



Mixology and Theology

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Week Nineteen: Sweet Science, and God and Physics

Mixology: Sweet Science

What cocktail could possibly go with our theme? This is what I could find. It's a relatively new cocktail created by German mixologist Charles Schumann.

Drambuie is a Scotch whiskey based liqueur with origins going back to 18th century and the Scottish Isle of Skye. The Scotch whiskey is blended with spices, herbs, and heather honey. "Drambuie" comes from the Scots Gaelic phrase "An Dram Buidheach," meaning "the drink that satisfies." It is featured in cocktails like the Rusty Nail and a Scotch Coffee.

Sweet Science

2 oz Scotch whiskey
3/4 oz Drambuie liqueur
1 1/2 oz orange juice

1. Add all ingredients into a drink shaker with ice.
2. Shake until chilled.
3. Strain into a cocktail glass.

Sweet Science Mocktail

6 oz orange juice
2 tsp honey
1/4 tsp vanilla
pinch ground cloves

1. Add ingredients to tall glass. Stir well to dissolve honey, then add ice and stir again.

Theology: God and Physics

Introduction

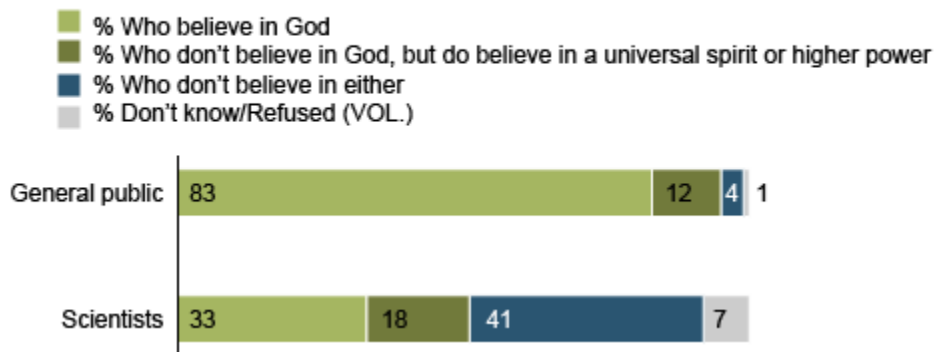
How does science, and physics in particular, inform and challenge faith and theology?

How can theology be used to interpret physics from a faith perspective?

What do discoveries in physics reveal about God and God's intentions for creation?

These are the big questions that guide our topic. For some, physics and faith do not blend together easily. For others, connecting the two is natural and inspiring, even if challenging at times. There are far more theologians and people of faith who accept and trust the findings of physics and other sciences than there are physicists who have some kind of faith in God or belief in Christianity. This Pew Research Center survey is revealing (<https://www.pewforum.org/2009/11/05/scientists-and-belief/>):

Religious Belief Among the General Public and Scientists



Philosophy of Science and Theology

One of the issues we need to address at the beginning is what we think science is, and how theology can make truth-claims about God.

Philosophy of science explores what science is, and what kind of knowledge claims can be made through science. The big questions are whether science reveals the world as it is, or whether we only know the world through our senses and rationality. Another question is whether scientific reasoning leads to truth. We're not going to resolve these questions one bit. But it is important to see that many of us assume that science, and physics in particular, leads to objective truth about the world.

In the realm of theology, philosophical reflection raises questions of if and how humans can know God: can we speak positively about God, or only say what God is not; can we know God through the created world, or only through God's self-revelation; how does Scripture reveal God and how do we interpret it in a modern, scientific world?

As we'll see, the theological and scientific assumptions people have will impact how they think physics and God are connected, if at all. We'll also see that it is often the philosophical issues that cause a gap between the two, not the actual claims made by each. Often it is when theologians try to dismiss the proven theories of physics, and when physicists make philosophical and theological claims beyond their scientific claims, that we end up with problems.

The Big Issues in Physics

Newtonian Laws of Motion

Newton developed the fundamental laws of motion that set the stage for modern physics, at least up until Einstein's theories expanded them. His work is a foundational source for the belief in a deterministic world operating according to natural laws, rather than divine fiat. Newton saw his own work from a Christian faith perspective, and saw his own physics as an affirmation of his faith. He wrote in his *Principia*:

This Being governs all things, not as the soul of the world, but as Lord over all... The Supreme God is a Being eternal, infinite, absolutely perfect... and from his true dominion it follows that the true God is a living, intelligent, and powerful Being... He is not eternity and infinity, but eternal and infinite; he is not duration or space, but he endures and is present.

<https://rsc.byu.edu/converging-paths-truth/brief-survey-sir-isaac-newtons-views-religion>

Einstein: Relativity, Space, Time, Gravity

Einstein's work begins where Newton left off, exploring the laws of gravity and motion from a larger perspective. His theoretical physics showed that motion is relative to the observer, not absolute in reference to a fixed point. The exception to this is that the speed of light is constant for all observers no matter their motion, and is actually the maximum speed of anything in the universe. He showed that space and time are part of the same thing, a four-dimensional universe. He explained that gravity is not a force per se, but a bending of space-time by mass, changing the motion of objects through space-time because of the curvature of space and the distortion of time.

Einstein is a fascinating person for his thoughts on faith and physics. He wrote:

I'm not an atheist, and I don't think I can call myself a pantheist. We are in the position of a little child entering a huge library filled with books in many languages. The child knows someone must have written those books. It does not know how. It does not understand the languages they are written in. The child dimly suspects a mysterious order in the arrangement of the books but doesn't know what it is. That, it seems to me, is the attitude of even the most intelligent human being toward God. We see the universe marvelously arranged and obeying certain laws but only dimly understand these laws. Our limited minds grasp the mysterious force that moves the constellations.

In response to a sixth-grade student in the Sunday school of Riverside Church in New York, in 1936, Einstein wrote:

Scientific research is based on the assumption that all events, including the actions of mankind, are determined by the laws of nature...however, we have to admit that our actual knowledge of these laws is only an incomplete piece of work, so that ultimately the belief in the existence of fundamental all-embracing laws also rests on a sort of faith... largely justified by the success of science. On the other hand, every one who is seriously engaged in the pursuit of science becomes convinced that the laws of nature manifest the existence of a spirit vastly superior to that of men, and in the face of which we with our modest powers must feel humble... (Einstein and Religion: Physics and Theology. Max Jammer)

Einstein was influenced by the determinism of Newtonian physics, and the philosophy of Spinoza. He didn't see God as person and acting in the world in particular ways, but as the source and meaning behind a deterministic world. His strong belief in determinism is what led to his resistance and errors in response to the developing field of quantum mechanics.

Einstein published a New York Times magazine article in 1930 on religion and science:

<https://timesmachine.nytimes.com/timesmachine/1930/11/09/92114511.html?pageNumber=136>

One of the theological implications of Einstein's theories of space-time is that time itself is part of creation, and if God is beyond creation, then God is beyond time. This removes notions and limitations of time on God and in thinking about what eternal and infinite mean theologically.

Big Bang, Expanding Universe

One of the most interesting developments in physics from a theological perspective is the change in belief in a universe that is static and constant to the observation that the universe is expanding. This observation comes from Edwin Hubble in 1929, and leads to the theory of a Big Bang that started the universe: if the universe is expanding, it must have started from a single point. The Hubble space telescope first gave evidence that the universe is expanding faster than expected from scientific predictions. Further observations show that the universe is accelerating in its expansion, not slowing down as you would expect. This has led to ideas of dark matter, or the notion of modified gravity, to explain the acceleration.

All of this creates openings and problems for theology. The Big Bang theory opens up room for belief in a God who started the universe at a particular point. However, this may only support the more deterministic deism of Einstein and others. It doesn't necessarily support belief in a God who is engaged with and acting in the world. It also could be a way of pushing back the question of God and creation to a single event, and raises the question of what comes before the Big Bang.

Quantum Mechanics

Nothing is more mysterious and non-intuitive in physics than quantum mechanics. Some of the challenging points from quantum mechanics include:

Wave/particle duality of particles: Observations dating back over 200 years began showing that the behavior of the physical world is not what we expect from classical assumptions. The dual-slit experiment showed that light behaves both as a particle and a wave. Further experimentation in the 20th century showed that light and fundamental particles like electrons cannot be described simply as particle in space, but must be described by a quantum equation of probability. An electron is both a wave and a particle, and not until an observation is made to determine its location or motion does it collapse from a wave into a particle. This has raised the philosophical question of the role of the observer in determining reality.

Randomness: Einstein wrestled with the implications of quantum mechanics throughout his later work. He rejected the notion that reality could be subject to probability and randomness, which doesn't fit within his belief in a deterministic world. He famously said, "God does not play dice," implying that the random-

ness that appears in quantum mechanics must be due to lack of information or a full understanding.

Non-locality: Another bizarre implication of quantum mechanics is that particles can become entangled so that their quantum states are connected no matter their location in the universe. An observation of one entangled particle in one location immediately tells you something about the other particle, even with the random nature of how particles behave.

The biggest issue in theoretical physics today, as it has been for decades, is the problem that Einstein's relativity and quantum mechanics do not work together, particularly in understanding gravity.

Quantum mechanics creates many openings within the deterministic world-view of classical mechanics for a different philosophical understanding of the world, and perhaps, creates a place for theological reflection. No one has done this reflection better than the theoretical physicist, theologian, and Anglican priest John Polkinghorne (1930 — 2021).

John Polkinghorne

Polkinghorne was from England, attended Trinity College in Cambridge, and was professor of Mathematical Physics at the University of Cambridge from 1968 — 1979. He left his position to attend seminary and was ordained a priest in the Anglican church in 1982.

He introduces the 2014 article below with this statement: *The role of theology in relation to science is not to try to tell physics how to answer its own proper questions. We have every reason to believe that physics questions will eventually receive physics answers. However there are meaningful and necessary questions which arise from considering the results of physics but which exceed its self-limited power to address.*

<https://www.europhysicsnews.org/articles/ePN/pdf/2014/01/ePN2014451p28.pdf>

Some of the main issues Polkinghorne addresses in the connections between physics and theology include:

Intelligibility: It is remarkable that the universe is intelligible, is rationally transparent to human enquiry, and is also rationally beautiful. Much of the beauty of mathematics (purity, simplicity, and orderliness) is directly applicable to the equations of physics. Polkinghorne notes that while physicists often rely on mathematical beauty in forming their own theories, they cannot through physics speak to why this is so. They cannot derive the meaning of this, which Polkinghorne says cannot intellectually be dismissed as merely a fortunate accident, but creates an opening for a religious perspective of the world and for theological exploration.

Cosmic fine-tuning: This is the observation that a universe that leads to complexity of life and human intelligence is only possible because of the particular constants and laws of the universe. But the question can always be raised: Could it not be otherwise? Why is it this way? For Polkinghorne, this is not within the realm of physics to answer, but is the proper place for theology. Polkinghorne suggests that the fine-tuning of the universe is a gift of the Creator for the sake of a world with a fruitful history.

Causality: The randomness in quantum mechanics raises the question of causality and unpredictability. Two different responses to this are 1) the Copenhagen interpretation of Bohr and others (which most physicists accept), which says that randomness in physics is an inherent part of reality; and 2) the belief

that unpredictability is the result of lack of knowledge on our part, promoted by David Bohm, which requires a “hidden wave” theory to account for the bizarre observations of quantum behavior. Polkinghorne leans toward the Bohr Copenhagen view, but sees that physics is limited in explaining causality, with degrees of openness allowing for other causal principles to be at work. This speaks to the deterministic problem of the universe and sees room for both divine and human causality within the world.

Philosophical Limits and Possibilities

As we can see in this brief exploration, both physics and theology have inherent limits in what kinds of truth claims they can make, and what means of claiming knowledge they make use of. They mostly focus on separate, but inter-related, questions. We might summarize it like this:

Theology deals with Why and Who: Why is there something instead of nothing? Why is the universe the way it is? What is the meaning of existence? What is the source of reality? Theology does not appropriately deal with pre-determining answers to purely scientific questions, though it can be influenced by them.

Physics deals with What and How: What laws and constants determine the behavior of the physical world? How do things relate to each other? How did the physical world begin? What happens when we make this observation or that experimental study? Physics does not appropriately deal with metaphysical, theological, and philosophical claims, though it can offer insights into those claims.

Theology and physics both operate from a sense of wonder, awe, and mystery in being intelligent creatures able to comprehend something of the vast universe. They respond to that wonder and mystery from different perspectives, but they need not exclude the other, and can mutually benefit from engaging the other.

Additional resources:

God and the New Physics. Paul Davies. 1983.

A Brief History of Time: From the Big Bang to Black Holes. Stephen Hawking. 1988.

The Polkinghorne Reader: Science, Faith, and the Search for Meaning. John Polkinghorne, Thomas Jay Oord. 2010.

Modern Physics and Ancient Faith. Stephen Barr. 2003.

I highly recommend the PBS series and Youtube channel “Closer to Truth,” hosted by Robert Lawrence Kuhn. Some links to check out:

Why Consonance in Science and Theology?: <https://youtu.be/AScxroVt7jQ>

John Polkinghorne: Why is the Quantum so Mysterious? <https://youtu.be/35Tp8UqdaEU>