



The Scientific Revolution

with Dr. Ted Davis

Lecture 9.2: New Interactions between Christianity and Science: Part Two

Outline:

New Interactions between Science & Religion

- Christianity interacted with the new science in very important ways. Metaphysical questions are never far from science. Christian beliefs shaped early modern views of scientific knowledge mainly at the metaphysical level, below the surface rather than in your face.

How Theology can Influence Views of Scientific Knowledge

Can science be done? (Why is science of nature possible?)	The possibility question
Why should science be done?	The morality/motivation/justification question
What sorts of theories are acceptable?	The regulative question
How should science be done?	The methodology/epistemology question

What sorts of theories are acceptable?

- The regulative question was also discussed during the Scientific Revolution, and sometimes theological justification was given for a specific answer.
- Two important examples:
 - (1) **Johannes Kepler** was attracted to Copernican theory by the central role it gave to the Sun, as a symbol of the centrality of God the Father;
 - (2) **Robert Boyle** argued that the mechanical philosophy was superior to Aristotle's philosophy – not only scientifically, but also (and crucially) theologically.
- As a university student, **Kepler** came to believe that the heliocentric universe, with the sun (the symbol of God the Father) in the center, was a physical representation of the Christian doctrine of the Trinity.
 - As he said many years later, in his *Epitome of Copernican Astronomy* (1618-21), "The philosophy of Copernicus counts up the principal parts of the world by dividing the form of the universe into parts. For in the sphere, which was the image of God the Creator and the Archetype of the world, there are three parts, symbols of the Holy Trinity – the center, of the Father; the surface, of the Son, and the

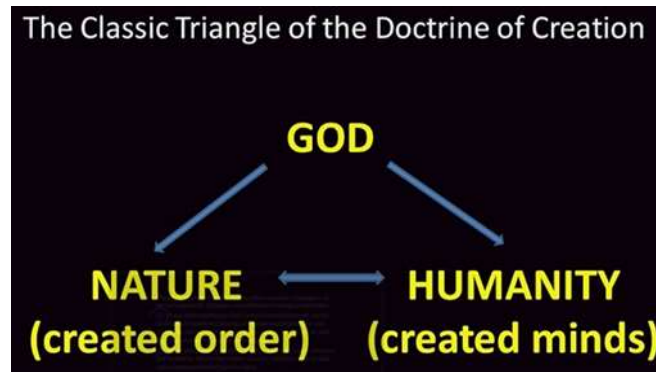


intermediate space, of the Holy Spirit.” (Translation by Owen Gingerich, *Theology and Science*, 2011, p. 45)

- In short, Kepler was such an enthusiastic Copernican, partly because he saw the heliocentric universe as evidence of the truth of Trinitarian Christianity.
- **Robert Boyle** challenged prevailing Aristotelian and Galenic notions (key components of the old world picture), which typically depicted “Nature” as a wise and benevolent being:
 - “Nature does nothing in vain”
 - “Nature abhors a vacuum”
 - “Nature is the wisest physician”
 - By contrast, Boyle held that the world was incapable of acting consciously – it does not have a mind of its own, to obey or disobey the laws of nature.
 - Nor is there a supervising agent, “Nature,” to act wisely and not in vain.
 - Boyle considered this “vulgarly receiv’d notion of Nature” to be like “a goddess, or a semi-deity” – it was theologically objectionable to him. He did not find in “the Old Testament...any one Hebrew word that properly signifies Nature, in the sense we take it in.”
 - For Boyle, the mechanical philosophy was a theologically attractive alternative to the old world view, partly because it eliminated the idea an intelligent “Nature” as an intermediary between God and the world. In this way, **the mechanical philosophy benefitted theology by underscoring divine sovereignty**: nature is a creation, not an independent being, and its created properties and powers are the proper subject of our study. And, by giving a more coherent and intelligible explanation of natural phenomena, **the mechanical philosophy held out the possibility of genuine progress** in the medical and mechanical arts, consistent with the Genesis mandate.
 - Also, by emphasizing the wonderful astonishing complexity and intricacy of the created order, **the mechanical philosophy focused our attention on the Creator himself**: his wisdom, power, and goodness could be seen so clearly in the creation.
 - Finally, Boyle believed that our knowledge of how the world really works, based on the mechanical philosophy, would help us identify genuine miracles (such as those in the Bible): if nature cannot do it, then it’s a genuine miracle – providing evidence of the truth of Christianity.
 - In short, Boyle was such an enthusiastic promoter of the mechanical philosophy, partly because he found it theologically superior to the old world view.

How should science be done?

- The methodological question is about the nature of scientific knowledge: how do we acquire it? Is our knowledge of nature rationally necessary, or only contingent? Can we obtain certainty, or only some degree of probability, for our conclusions?
- Such topics were often discussed during the Scientific Revolution. Historians have shown that Christian theological assumptions shaped views of scientific knowledge and how we should acquire it during the Scientific Revolution.
- **Christian beliefs about God and creation significantly influenced new views of scientific knowledge during the Scientific Revolution.**
- The Classical Triangle of the Doctrine of Creation:



- Oxford philosopher Michael Beresford Foster (1903-1959) is especially associated with this general idea. In a series of essays published in the 1930s, Foster focused on the **doctrine of creation** as the vehicle through which theology impinged on natural philosophy. His claim is sometimes called the “Foster thesis”.
 - The Christian doctrine of creation often involves a dialogue, or formal argument, between two different theological attitudes:
 - Those who emphasize God’s unconstrained free will, which utterly transcends the bounds of human comprehension and cannot be limited by human reason – God is free to act as God pleases, whether or not we understand.
 - Those who emphasize God’s orderly intellect, which serves as the model for the human mind – we can read the mind of God and understand what God has done.
 - Those emphasizing the divine will (1) are often called “**voluntarists**,” and those emphasizing the divine reason (2) are often called, “**rationalists**.”
 - Both of these are true.
 - **According to Foster, rationalist theology** “is the doctrine that the activity of God is an activity of reason.” Since “God is nothing but reason, there is...nothing mysterious or inscrutable in his nature.”
 - Such a theology “involves both a rationalist philosophy of nature and a rationalist theory of knowledge of nature.” Because the world is a



product of divine reason, it must embody the ideas of that reason.
[rationalist philosophy of nature] Our own reason, “in disclosing to us God’s ideas, will at the same time reveal to us the essential nature of the created world.” [rationalist theory of knowledge of nature]

- In other words, an *a priori* science would be possible.
- **According to Foster, voluntarist theology** “attributes to God an activity of will not wholly determined by reason.” The product of God’s creative activity are not necessary, but contingent – nature does not have to exist, and it does not have to have any given properties. Because our minds cannot have demonstrative, a prior knowledge of a contingent reality, the created world can be known only empirically.
 - In other words, only a *posteriori* science would be possible.
- For example, **Galileo was a rationalist** in his conception of scientific knowledge. Despite his commitment to experiments, ultimately he believed (like the Greeks) that genuine “science” was still about obtaining the certainty of deductive demonstration; it was still “knowledge,” not mere opinion.
 - “The Divine intellect indeed knows infinitely more propositions [than we can ever know]. But with regard to those few which the human intellect does understand, I believe that its knowledge equals the Divine in objective certainty...” *Dialogue on the Great World Systems* (1632)
 - “Philosophy [Natural Philosophy] is written in this grand book – I mean the Universe – which stands continually open to our gaze, but it cannot be understood unless one first learns to comprehend the language and interpret the characters in which it is written. It is written in the language of mathematics, and its characters are triangles, circles, and other geometrical figures, without which it is humanly impossible to understand a single word of it.” – *The Assayer* (1623)
- On the other hand, Robert Boyle was a voluntarist in his conception of scientific knowledge.
 - “For if we believe God to be the author of things, it is rational to conceive, that he may have made them commensurate, rather to his own designs in them, than to the notions we men may best be able to frame to them.” – *The Christian Virtuoso, I, Appendix* (posthumously pub. 1744)
 - “...it appears by the history of the creation, that the world itself was first made before the contemplator of it, man: whence we may learn that the author of nature consulted not, in the production of things, with human capacities; but first made things in such a manner, as he was pleased to think fit, and afterwards left human understandings to speculate as well as they could upon those corporeal, as well as other things.” – *The Christian Virtuoso, I, Appendix*



- In short, theological ideas about divine freedom and human reason were important reasons for adopting an empirical approach to nature during the Scientific Revolution.
 - Where M.B. Foster argued for the importance of seeing nature as the creation of a free and rational God, the Dutch historian Reijer Hooykass (1906-1994) argued that modern scientific method has theological roots.
- Hooykaas called this method “rational empiricism.” It “recognizes that reason is indispensable for the creation of order, but that it has to submit to what has been given in the world; it has an open eye for the contingency of the existence and the way of being of things.”
 - “According to the Greek idealistic philosophers nature is full of reason and logical necessity, to which even Plato’s demiurge [his creator-god] had to submit.
 - “The God of the Bible, however, Yahveh, is a God who need to obey nothing, not even the Ideas. Between these two views there is so fundamental an opposition to their concept of the world that this opposition influences the method of acquiring scientific knowledge about the universe.”
 - “If, however, God is creator not bound to any model or final purpose, then man can only find out a posteriori how far the data of nature and comprehensible to human reason.” – Religion and the Rise of Modern Science, pp. 29-30
- Australian historian Peter Harrison offers another perspective on the same issue – the relatively certainty of mathematics vs. empiricism. He argues that belief in the Fall provided a crucial impetus for empiricism during the Scientific Revolution: “the standard pattern for early modern epistemological enterprises [involved] self-examination, assessment of the extent of the wound caused by sin, [and] determination of what traces of the divine image remain.” (p. 99)
 - Masaccio, *The Expulsion from Paradise* (1426-27), Brancacci Chapel
- During the Scientific Revolution, a debate took place over how much of the traditional view of knowledge needed to be discarded: was it simply the method of gaining knowledge that needed to be replaced, or did the certainty of scientific knowledge also need to be discarded?
- For some, such as Lutheran theologian Philipp Melanchthon, his disciple Kepler, and Galileo, fallen humanity still retained enough of the divine image to guarantee the veracity of mathematics. Science could still achieve certainty through *a priori* demonstration – especially through mathematics.
- For others, especially Bacon, the Fall resulted in both a great loss of knowledge and the diminished ability of the reason to repair the damage. Thus, we need to rebuild our knowledge from the ground up; our minds are not sufficiently reliable to achieve certainty.
- Harrison pretty much demolishes the standard, Enlightenment-style interpretation of the Scientific Revolution: “The birth of modern experimental



science was not attended with a new awareness of the powers and capacities of human reason, but rather the opposite – a consciousness of the manifold deficiencies of the intellect, of the misery of the human condition, and of the limited scope of scientific achievement.” – *The Fall of Man and the Foundations of Science*, p. 258

Conclusion: Did Christianity “Cause” Modern Science?

- In short, specific elements of Christian theology – belief in the creation of the universe by a free and rational God, and belief in the fall of humanity – significantly shaped the views of scientific knowledge during the Scientific Revolution.
- Does this mean that Christianity “caused” modern science?
 - Not exactly. The full historical picture is complex: science, philosophy, and theology are inextricably intertwined. To single out any one factor as the sole cause is to misrepresent the actual situation. However, Christianity did significantly influence modern science in its formative years; the common claim of a “warfare” between Christianity and science is obviously false.