to give a hundred hostages to fortune; and as the physical and biological sciences succeeded in explaining the supposedly supernatural inexplicabilia, all of these hostages in turn had to be ransomed, one after another.

c. Modest Methodological Naturalism and Evolution

The latest manifestation of the bad habit of premature resort to supernatural agency is found in recent Christian attacks on theories of evolution. In addition to the claim that such theories contradict Scripture, two versions of that attack can be distinguished. Each is an attempt to deploy argument to the best explanation against some particular evolutionary theory.

21 Natural Theology; or Evidences of the Existence and Attributes of the Deity, Collected from the Appearances of Nature (1802).
22 Exposition du système du monde (1796), V. 6.
23 The Origin of Species (1859).
25 This habit is bad independent of whether the appeals to supernatural agency are used as part of an argument for the existence of God.
One version has it that there is good scientific (i.e., observational and experimental) evidence of a recently created earth, separate creation of each kind of living thing, &c. This line of reasoning has been advanced by Henry Morris and others in a project they call “creation science.” The many problems that this research program has, both in developing its own evidence and in understanding evolutionary theories well enough to offer a serious critique of them, have been well canvassed elsewhere.

Another version, advanced by Philip Johnson, Alvin Plantinga, and others combines a critique of evolutionary biology and of the prospects for a chemical-evolutionary theory of the origins of life with a reminder that the alternative of direct creation of life and of major kinds of living things (sc., by a supernatural intervention independent of the laws of nature) is always available (at least to the theists) as an alternative. These authors have defended such appeals, in part, by analogy to the occurrence of miracles. In fact, appeal to supernatural agency to explain the origins of species and of life on earth is different in significant respects from the appeals to supernatural agency in the cases of miracles and apparitions treated above.

The problem about appeal to supernatural agency is that divine omnipotence makes direct supernatural agency (practically) always a possibility. If no more than mere possibility is sufficient to make appeal to supernatural intervention plausible, then such intervention will be the view to adopt (on the basis of argument to the best explanation) every time we find something which we cannot (yet) explain by natural agency. For in those cases it will be more plausible than all rival explanations. Plantinga writes:

If you are a Christian, or a theist of some other kind, you have a ready answer to the question, how did it all

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26 Scientific Creationism (Creation Life Publishers, 1974).
27 Godfrey’s Scientists Confront Creationism, cited above, and Ashley Montagu, Science and Creationism (Oxford, 1984) are just two examples. Unfortunately, many of these critiques combine very good science with an understanding of philosophical and theological issues that is as embarrassingly inadequate as is the scientific creationists’ understanding of science.
happen? ... The answer, of course, is that they have been created by the Lord.  

Such answers, however, are too “ready.” The fact that there is no generally accepted natural explanation of the source from which quasars get their energy does not make direct creation of the energy by God the best explanation. Johnson writes:

> Occasionally, a scientist ... will suggest that perhaps supernatural creation is a tenable hypothesis in this one instance. Sophisticated naturalists instantly recoil in horror, because they know that there is no way to tell God when he has to stop.

One might add that modest methodological naturalists react with concern because they know that there is no way to tell eager appealers to supernatural agency where they have to stop.

In the case of miracles, there are several things that make supernatural agency not just a minimally plausible but a good explanation. There is clear Scriptural evidence that God does perform miracles. In addition, there is prayer for the event in question, and Scriptural evidence that God performs miracles precisely in response to requests for help. In addition, the aetiology and symptoms of many diseases are now well understood. For apparitions, too, precedent can be found—at Mount Tabor and on the road to Damascus.

In the case of origins theories, by contrast, the matter is very different. We know rather less about the limits of changing gene ratios, possible chemical pathways to living cells, and so on. In addition, although Scripture is explicit about God's creation of the world and his providential care for it, including special providence to cover the needs of individuals and communities, it does not give us good reason to believe that He suspends the laws of nature in order to keep his (non-human) creation on the track He intends for it. To the extent that one can make a judgment about such things, it would seem more consonant with God's wisdom and providence to think that He could and did create a world of secondary natures that could and did do His will. In other words, that He created a world which developed in the way in which He intended without His continually having make adjustments. In His personal interaction with rational beings, who are both free and special objects of God's concern, interventions in ways which suspend the laws of nature seem entirely proper. They seem odd elsewhere.

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30 “Clash,” p. 18.
4. Historical Rivals? The History of the Relations between Science & Theology

A second version of the inconsistent alternatives model is the conflict (or warfare) thesis that has become something of a commonplace in the historiography of the last 150 years. Here, the focus is not in the first instance on methodology, but on history. Science and religion (or theology), the thesis goes, have been in fact been at war for many centuries and for reasons that are grounded in the essential nature of each activity. This thesis may in fact lead one back to the methodological issues raised above, but is at least superficially distinct.

a. The “Warfare Model” of Science Religion Relations

The warfare thesis received its first formal elaboration in the works of two nineteenth century American authors—John William Draper and Andrew Dickson White. Their work was, however, only the full version of a belief widely shared in the nineteenth century and still very much alive in the twentieth.

John William Draper was born in England in 1811, but he came to America as a young man. He made a name for himself as a chemist, with a particular interest in the chemical effects of light. He was a pioneer in the development of photography, and among other accomplishments, was the first to make a photograph of the moon. In 1841, he helped to founded the New York University School of Medicine and in 1876 was elected first president of the American Chemical Society.

In 1850, he published his last piece of scientific research and turned his attention to intellectual history, publishing first, in 1863, a *History of the Intellectual Development of Europe* and then, in 1874, his *History of the Conflict between Religion and Science*. The thesis of that latter book is stated by Draper in the following terms:

> The history of Science is not a mere record of isolated discoveries; it is a narrative of the conflict of two contending powers, the expansive force of the human intellect on one side and the compression arising from traditionary faith and human interests on the other.

The enemy, Draper goes on to make clear, is not Christianity generically, but Roman Catholicism. Draper was not by training an historian, as the quality of his argument makes clear. At about the same time, however, the history of the relations between science and theology caught the interest of another American, and one who was a professional historian.

Andrew Dickson White, born in 1832 into a Protestant Episcopal family, went through a series of battles with conservative Protestantism in his early

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32 P. vi.
adult years. The most important of these was the result of his attempt to establish, with Quaker philanthropist Ezra Cornell, Cornell University as the first private non-denominational university in the United States. White’s frustration with accusations of atheism and the like led him to accept an invitation to give a lecture at the Cooper Union in 1869, where he chose as his topic “The Battlefields of Science” with the stated theses that:\footnote{History of the Warfare of Science with Theology in Christendom (Appleton, 1896). More conveniently available from Dover (1960). Here, p. viii.}

In all modern history, interferences with science in the supposed interests of religion, no matter how conscientious such interferences may have been, have resulted in the direst evils both to religion and to science, and invariably; and on the other hand

all untrammelled scientific investigation, no matter how dangerous to religion some of its stages may have seemed for the time to be, has invariable resulted in the highest good both of religion and of science.

He continued his work on this topic for nearly thirty years, finally publishing his two-volume *History of the Warfare of Science with Theology in Christendom* in 1896.

White’s statement does not accurately reflect the real thesis of his book as well as does his title. In fact, the fundamental thesis seems rather to be that the differences between science and religion are not merely the differences that might occur between any two disciplines, as between physics and geology, but are “a struggle between science and dogmatic theology … the conflict between two epochs in the evolution of human thought.”\footnote{P. ix.} Theological resistance to the advancement of science poses “a menace to the whole normal evolution of society.”\footnote{P. v.}

Although Draper and White write a history of many campaigns, surely the two incidents in the history of science and religion that would come most readily to mind to today’s reader would be the Galileo case and the reception of Darwinism.

White introduces the story of Galileo in the following terms:\footnote{Vol. 1, p. 130-1.}

On … Galileo, the whole war was at last concentrated. … Against him … the war was long and bitter. The supporters of what was called ‘sound learning’ declared his discoveries deceptions and his announcements
blasphemous. Semi-scientific professors, endeavoring to curry favor with the Church, attacked him with sham science; earnest preachers attacked him with perverted Scripture; theologians, inquisitors, congregations of cardinals, and at last two popes dealt with him and, as was supposed, silenced his impious doctrine forever.

He goes on to tell us how Galileo’s discovery of the moons of Jupiter led to clerical denunciations with the result that “multitudes of the faithful besought the Inquisition to deal speedily and sharply with the heretic.” He was denounced as an infidel and an atheist. His opponents “scream in rage” against Copernicanism. In 1615, “the mine which had been so long preparing was sprung”—Galileo is forced to promise to write no more in defense of Copernicanism and Copernicus’ works themselves are placed on the Index of Prohibited Books, infallibly committing the Church to geocentric cosmology.

The story of the reception of Darwinism is itself epitomized in popular historiography in two great battles—the Wilberforce-Huxley exchange of 1860 and the Scopes Trial of 1925.

The Wilberforce-Huxley exchange, which Darwin himself in his later years called “the battle royal at Oxford” and of which historian James R. Moore has said, “No battle of the 19th century, save Waterloo, has been better known,” occurred on 30 June 1860 at a meeting of the British Association for the Advancement of Science held at Oxford University. There John W. Draper was scheduled to give a paper on “the Intellectual Development of Europe considered with reference to the views of Mr. Darwin.” It was generally known that Samuel Wilberforce, Anglican Bishop of Oxford, intended to use the occasion to offer a critique of Darwin. Many also expected Thomas H. Huxley, a prominent Darwinian, to make a reply. The following is a typical modern account of the details of the incident:

For half an hour the Bishop spoke, savagely ridiculing Darwin and Huxley, and then he turned to Huxley, who sat next to him on the platform. In tones icy with sarcasm he put his famous question: was it through his grandfather or his grandmother that he claimed descent from an ape? … [Huxley] tore into the arguments Wilberforce had used…. Working himself up to his climax, he shouted that he would feel no shame in having an ape as an ancestor, but that he would be ashamed of a brilliant man who plunged into scientific questions of which he knew nothing….

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The room dissolved into an uproar. Men jumped to their feet, shouting at this direct insult to the clergy. ... Admiral Fitzroy, the former Captain of the Beagle, waved a Bible aloft, shouting over the tumult that it, rather than that viper that he had harbored in his ship, was the true and unimpeachable authority....

The issue had been joined. From that hour on, the quarrel over the elemental issue that the world believed was involved, science versus religion, was to rage unabated.

The Scopes Trial, which law professor Samuel Walker has called “one of the most famous courtroom battles in American history,” occurred in Dayton, Tennessee in July, 1925. It is known best to Americans through the dramatic efforts of Jerome Lawrence and Robert E. Lee, whose long-running Broadway play Inherit the Wind was later made into a movie and has since been produced and read by countless classes of high school students. Although Lawrence and Lee do not claim to have written history, and even changed the names of the characters in the story, their play has etched into the public imagination the image of Scopes as a courageous school teacher persecuted for his beliefs. The incident, thus understood, has become, in the words of liberal journalist Joseph Wood Krutch, part of “the folklore of liberalism.”

Popular historians are somewhat more careful. They do recognize that the case was a test case over whether the legislature or the academic community has the right to decide what should be taught in public schools. But, that point having been acknowledged, they seem drawn irresistably back to the warfare thesis. So, journalistic historian Frederick Lewis Allen, in a book used in American college classrooms for decades, wrote:  

The Scopes case ... dramatized one of the most momentous struggles of the age—the conflict between religion and science. ... All through the decade the three-sided conflict [between Fundamentalism, Modernism, and scepticism] reverberated. It reached its climax in the Scopes case of 1925.

How accurate are these accounts? Pope John Paul II once said about the Galileo case:

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From the beginning of the Age of Enlightenment down to our own day, the Galileo case has been a sort of “myth,” in which the image fabricated out of the events was quite far removed from reality. … This myth has played a considerable cultural role. … The clarifications furnished by recent historical studies enable us to state that this sad misunderstanding now belongs to the past.

The same thing could also be said about the two other stories, as much recent historical work has made clear.42

b. The Real History of Science-Religion Relations

The question we must ask is the following: Do any of the incidents mentioned above show that there is an inherent tension between science and religion as such?

First, the Galileo case. Was this a battle between science and religion? There are two alternative and, to my mind, more plausible ways to understand the story. The first is as a battle between the new science and the old science, a battle in which the Church was persuaded to weigh in on the side of the old. Copernicus, at the beginning of the sixteenth century met no objections from the Church. Indeed a lecture on Copernicus’ work presented to Pope Clement VII and others at the Vatican in 1533 received a favorable reception. Copernicus received encouragement to publish his ideas from Nicholas (later Cardinal) Schönberg. When he was finally ready to publish, his work was seen through the press in part by Tiedemann Giese, Bishop of Kulm.

There were no problems with the Church for over seventy years, until the days of Galileo, when Galileo’s challenges to Aristotelian physics and his attempts to do Scriptural exegesis in support of his Copernican views prompted the Aristotelians to complain to Rome. Even then, at the first ecclesiastical inquiry into Copernicanism, in 1615-6, St. Robert Bellarmine said that:43

whenever a true demonstration would be produced that the sun stands in the center of the world and the earth in the third heaven, and that the sun does not rotate around the earth but the earth around the sun, then at that time it

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would be necessary to proceed with great caution in interpreting the Scriptures that seem to be contrary, and it would be better to say that we do not understand them than to say that what has been demonstrated is false. But I do not believe that there is such a demonstration.

Galileo did not have such a demonstration in 1616. Nor did he have one in 1633.

Surely the Church should not have taken sides in this dispute. This point has already been made by many Catholic writers. The Church did not, however, commit itself without reason on the side of the old and, as we now recognize, erroneous science. Nor did its statements on this matter meet the criteria of infallibility. The fact that it spoke on the matter at all indicates no more that there is an inherent conflict between science and religion than does the Lysenko case show that there is an inherent conflict between government and religion.

The second alternative way to understand the story is as not so much a battle between two mighty factions as a personal tragedy, in the precise sense of the term. On one understanding of the essence of tragedy, the tragic hero is a character basically good, but nevertheless imperfect in a way that leads ultimately to his undoing. Macbeth is ambitious; Hamlet, immoderate in his desire for revenge. Galileo's fault was perhaps a kind of pride that led to an over-valuation of his evidence and to a cleverness in speech that wounded his opponents.

The first led him to believe that he had a good demonstration for the real movement of the earth on the basis of the motion of the tides, when his theory of tides was unable even to account for so elementary aspect of tides as the frequency of their occurrence. The second is exemplified in his controversy over the nature of comets. Jesuit Father Orazio Grassi had criticized Galileo in a pamphlet entitled The Astronomical and Philosophical Scales. Galileo replied with a pamphlet of his own called The Assayer, an assayer being one whose techniques of weighing were much more precise than was the use of a scales. Both of these problems, and perhaps particularly the latter, led him to make enemies, and thereby led ultimately to his undoing.

Although Wilberforce did criticize Darwinism at the meeting in question and Huxley did respond, most of the rest of the details in the popular story are at best misleading. It is, in the words of Stephen Jay Gould, “a reconstruction, made by Darwin’s champions, some quarter of a century after the fact.”44 Although the evidence is too scant for a clear account of exactly what transpired, the evidence is good that Wilberforce’s presentation was a critique of evolutionary theory, not merely a piece of empty rhetoric, that Huxley’s reply was not found convincing by all fair-minded hearers, and that the meeting did not dissolve into chaos immediately after the exchange.

Was this a battle between science and religion? It was a debate between a scientist and a bishop-theologian, to be sure. But nineteenth century biology was not such a specialized field that outsiders could not make a contribution. Indeed Darwin himself acknowledge that one of the keenest critiques of evolution came from a Scottish engineer, Fleeming Jenkin. Wilberforce himself was not so penetrating in his critique, but the general consensus is that he was presenting the views of England’s leading paleontologist, Richard Owen. It is surely worth noting that Huxley had had just as fierce an exchange with Owen a mere two days before. Though Wilberforce may well have had theological commitments as well as scientific ones, Huxley himself surely had anti-clerical commitments as well as scientific ones. In a letter to a friend the year before he had written:

both [Theology and Parsondom] are in my mind the natural and irreconcilable enemies of Science. Few see it but I believe we are on the eve of a new Reformation and if I have a wish to live thirty years, it is that I may see the foot of Science on the necks of her enemies.

With non-scientific concerns on both sides, with exchanges between scientists very much like the exchange between the scientist and the bishop, and with some scientists thinking that the bishop had the better of the argument, it is hard to see this exchange as evidence of an inherent tension between science and religion.

The legend of the Scopes Trial also bears at best a loose connection with reality. The real story of the trial begins with American populist William Jennings Bryan, three times presidential candidate of the Democratic Party and Secretary of State under Woodrow Wilson. Bryan had long shared Fundamentalist Protestantism’s mistrust of Darwinism and had spoken against it from as early as 1904. In the early twenties, Bryan decided to campaign for the exclusion of Darwinism from the public schools. His first success in this campaign was the Butler Act, signed into law in Tennessee on 21 March 1925, which made it unlawful for public school teachers “to teach any theory that denies the Divine Creation of man as taught in the Bible, and to teach instead that man has descended from a lower order of animals.” The American Civil Liberties Union promptly set in motion a search for a Tennessee teacher who might be willing to challenge the law in court. At the suggestion of some of the local citizens, John T. Scopes, a young teacher in Dayton, Tennessee, decided to volunteer. Since a discussion of evolution was included in the state-approved biology book currently in use in the state and Scopes said he must have discussed evolution when he was substituting for the regular biology teacher, the outcome of the trial was

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never in doubt. After an indulgent judge allowed a long exchange between William Jennings Bryan and prominent agnostic Clarence Darrow, who was representing Scopes, the case moved quickly to a verdict. Scopes was convicted and the case was moved to the State Supreme Court, which overturned the conviction on a technicality.

Was this a battle between science and religion? Again, there was a battle, but who were the protagonists? In the courtroom, the battle was between Darrow and Bryan. Darrow surely saw it as a battle against religion, but Darrow, however much he might have identified himself with science, was not in any sense a scientist and his agenda was not driven by science but by his militant agnosticism. Bryan surely saw himself as the defender of religion, but we need not agree with him that he was a defender of religion as such. Pope John Paul II recently said that

The rationalist context in which [nineteenth century advances in the historical sciences] were most often presented seemed to make them dangerous to the Christian faith. Certain people, in their concern to defend the faith, thought it necessary to reject firmly-based historical conclusions. That was a hasty and unhappy decision. The work of a pioneer like Fr. Lagrange was able to make the necessary discernment on the basis of dependable criteria.

Allen’s division of religion into Fundamentalist and modernist camps is therefore mistaken. Surely Catholics, for one, were neither.

What about the larger battle, the political battle that led to the passage of the Butler Act in Tennessee, and similar measures in two other states? Was not that a battle between science and religion? In fact, no. First, one must acknowledge again that it was not religion as such that proposed passage of the anti-evolution laws. Indeed the ACLU was prepared to bring theologians to Dayton to testify against the measure. There is no more reason to identify religion and Fundamentalism than to identify science with the agnosticism of Darrow or with the abuses of science in the service of eugenics. Though Bryan’s focus on evolution itself as the culprit may have been mistaken, there is no doubt that he had identified some real problems. And if he was wrong to associate evolution with so much that is extrinsic to it, at least he can offer the plea of good company. Anti-evolutionists often make that same mistake.

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Prominent evolutionary biologist William B. Provine, for example, recently wrote:\textsuperscript{48}

[Darwin] understood immediately that if natural selection explained adaptations, and evolution by descent were true, then the argument from design was dead and all that went with it, namely the existence of a personal god, free will, life after death, immutable moral laws, and ultimate meaning in life.

That Darwin believed that there was any such connection is, I think, doubtful, but Provine seems to believe in the connection. It is too bad that sincere Christians, from Bryan down to contemporary anti-evolutionists, are so ready to make the same mistake.

5. Connected Complements

If science and theology are complements, not contraries, and connected, not mutually irrelevant, how exactly are they related to one another? There are a variety of possible answers to this question. Perhaps we can get some idea of the range of possible views by contrasting two—synthesis and consonance.

a. Synthesis

The first of these alternatives can be seen in the work of the French Jesuit Pierre Teilhard de Chardin. Born in 1881, Teilhard was an active scientist with professional specialities in paleontology and stratigraphy. He collaborated in the discovery of Peking man in 1929 and spent many years working on a synthesis of the continental geology and paleontology of Asia.

What requires mention here is what Maurice Cardinal Feltin has called Teilhard’s\textsuperscript{49}

marvelous project of attempting to create a global vision of the universe in which matter and spirit, body and soul, nature and the supernatural, science and faith, find their unity in Christ.

Such syntheses are not in principle inappropriate. Pope John Paul II commented without objection that:\textsuperscript{50}

\textsuperscript{48} “Response to Phillip Johnson,” \textit{First Things} 6 (October, 1990), pp. 23–24, here 23.
Contemporary culture demands a constant effort to synthesize knowledge and to integrate learning.

But a synthesis must be judged on its merits. And, as Cardinal Feltin went on to say about Teilhard:

without a doubt, many of his conclusions satisfy fully neither the scientist, nor the philosopher, nor the theologian.

Whether Teilhard succeeded in making a synthesis that was faithful to science and theology is a topic too complex for the limited time available here. He has had his critics and his defenders in both camps.

The concept of synthesis, however, may suggest a much stronger connection than is generally appropriate. And so I would like to explore the connection between science and theology in terms of a less ambitious image.

b. Consonance

Fr. Ernan McMullin, in some of his writings, speaks of the necessity of a “consonance” between theology and religion.:51

The Christian cannot separate his science from his theology as though they were in principle incapable of interrelation. On the other hand, he has learned to distrust the simpler pathways from one to the other. He has to aim at some sort of coherence of world-view, a coherence to which science and theology … must contribute. He may, indeed must, strive to make his theology and his cosmology consonant in the contributions they make to this world-view.

One finds a very similar approach in the remarks on science and religion that have been made by Pope John Paul II. These views find their clearest expression in two communications to the Pontifical Academy of Sciences. The first was an address given in 1992 on the occasion of the completion of the recent inquiry into the Galileo case.52 The second was a message sent in 1996, when members of the Academy met to discuss the origins of life and evolution.53

John Paul II rejects the mutual irrelevance model. In his Evolution Address, he said: 54

There exist two realms of knowledge, one which has its source in Revelation and one which reason can discover by its own power. To the latter belong especially the experimental sciences and philosophy. … The two realms are not altogether foreign to each other, they have points of contact.

Like Gould, he believes that science and religion are not mutually irreconcilable, but he offers a very different reason: 55

There can be no fundamental conflict between a reason which, in conformity with its own nature which comes from God, is geared to truth and is qualified to know truth, and a faith which refers to the same divine source of all truth.

But unlike Gould, he believes that these “points of contact” include precisely the kind of overlap which the Non-overlapping Magisteria Principle is designed to exclude. In the same address, he reiterates a concern previously raised by Pius XII in his encyclical Humani Generis, namely that evolution “should not be adopted … as though one could totally prescind from revelation with regard to the questions it raises.”

His views on the proper relationship between science and religion must also be distinguished from the comprehensive synthesis offered by Teilhard. What exactly does McMullin’s “consonance” come to? Two passages from the Evolution Address are suggestive in this regard. In one, he focuses more on the significance of theological insights for the philosophy of man: 56

Theories of evolution which, in accordance with the philosophies inspiring them, consider the spirit as emerging from the forces of living matter or as a mere epiphenomenon of this matter, are incompatible with the truth about man.

In the other, he speaks more directly to the implications of theology for more purely scientific views: 57

54 §12.
56 §5.
57 §6.
With man, then, we find ourselves in the presence of an ontological difference, an ontological leap, one could say. However, does not the posing of such ontological discontinuity run counter to that physical continuity which seems to be the main thread of research into evolution in the field of physics and chemistry?

In the Galileo Address, he had emphasized that theologians might also learn from science:\(^{58}\)

It is a duty for theologians to keep themselves regularly informed of scientific advances in order to examine if such be necessary, whether or not there are reasons for taking them into account in their reflection or for introducing changes in their teaching.

He concludes with some remarks about how the disciplines of natural science, philosophy and theology might collaborate in a comprehensive view of the human person:\(^{59}\)

Consideration of the method used in the various branches of knowledge makes it possible to reconcile two points of view which would seem irreconcilable. The sciences of observation describe and measure the multiple manifestations of life with increasing precision and correlate them with the time line. The moment of transition to the spiritual cannot be the object of this kind of observation, which nevertheless can discover at the experimental level a series of very valuable signs indicating what is specific to the human being. But the experience of metaphysical knowledge, of self-awareness and self-reflection, of moral conscience, freedom, or again of aesthetic and religious experience, falls within the competence of philosophical analysis and reflection, while theology brings out its ultimate meaning according to the Creator’s plans.

d. Consonance, Evolution and Creation

The Evolution Message suggests one practical implication of the concern for consonance between our scientific and our religious views. Pope John Paul emphasizes that theories like evolutionary biology, often in their very formulation, rely not only on empirical data but on a particular philosophy of

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\(^{58}\) §8.

\(^{59}\) §6.
nature. Thus, he says, one can find materialist and reductionist, as well as spiritualist, philosophies of nature.60

In the previous lecture, my comments on monogenesis illustrate this approach in the question of human origins.

6. Conclusion

On my consonance-centered account of theology and science, in contrast to that based on Gould’s Principle of Non-Overlapping Magisteria, there is no guarantee that science and theology will not conflict. The principle enunciated by Pope Leo XIII in Providentissimus Deus, “that truth cannot contradict truth” precludes conflict between what one might call ideal science and ideal theology, but it does not prevent the emergence of apparent contradictions between science and theology, or, to put the point differently, actual contradictions between the best current science and the best theological opinion on matters not defined de fide.

The reason this possibility cannot be precluded in principle is that modern science is based on a pattern of argument that cannot get beyond probable reasoning. Some theological claims—claims about miracles and apparitions, for example, apart from those presented to us in Scripture—are also based on the same fallible argument form. Whenever one relies on forms of probable reasoning, one runs the risk of error.

This prospect of conflict between scientists and theologians (or believers and non-believers) is somewhat diminished by the complementarity between spheres of scientific and theological special interest. The responsibility of theology is, to adapt the words of Ven. Cesare Baronius, with how to go to Heaven, not how the heavens go. Only occasionally is knowledge of how the natural world works necessary to our salvation. The responsibility of science is to explain how nature works, i.e., to give an account of natures and their powers or of complex objects and the structures that make their operations possible. It is not the responsibility of science to explain everything that happens in the natural order, at least not if some things that happen there are not the result of the actions of natural objects.

So, while there is no reason why theology and the best science of any given day could not conflict, they are, for the most part, unlikely to do so. That, despite the claims of extremists on both sides of the spectrum, the history of their interrelation is not characterized by such conflict is, therefore, not surprising.

60 §4.