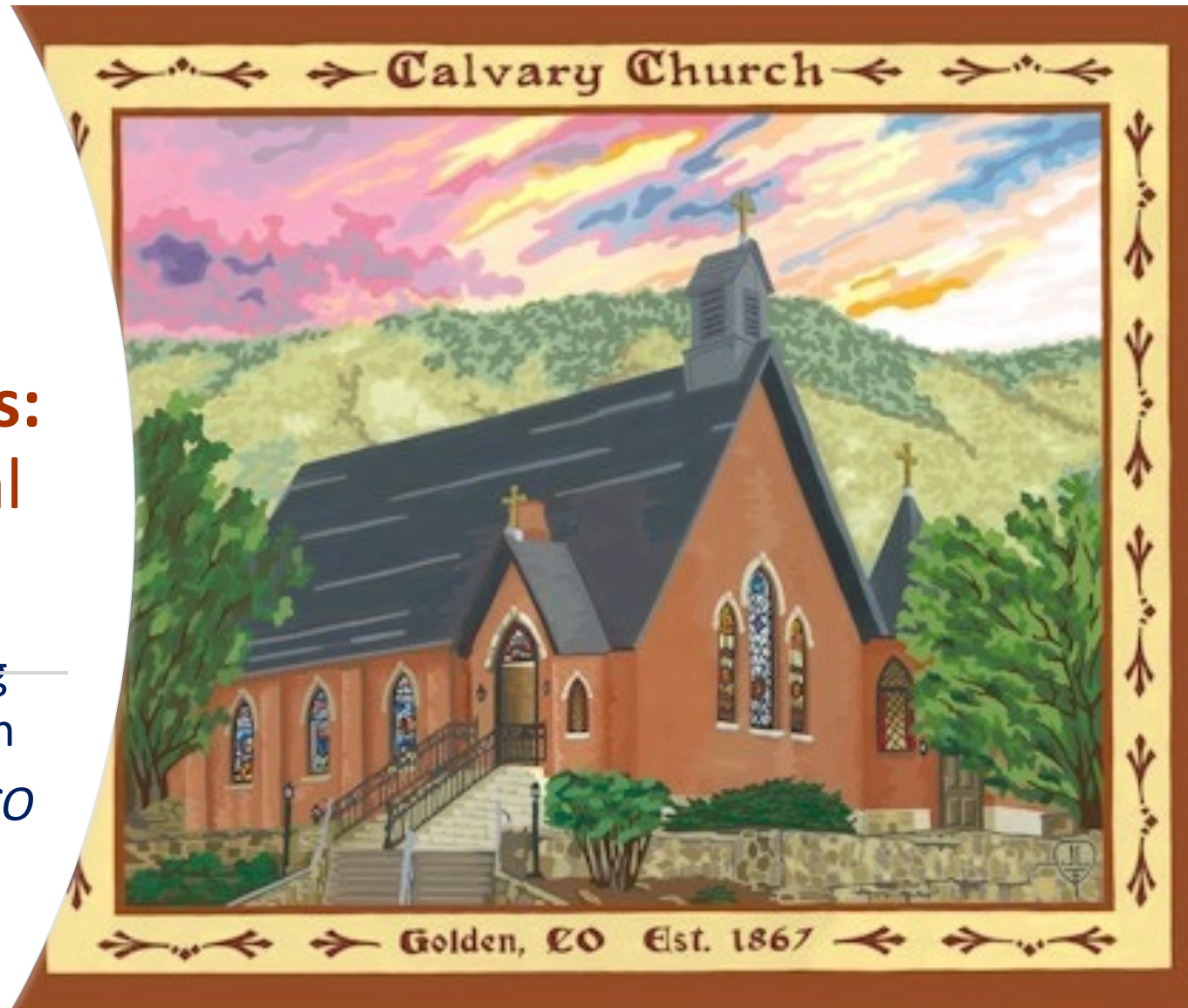


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Engaging with Science as Followers of Jesus: Part 1) A Historical Perspective

A discussion led by Greg
Jackson and Ken Touryan
Calvary Church, Golden CO
January 2024



Overview of Discussions

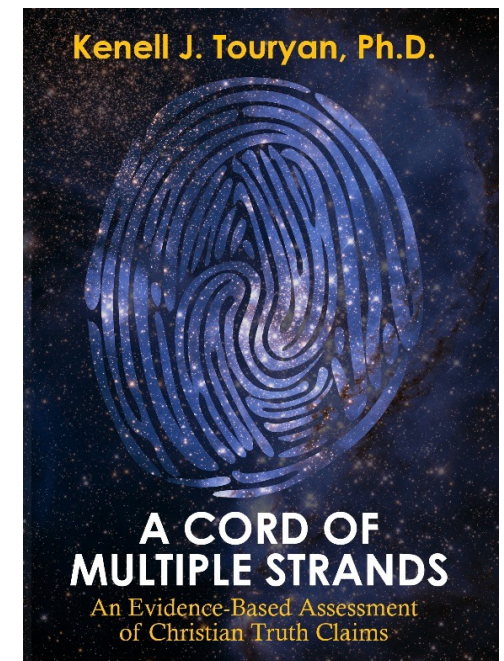
- **Schedule**

- 1/7: historical highlights of how the church has participated in, responded to, and understood scientific progress
- 1/14: present day example of how the church can interact with scientific understanding – climate and weather
- 1/21: speaking as Christians about science and our faith in a post-modern world

- **Learning Outcomes**

- articulate how the church has led and understood scientific progress throughout its history
- appreciate how commitment and trust in science and in faith are similar and how they apply to current discussions
- develop an awareness of how modern scientific understanding aids in our witness to a personal God of the universe

- **Complementary Text**



Veni Creator by Czesław Miłosz

Come, Holy Spirit,
bending or not bending the grasses,
appearing or not above our heads in a
tongue of flame,
at hay harvest or when they plough in the
orchards or when snow
covers crippled firs in the Sierra Nevada.
I am only a man: I need visible signs.
I tire easily, building the stairway of
abstraction.
Many a time I asked, you know it well, that
the statue in church
lifts its hand, only once, just once, for me.
But I understand that signs must be human,
therefore call one man, anywhere on earth,
not me—after all I have some decency—
and allow me, when I look at him, to
marvel at you.



The Bible and Nature

- (According to AAAS) Science is a way of knowing based upon **testable descriptions** of the world obtained through the **human interpretation** in natural categories of publicly **observable and reproducible** sense data, obtained by interaction with the natural world.
- History like science uses critical (reasonable) assessment, but history focuses on particular facts that are revealed by witnesses, human and divine.
- The Bible was written before science was a profession. It is an authoritative, canonical book of history, poetry, prayer, prophecy, and exhortation.
- The Bible does lay a groundwork for scientific enquiry because God's creation is orderly and "law"-abiding.
 - [Psalm 8](#) [Job 38](#) [Psalm 19:1-4](#) [Acts 17:16-34](#)
- It is no surprise many of the great scientists were **Jews, Theists,** or **Christians.**

Knowledge/Understanding in the Bible

- New Testament writers relied on critical assessment of experience/testimony to historical events. They had commitment to believe these testimonies.
 - Luke: Luke 1:1-4,
 - John: 1 John 1:1-4, John 21:24
 - Paul: 1 Corinthians 15
- We are called to present critical assessment of our testimony (1 Peter 3:15) – both of Scripture and forebearers of our faith. (Hebrews 12:1-3).
 - Gandhi’s quote to **E. Stanley Jones**: “If Christians would really live according to the teachings of Christ, as found in the Bible, all of India would be Christian today.”
- How do we know the truth of a testimony? New Testament words for know:
 - γινωσκω: to know through experience– John 8:32 (“Then you shall *know* the truth.”)
 - εἶδω: to know intuitively – John 21:24 (“We *know* that his testimony is true.”)

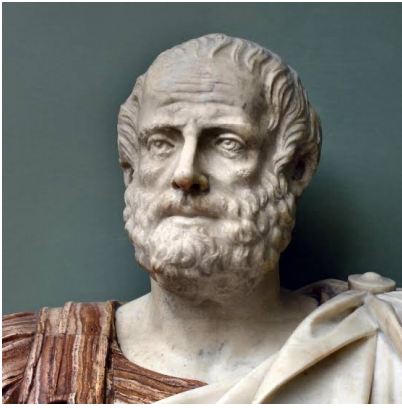
The Greeks Informed the Church's Early Approach to Science

- Plato (429-347 BC) – Classification of objects and the reality of “forms” (ideal archetypes) paved the way to a broader intellectual (eventually scientific) framework.
- Aristotle (384-322 BC) – Natural philosophy: Observation of nature leads to explanations of what really is and points to a primary cause. Natural objects are explained by their purpose and the forces that control them. Through the Middle Ages in the “West”, this was the prominent way to understand nature.
- **Philo** of Alexandria (20 BC – 50 AD) adopted ideas of Hellenistic philosophy to understand Hebrew scriptures applied Platonic ideals to Jewish theology. This influenced Christian approaches to talking about the mind of God (or logos).



Checking in

- Who was not a contemporary of Philo?



Aristotle



Mary mother of Jesus



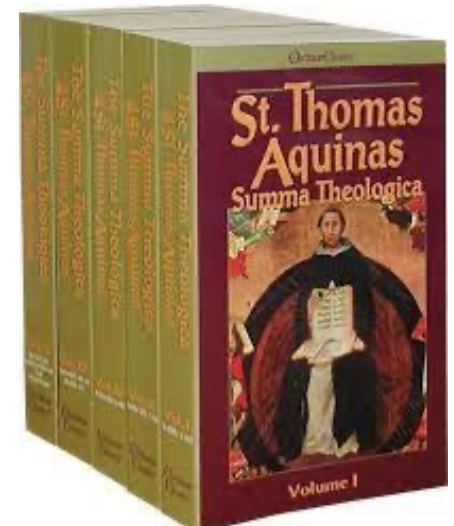
Tiberius



St. Paul

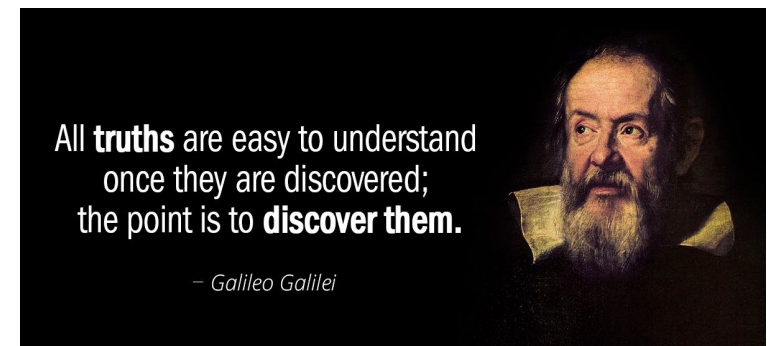
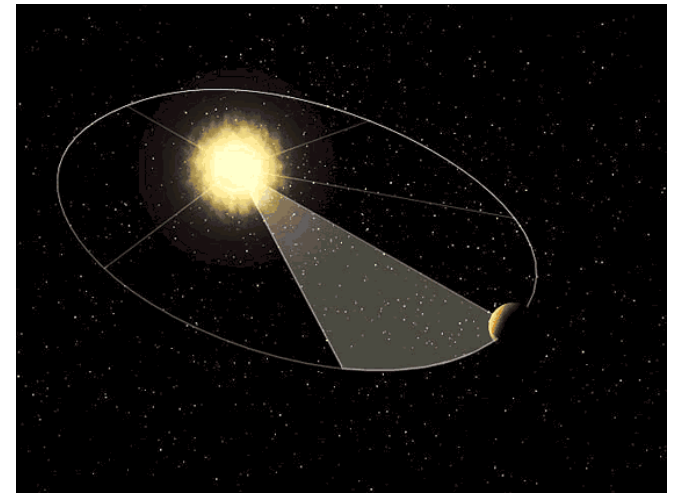
St. Augustine of Hippo and St. Thomas of Aquino

- **St. Augustine** of Hippo (354-430 AD) was one of the earliest Christian thinkers who thought about reason. “*credo ut intelligam*”
 - Hippo is on what continent? [Answer](#)
 - “We must be on our guard against giving interpretations that are hazardous or opposed to science, and so exposing the Word of God to the ridicule of unbelievers.” from [The Literal Meaning of Genesis](#)
- **St. Thomas** of Aquino (1220-1274 AD) **MOVIE TIME**
 - Reasoning (causes/effects) should be consistent with God’s revelation. Everything in nature has a cause, but God does not have a cause. Thus, God must have started the whole show.
 - His ideas built on Aristotle and furthered the incorporation of Aristotle’s understanding of nature into the church’s teaching. As science moved away from Aristotle, conflicts grew between science and the church.
 - Aquinas also postulated that some of the most important truths may lie outside of reason (scientific rationality). This is where many Christians find comfort in pursuit of their faith outside of science.



Planetary Movement and Classical Physics

- **Nicolaus Copernicus** (1473-1543) and **Johannes Kepler** (1571-1630) developed an understanding of planetary orbits around the sun. Copernicus proposed a heliocentric solar system, and Kepler developed mathematical models for the planets' elliptical orbits. This was one of the first major scientific findings that challenged the Western Church's Aristotelian teaching.
- **Galileo Galilei** (1564-1642) emphasized experiments as a principal means for evaluating scientific truths and he felt when biblical interpretation and science conflict, the Bible must be reinterpreted. Galileo established the idea that science (physics) was largely about mathematical relationships and experimentation to confirm those relationships.



Planetary Movement and Classical Physics

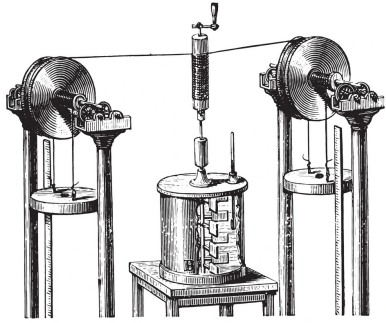
- **Isaac Newton** (1642-1727) founded classical (Newtonian) physics. All bodies in motion can be calculated by an elegant mathematical relationship. Newton's ideas led to a later belief that science describes all that happens and demonstrates God's handiwork. In this belief system, God is relegated to designer of laws and matter.
- With Newtonian physics / calculus, we can predict how objects interact mathematically and the whole is the sum of the parts. This is the "reductionist" approach to discovering the most basic laws of science.
- There were still some anomalies unexplained in the planetary orbits that called into question what limits there might be to Newtonian physics.



from Bill Newton

Confidence of Science and Arrival of Thermodynamics

- Confidence in science began to spin scientific inquiry away from questions of purpose to those of cause. This began to lead scientists from deism to materialism:
 - Scientific methods are the only reliable path to knowledge.
 - Matter/energy is the fundamental reality of the universe.
- Pierre-Simon Laplace (1749-1827) proposed a reductionist, materialistic idea that a large enough calculator with knowledge of positions and momentums of all particles in the universe would provide infinite knowledge of the future and past.
 - While this concept is discredited, many still approach science with this presupposition.



Joule's famous experiment

- 1st Law of Thermodynamics, **J.P. Joule** (1818-1889) – Energy is conserved; energy in minus energy out equals the change. This was an observation not a proof. It makes sense and scientists/engineers hold it as sacred.
- 2nd Law of Thermodynamics, **Sadi Carnot** (1796-1832) – Temperature evens out. Time has a direction for systems even though at the atomic or sub-atomic particle scale, time should seemingly be reversible.
- Statistical Thermodynamics, Ludwig Boltzmann (1844-1906)

Checking in

• Which law(s) does this movie violate? MOVIE TIME

– Newton's laws of motion

– 1st law of thermodynamics

– 2nd law of thermodynamics



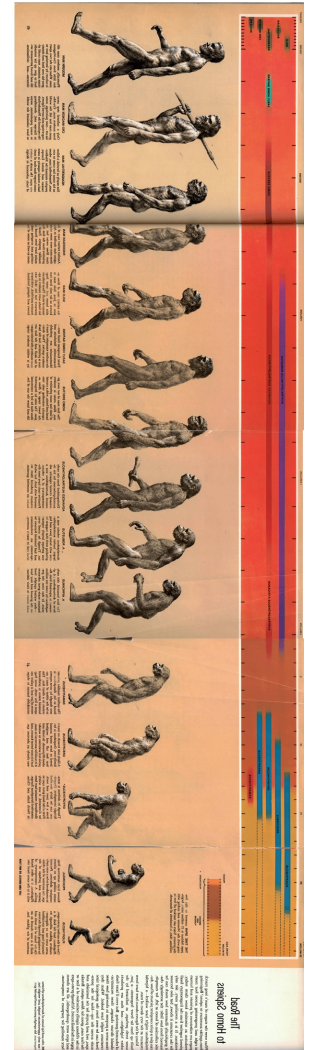
Sadi Nicolas Léonard Carnot

The Limits of Classical Physics – Relativity and Quantum Physics

- **Albert Einstein** (1879-1955) – Mass, time, and space can vary in relationship with one another. New relationship between energy and mass, $\Delta E = \Delta mc^2$.
 - Relativity doesn't rule out determinism but changes our understanding of time and space.
- Quantum mechanics introduces particle/wave duality of mass and the notion that properties exist in a state of probability until measured.
 - **Werner Heisenberg** (1901-1976) – Properties have an inherent uncertainty. If we measure one property precisely, others become indeterminate. Are there limits to what we can truly know?
- 20th century discoveries in physics have reshaped our thinking about the fundamental nature of matter and energy. Einstein's theory of relativity, quantum physics, and chaos theory have illuminated the limits of the predictability of nature at both small and large scales.
- Many models in physics are understood by the general populace due to the success of technology. Many people still hold to a classical realism, deterministic and reductionist view of nature. Physicist **Stephen Barr** summarizes how this philosophy manifests itself in "*Retelling the Story of Science*".

Charles Darwin, Evolution, and Creation

- **William Paley (1743-1805)** – Evidence for God can be found by looking at intricate designs in nature (the argument of design for God's existence). He penned the watchmaker argument, which has been debunked and reinstated in new forms over the past century by many such as intelligent design movements. Paley influenced Darwin.
- **Charles Darwin (1809-1882)** – With natural selection, we now have less of a reason to hypothesize a universal designer. Darwin exemplified science as critical observation and historical description, which opens up the question about the personal nature of science.
- **Thomas Huxley (1825-1895)** used Darwin's Origin of Species to challenge widely held notions about creation in the church. He fomented conflict between science and religion, which continues to this day as understanding of evolution has developed with genetics/mathematics.
- This conflict has been mitigated by new literal readings of Genesis that allow for some forms of natural selection as a means of God's creation.



Continued Advances in Biological Science

- James Watson (1928-) and Francis Crick (1916-2004) – In 1953, these men (with help from Rosalind Franklin and Maurice Wilkins) discovered “the secret of life”, DNA structure. This gives a mechanism for genetic expression, evolution, and numerous other aspects of biology. The understanding of self-replicating DNA provides a new logical framework within which to understand biology and the development of life.
- Teams led by **Francis Collins** and Craig Ventner mapped ≈ 3 billion DNA base pairs that compose the human genetic code. This has opened a new ability to evaluate biochemical mechanisms in human development. For many non-theists, this defines life wholly.
- This increased understanding of the molecular nature of life has demystified medical and life sciences. Although medical research is often based on correlation studies, molecular genetics has provided a new approach to understanding development of life. This has led to a bold generation of biological reductionists such as Watson and Richard Dawkins.



Science Discovering its Own Limits

- **Kurt Gödel** (1906-1978) – No mathematically based system can prove its own validity. Thus, positivistic views of science cannot prove themselves. This suggests that at some level scientific understanding relies on empiricism or commitment.
- Chaos Theory -- Edward Lorenz (1917-2008) – Chaotic systems require an infinite degree of knowledge to be fully predictable. This suggests a limit to attainable understanding of physical systems – *notably the weather and the double pendulum*.
- Ilya Prigogine (1917-2003) – Many possible behaviors of systems far from equilibrium suggests a lack of predictability. Orderly, law-abiding behavior occurs that cannot be explained by description of individual sub-particles. This challenges reductionism.
- Remaining questions and attempts to unify physical understanding of nature's basic forces has led to exploring smaller and smaller scales where experiments have less and less accessibility and Karl Popper's idea of testability is harder to realize.

Scientific Progress as Understood by Classical Scientists

- **Galileo** and **Francis Bacon** popularized the method of experimentation to validate mathematical theories. Francis Bacon called this in the “scientific method”. Many hold a naïve view that all scientific ideas are testable.
- **Newton**’s laws of motion and **James Maxwell**’s laws of electromagnetism – the lynchpins of classical physics – encouraged many to adopt a deterministic view of the physical world. However, in the 1920s, determinism was swept away in the quantum revolution. Even the precise state of a physical system at one time determines its future only in a probabilistic sense.



Scientific Progress/Understanding – Thomas Kuhn

- Thomas Kuhn's The Structure of Scientific Revolutions (1960's) presents how assessments of scientific data are interpreted within paradigms (or “scientific work that embody a set of conceptual and methodological assumptions”). Scientific fields undergo paradigm shifts or revolutions when anomalies and ad hoc modifications lead to a crisis. Scientific learning involves initiation into a community with held beliefs/presuppositions based upon presumed incontrovertible scientific knowledge.
- Even so, many confer certainty to the confidence of scientists in their quest for truth. Is this well founded? Maxwell (1831-1879) claimed that ether is the best-known entity in all of physics. Nothing was further from the truth.



Scientific Progress/Understanding – Michael Polanyi

- **Michael Polanyi** (1885-1971) in Personal Knowledge challenged the notion that science is based upon an impersonal reckoning of measured data. He argued that major scientific discoveries are derived from a heuristic and hyper-scientific passion for beauty and order and personal commitment to a science field.
- Polanyi warned of the need to acknowledge the subjective nature of scientific discovery. “A reductionist materialistic worldview has led ... to the establishment in our time of the scientific method as the supreme interpreter of human affairs.” *MOVIE TIME*



“The amount of knowledge which we can justify from evidence directly available to us can never be large. The overwhelming proportion of our factual beliefs continue therefore to be held at second hand through trusting others, and in the great majority of cases our trust is placed in the authority of comparatively few people of widely acknowledged standing.”

~MICHAEL POLANYI

azquotes.com

Christian Understanding of Scientific Progress

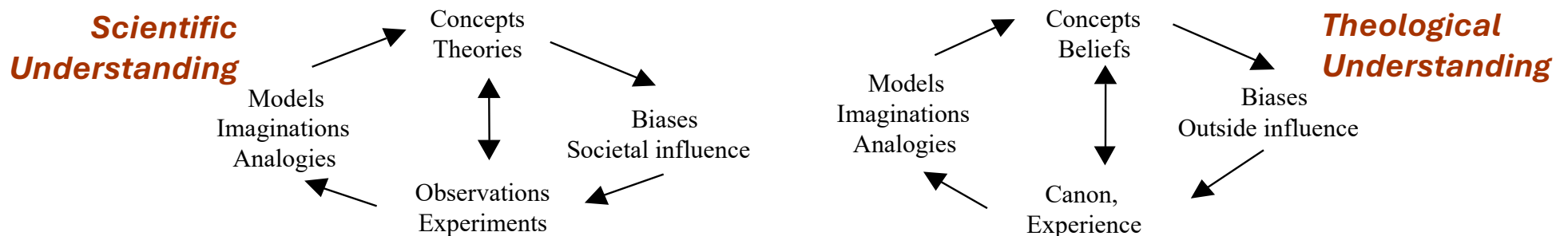
- **John Polkinghorne** (in Belief in God in an Age of Science proposes a commitment to "critical realism" in science based on these four positions.
 - 1) Past well-tested ideas in science should not be quickly abandoned.
 - 2) The methods for discovering scientific truths should not be defined too strictly.
 - 3) Scientific truths must synthesize experimental observations with theoretical insight.
 - 4) Science is about truth seeking and not just making culturally conditioned claims.
- With limits on scientific certainty and changes in scientific models, we are not left without truth but rather with partial truth.
- Christians can hold to some form of realism ("critical") and embrace science as an endeavor to understand the world because we hold to the belief that God has made the world for us to understand.
- Romans 1:20

Christian Response to Scientific Progress

- **Dietrich Bonhöffer** (1906-1945) – God is not there to explain away things that science has failed to explain. Instead, God must be understood in the light of (not in spite of) scientific progress. (Letters and Papers from Prison)
- **Ian Barbour** has proposed ways in which believers respond to the expanding role of science in understanding life and developing technological control over nature. They are summarized in his book Religion and Science.
 - 1) Conflict: This way is taken by many who are out to discredit claims either by scientists or religious adherents.
 - 2) Independence: This view is adopted by many who claim truth realms of science and religion do not overlap (e.g., Stephen J. Gould) and who want to marginalize claims of religion.
 - 3) Dialogue: Science informs religious viewpoints and religious understanding allows for proper context of science. This approach is appealing.
 - 4) Integration: Science and religion can be integrated into a coherent natural theology. Some forms of integration have led to distinct blends of science and Christianity or Eastern religions.
- Acts 17:24-28

Christian Approach to the Limits of Science

- Many scientists agree that there are so-called limit questions – where science leaves off and we need other methods of truth seeking.
 - 1) Why is the universe ordered in such a way that we can enjoy it? Why do we enjoy understanding mathematical truths?
 - 2) Why is there such unity and amazing interconnectedness amongst physical laws?
 - 3) What can be said about the contingency of existence, universe's boundary conditions, and events?
- Approaches of theology to these limit questions correlated with ways science approaches its big questions (Ian Barbour).



Christian Approach to Knowledge

- How do we test the truth of theological concepts/beliefs? Theological and scientific truths must have explanatory power:
 - 1) agreement with observations/data, our scriptural canon,
 - 2) usefulness or scope,
 - 3) coherence with other primary views.
- Scientists test not only by experimental methods but also with deductive reasoning. These tests are conducted within the context of a scientific community. In what ways are our attempts to understand theological truths about our faith similar and different?
- Michael Polanyi (1885-1971) – Both scientific and religious understanding is gained through personal experience and requires creative thought and personal commitment. Both require assessment of evidence and community against unguarded subjectivity.

Christian Approach to Scientific Knowledge

- Polkinghorne and Barbour state that like the scientific community, Christians can commit to a "critical realism" based on some guidelines:
 - 1) Past well-tested interpretations of the Bible and beliefs/doctrines should not be quickly cast aside.
 - 2) Methods for understanding truths about God are personal (not the same as relative) and can be communicated and understood.
 - 3) Theological truth seeking should combine critical evaluation of personal experience with the church's tested beliefs/understanding.
 - 4) As Christians, we assert that God can be understood at some level, though the more we understand "the greater the mystery".
- St. Augustine's "*credo ut intelligam*" (I believe so that I may understand) provide a basis for how we approach our faith, and in some ways, it can be applied to how people approach all fields.
- Christians can apply the principles to seeking God because we are made in His image such that we can have basis for perceiving who he is and what he does.
- [Genesis 1:26-27](#)

Christian Approach to Knowledge

- The proposition that science is the only home for reason (and certainty) was foreign to famous Christian thinkers throughout history. **Richard Hooker** in his theological debates with the Puritans is informative here.
- How do we talk about knowledge within our faith ([Hebrews 11:1-3](#))? God is a free and not scientifically predictable. But we can talk of knowing God in a relational experience. This is not irrational nor relative. **Søren Kierkegaard** says a lot on this.
- John refers to Jesus as the Logos (λογος) – Greek for expression/reasoning. Jesus is the “reasoning of God” made known to humans. What does this say about our knowledge as Christians ([John 1:9-14](#)), which is tied to the “historical” event of Jesus’ appearance? If so, how do we apply truth seeking to Christianity?
- [Psalms 139](#) gives a glimpse of God’s knowledge of us and of how we may know him.
- **Arthur Eddington** uses a fishing net analogy for knowledge. We catch things based on the size of holes in our net. People fish with a net that is fine enough to catch truths of a certain size. This can be applied to science (i.e., use of Newtonian classical physics) and to faith (use of a material world net). A materialist fishing net does not find theological knowledge. We get the level of insight we are looking for.
- [1 Corinthians 13:12](#)



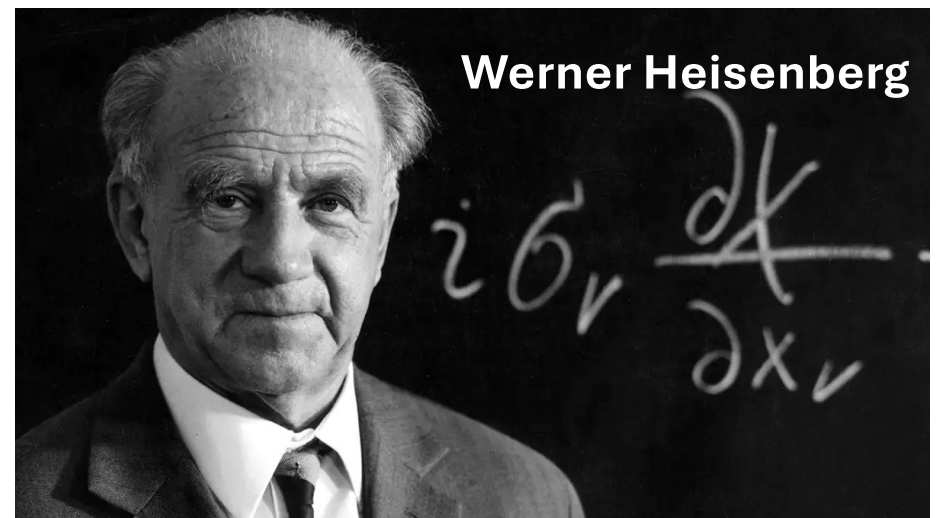
Final Check

- What world famous scientist said this?

“Der erste Trunk aus dem Becher der Naturwissenschaft macht atheistisch, aber auf dem Grund des Bechers begegnet uns Gott.”

Translation: The first gulp from the glass of natural science turns one into an atheist, but at the bottom of the glass, one encounters God,

Hint: Don't be too certain.



Some References (Highlighted are good introductory reads)

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