

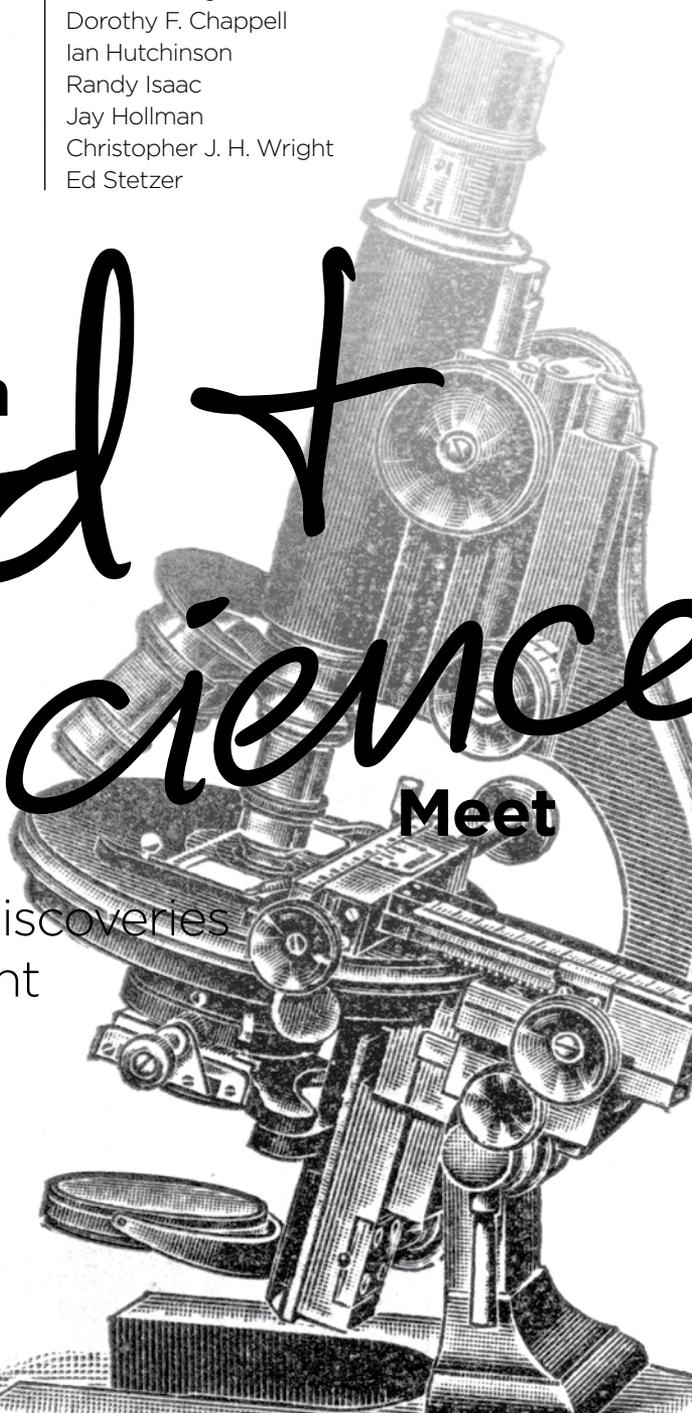
NAE | National Association of  
**Evangelicals**

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Randy Isaac  
Jay Hollman  
Christopher J. H. Wright  
Ed Stetzer

**FOREWORD BY**  
Jennifer Wiseman

**INTRODUCTION BY**  
Leith Anderson

# When God + Science Meet



Surprising Discoveries  
of Agreement



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## **When God and Science Meet: Surprising Discoveries of Agreement**

A resource of the National Association of Evangelicals

The mission of the National Association of Evangelicals (NAE) is to honor God by connecting and representing evangelical Christians. Founded in 1942, the Association represents more than 45,000 local churches from 40 different denominations and serves a constituency of millions. For more information about the NAE visit [NAE.net](http://NAE.net).

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## **Foreword** Jennifer Wiseman

Science and technology impact nearly every aspect of modern life, from health care to agriculture to education. Yet when it comes to public understanding of and support for science from the large and varied sector of religious communities, it is the perception of the role of science and of scientists themselves (e.g., their motives, expertise and influence) that often carries the most weight. Likewise the perceptions of scientists toward religious communities greatly impact their effectiveness in engaging them with science.

The American Association for the Advancement of Science (AAAS), through its Dialogue on Science, Ethics, and Religion (DoSER) program, has partnered with the National Association of Evangelicals and Rice University on a three-year project that investigates the perceptions members of these communities have about one another. The goal of this partnership has been to increase understanding and foster more productive dialogue about issues that are vital to the health of the nation. This booklet, produced by the NAE for churches, is a small but important part of that effort.

Because evangelical Christians make up 25 to 30 percent of the U.S. population and wield considerable influence on the public's support for and perception of science, AAAS has emphasized evangelical perceptions in this project.

Research, including a nationwide study conducted by AAAS in collaboration with Rice University sociologists, has consistently shown that evangelicals are often more wary about certain areas of science than other groups, and yet many also highly value science and are early adopters of technology. Evangelicals are also twice as likely as other groups to look to church leaders for answers to their questions about science. This resource was designed by the NAE to help church leaders begin to think about how to address their congregants' curiosity and concern.

Additionally, as several writers in the booklet demonstrate, many eminent scientists are also people of faith. Historian Mark Noll traces their influence back to the Middle Ages. Plasma physicist Ian Hutchinson eloquently describes his experience as a Christian scientist today. Other writers outline how their faith enriches their science. Likewise, pastors Leith Anderson, John Ortberg and Ed Stetzer affirm the rich benefits that science offers society.

AAAS has long recognized the value of engaging with religious communities about science and founded DoSER in 1995 to foster this engagement. This booklet celebrates the positive and vital role science can play in church communities and ministries. I trust that church leaders will find the material to be a valuable asset as they lead their congregants into a greater understanding of and appreciation for science.



Jennifer Wiseman is Director of the Dialogue on Science, Ethics, and Religion for the American Association for the Advancement of Science. She is an astrophysicist who studies the formation of stars and planets in our galaxy using radio, infrared and optical telescopes. Wiseman holds a bachelor's degree in physics from the Massachusetts Institute of Technology and a Ph.D. in astronomy from Harvard University.

**Introduction** Leith Anderson  
**On the Same Page: Faith and Science**

On most university campuses the departments of religion and science aren't even in the same building, much less in conversation or compatibility. In our generation of specialization we are often better at separation than integration.

But, then we graduate and move into daily life when once academic distinctions become practical challenges. We hear our doctor describe a life threatening diagnosis in scientific terms and then rush to the hospital chapel where we pray for divine intervention. We listen to a pastor's sermon from the Bible and wonder how it fits with the latest article in TIME or National Geographic. We are dazzled by the discoveries about tiny DNA or massive galaxies and are humbled by the simplicity of the Bible's opening line that "God created the heavens and the earth" (Genesis 1:1).

As laypersons we sometimes wonder if we know enough about science or religion to ask the right questions of either. As scientists we may welcome serious conversations but wonder if others tilt more toward controversy or more toward truth. As pastors we often keep silent on science, because we don't know what to say or because we don't want to engage or escalate unwanted debates.

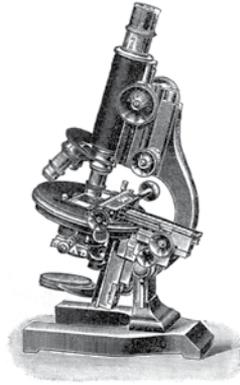
The National Association of Evangelicals asked a small cadre of authors to bring faith and science on to the same page. Each writer is a committed Christian and a credentialed scholar. They don't agree with one another on everything, just as we who are readers may not always agree with them or each other. Our goal is not to answer all the questions but to unite the conversation in a way that values and respects both faith and science.

Who are the readers we have in mind? Pastors who haven't said much about science in their sermons but are willing to begin. Students who love God and want to know God better through his creation. Scientists who are both believers and researchers.

The words of Saint Augustine, “Let every good and true Christian understand that wherever truth may be found, it belongs to his Master,”<sup>1</sup> are often paraphrased to say, “All truth is God’s truth.” There is an interesting comment in the Old Testament story of Daniel that connects with Augustine’s declaration. Daniel and a few other young men were drafted into a Babylonian culture that did not share their Hebrew faith, because they had an “aptitude for every kind of learning, well informed, quick to understand” (Daniel 1:4). They were faithful to God and scholars as well: “To these four young men God gave knowledge and understanding of all kinds of literature and learning” (Daniel 1:17). Long ago, faith and ancient learning were brought together on the same page.



Leith Anderson has been President of the National Association of Evangelicals since 2006 and was Senior Pastor of Wooddale Church in Eden Prairie, Minnesota, for 35 years before retiring in 2011. He has been published in many periodicals and has written over 20 books. Anderson has a Doctor of Ministry from Fuller Theological Seminary and is a graduate of Moody Bible Institute, Bradley University and Denver Seminary.



# The History of Science and Christianity

Mark A. Noll

Strong statements have described Christianity as the fountainhead of modern science. Equally strong statements have called it the greatest opponent of scientific progress. Neither is adequate. Instead, the best historians offer a complicated picture for which the key words are negotiation, compromise, maneuvering, accommodation and rethinking.

In the Middle Ages, theologians like Thomas Aquinas taught that God was separate from the world and that experience (not just thought) was necessary to discover what God had done in creation. Yet these positive steps were matched by negatives. The strong influence of Aristotle meant that medieval theology viewed nature as an emblem for higher realities and that it favored reasoning by deduction over learning based on experience. Yet an enduring gift from the Middle Ages was the powerful idea of “God’s Two Books” — knowledge from Scripture and knowledge about the physical world both come from God and therefore cannot be contradictory.

At the Reformation, Protestant challenges against Aristotle’s medieval theology spilled over into doubts about his concept of nature. These protests paved the way for Francis Bacon’s “*Novum Organum*” (1620), which contended that inductive experience (gathering facts through experimentation) gave the truest picture of the world. Although the Protestant stress on Scripture was not new, Protestant insistence on the Bible’s “literal” sense spurred scientific advance. “Literal” did not rule out the ancient conventions, symbols or metaphors in Scripture, but meant that texts should be studied first for what they described historically and for how they pointed to Christ.

Still, the era’s greatest scientific breakthroughs came from Roman Catholics, especially Copernicus, with his theory that planets moved around the sun, and Galileo, who offered astronomical evidence to support this theory. The judgments by the Vatican against Galileo in 1616 and 1633 may have had as much to do with philosophical controversies, political machinations, and the state of observational data as with specifically theological objections.

For their part, both Martin Luther and John Calvin denounced Copernicus' heliocentric views as heretical (though a few other Protestants were early supporters of the new picture). Moreover, Protestant attacks on traditional authority could stimulate an anti-intellectualism that favored direct inspiration by the Holy Spirit over disciplined human learning.

The leaders in what historians call the Scientific Revolution were usually friendly to the Christian faith. At the beginning of the 17th century, the German Lutheran Johannes Kepler credited God for his understanding of the actual behavior of planets. In England, many of the scientists who in 1660 founded the Royal Society had some connection with the Puritans, whose questing spirit spurred study of nature as well as church reform.

At the end of the 17th century, Isaac Newton gained immense international renown with his description of the universe functioning as a grand mechanism — matter in motion governed by regular mathematical laws. While a few of Newton's devotees felt that he was shoving God aside, the scientist himself believed that God could and did intervene in the rule-run universe he had created. It is a fact that Newton spent more time studying the apocalyptic books of the Bible than he did conducting scientific investigations. Throughout most of the century that followed, Alexander Pope's epitaph spoke for learned Europeans as a whole:

Nature and Nature's laws lay hid in night;  
God said, "Let Newton be," and all was light.

Yet a few far-sighted theologians insisted that a more dynamic view of God's sovereignty was required to keep Newton's science from slipping toward materialism. With variations, the French Catholic Nicolas Malebranche, the Anglican Bishop George Berkeley and the American Congregationalist Jonathan Edwards all proposed that modern science revealed the world accurately, but only because God at every moment upheld observable relations of cause-and-effect.



But he made a mistake to think that finite humans could understand with God's own clarity how God ruled the universe.

Most of western society, however, moved in other directions. During the age of Newton, a few thinkers began to speak of scientific knowledge as rendering the hypothesis of a divine creator irrelevant. Some Christians reacted by emphasizing “natural theology,” or the desire to show that objective scientific evidence demonstrated the existence of God. The culmination of that effort came in the works of William Paley who in 1802 wrote that if someone found a watch on an empty heath, it would be necessary to conclude that a watchmaker existed. Since the world is much more complicated than a watch, we must assume that a much more powerful artificer had brought it into being. Paley was certainly correct to insist upon the world as ordered, or designed, by God. But he made a mistake to think that finite humans could understand with God’s own clarity how God ruled the universe.

The Newtonian picture of a static, law-ordered world was breaking down before Charles Darwin published “The Origin of Species” in 1859. Napoleonic warfare, conservative political reaction, industrialization (William Blake’s “dark, Satanic mills”), class conflict and rapid population growth unsettled the social landscape into which Darwin (along with Alfred Russel Wallace) announced his version of evolution. That version made “natural selection” the key (organisms vary, more offspring are produced than can survive, those that survive are better adjusted to their environment for the purpose of survival). Darwin, who had been reared on Paley’s idea of a creation whose order was transparent to human inspection, thought of his own theory as random purposelessness. By contrast, many theologians and most Christian scientists of the day came to accept some variety of evolution (though not always natural selection), while affirming that it too reflected order and design consistent with a divine creator. Asa Gray of Harvard, who was Darwin’s chief promoter in the United States, always maintained his commitment to traditional Christian supernaturalism while trying to convince Darwin that his theory was compatible with a view of God as creator.

Responses to Darwin were strongly affected by many factors unrelated to science. Conservative Protestants in Scotland mostly made their peace with evolution, because they accepted a progressive view of human knowledge and were much more worried about destructive biblical criticism. Conservative white Protestants in the American South mostly opposed evolution, because it undercut the biblical literalism that had provided their defense for slavery.

The era of fundamentalist-modernist controversy saw issues of biblical interpretation replace questions of design as the most contested scientific questions. Modernists criticized fundamentalists for defending literal biblical interpretation — for the book of Revelation as well as the book of Genesis. As a result, loyalty to the Bible for many in the United States moved easily into loyalty to a strictly literal interpretation of Genesis 1–3. So strong was this reaction that some even came to question the broad acceptance of an ancient age for the earth that Christian geologists in the 19th century had embraced.

Today the Christian world contains a diversity of opinion on questions related to evolution and considerable controversy over proposed responses to climate change. Ethical questions about the application of science conclusions to genetics and stem cell research can also be controversial. These hot spots also co-exist with a nearly universal acceptance of scientific conclusions and empirical methods in all other areas of life.



Since 2006, Mark Noll has been Francis A. McAnaney Professor of History at the University of Notre Dame. He is the co-editor of *Evangelicals and Science in Historical Perspective* and co-editor with David N. Livingstone of *B. B. Warfield: Evolution, Science, and Scripture*. His other books include *America's God: From Jonathan Edwards to Abraham Lincoln*, *God and Race in American Politics: A Short History*, and *The Scandal of the Evangelical Mind*.



## The Wonder of Creation

Dorothy Boorse

**F**rom crystalline caves, to distant galaxies, to the tiny phytoplankton in the ocean that produce more than half of the earth's oxygen, the world we live in is complex and wondrous. Our own brains have 100 trillion to 1,000 trillion neural connections and more than 100,000 miles of myelinated nerve fibers. For a Christian, a natural awe in creation is the outcome of an awe of the creator. These amazing things we see, including our own brains, are the works of his hands.

Psalms 104 describes how the natural world glorifies God, saying in verses 5 and 6: "He set the earth on its foundations; it can never be moved. You covered it with the watery depths as with a garment; the waters stood above the mountains." Later verses describe God's power over winds, waters, the sun, moon, wild and domestic animals, wild and domestic plants, the oceans and its creatures. The psalmist gives glory to God for providing for the earth and all the creatures in it, not only humans, claiming, "He makes grass grow for the cattle, and plants for people to cultivate — bringing forth food from the earth" (v.14). The works of God are vast and show the wisdom of God, we are told. "How many are your works, Lord! In wisdom you made them all; the earth is full of your creatures" (v.24). Similar sentiments are expressed in the book of Job and elsewhere in the Bible.<sup>1</sup>

The conservationist John Muir saw the beauty of nature and reflected the sentiment of the psalmist in the living world around him, declaring, "Every hidden cell is throbbing with music and life, every fiber thrilling like harp strings, while incense is ever flowing from the balsam bells and leaves. No wonder the hills and groves were God's first temples."<sup>2</sup>

Muir's sentiment reminds us of 1 Chronicles 16:33, which says, "Let the trees of the forest sing, let them sing for joy before the Lord, for he comes to judge the earth." Similarly, Isaiah 55:12 says, "You will go out in joy and be led forth in peace; the mountains and hills will burst into song before you, and all the trees of the field

will clap their hands.” These verses enforce our sense that nature is both temple and choir, testifying to the glory of the Maker.

Muir argued for the protection of wild spaces and human enjoyment of the outdoors because nature so reflects God’s glory. However, for some who worship God, worship includes the in-depth study of the details of nature. While artists may paint a sunset to record its beauty, scientists study the natural world, even in the laboratory, out of a love for their subject and a God-given curiosity.

A scientist in the lab using curiosity to uncover creation’s secrets is doing God’s work as much as any hymn writer. The Bible describes an orderly, real world, one that can be understood by human study. The Bible, however, does not describe science as the process we know today. Like much of modern life, we have to extrapolate from biblical principles in order to understand how we are to view this modern effort. The pre-scientific nomadic tribes and ancient city dwellers present at the writing of the biblical texts did not have microscopes, telescopes, germ theory or ways of measuring radiation. Nonetheless, throughout the ages, the people of God have sought to honor God by understanding and caring for his world.

Today, we know that human curiosity is a great gift. One recent neuroscience study shows that our brains change when we are curious, and this makes us not only better at learning information on the subject of our curiosity, but on other subjects we may be less interested in as well.<sup>3</sup> The joy of learning is apparent in very young children. Grasping objects, looking at them, touching and tasting are ways young children learn about the world. The glee of learning about the world around us remains in adults as well. Marie Curie, the discoverer of radium and first person to win two Nobel Prizes in science said, “I am among those who think that science has great beauty. A scientist in his laboratory is not only a technician: he is also a child placed before natural phenomena which impress him like a fairy tale.”<sup>4</sup>

Marie Curie’s work is an example of science that involves what we call “pure science,” science about the basic functioning of the world. Those excited by science



Science not only honors God because God created the world we see, but also enables us to solve problems.

want to understand the patterns we see around us. How are the stars moving in the galaxy in which our sun resides? How do blood cells move in our own arteries and veins? These questions move our understanding of the world to a new level. What fun to extend the understanding of the universe, from the smallest subatomic particle to the greatest galaxy!

Science not only honors God because God created the world we see, but also enables us to solve problems. We call those more practical uses of science “applied science.” George Washington Carver, the great botanist and chemist, used his skill and curiosity to help poor people in the South, especially African Americans, have more food. He worked on ways to grow and use the peanut, a nutritional powerhouse, to solve malnutrition and found uses for peanut products in order to revive both the economy and soil depleted by the exclusive growing of cotton. He described his work this way:

As I worked on projects which fulfilled a real human need, forces were working through me which amazed me. I would go to sleep with an apparently insoluble problem. When I awoke the answer was there. Why then, should we who believe in Christ be so surprised at what God can do with a willing man in a laboratory?<sup>5</sup>

Christians in the sciences need the support of their congregations and church leaders. It is common for science and religious belief to be portrayed as being in conflict. That does not have to be the case.

Being involved in science is a natural outflow of our own human natures and God-given intellect, and Christians in the sciences can be a witness to the world around them. We need good science to care for the needs of people and the world around us. We have many good examples of past and living Christians in the sciences who both love God and are thrilled to be a part of studying the majestic, tremendous natural world.

## When God and Science Meet



Dorothy Boorse is Professor of Biology at Gordon College in Wenham, Massachusetts. She studies wetland ecology, invertebrates, vernal pools and salt marshes. She was the lead author on *Loving the Least of These: Addressing A Changing Environment* published by the National Association of Evangelicals. She holds a Ph.D. in oceanography and limnology from the University of Wisconsin-Madison and is a graduate of Cornell University and Gordon College.



# **The Competencies and Limitations of Science**

Katharine Hayhoe and W. Douglas Hayhoe

Science provides humans with a powerful way of understanding creation and harnessing it for the common good. When Galileo's observations, supporting the idea that the Earth and other planets revolved around the Sun, were criticized as contrary to biblical revelation, he replied that the use of our intellect in a systematic way must be what God intended: "I do not feel obliged to believe that the same God who has endowed us with senses, reason, and intellect has intended us to forgo their use and by some other means to give us knowledge which we can attain by them."<sup>1</sup>

Over the last five centuries, consistent application of the scientific method has enabled immeasurable advances in technology and medicine. Experiments typically begin with asking questions, formulating hypotheses, planning investigations and making observations. Scientific research continues through interpreting and analyzing data, building models and sharing results.<sup>2</sup> Throughout these steps run the common threads of the peer review process (subject to the scrutiny of peers most knowledgeable with the topic in question), and repeatability (results can be duplicated by independent researchers).<sup>3</sup> These two factors are key to how "science works, by achieving consensus," a consensus that is based not on opinion and conjecture, but on documented fact and proven theory.<sup>4</sup>

Science identifies physical relationships and principles that explain the world around us. Often, these principles can be extrapolated far beyond the conditions in which they were observed. This ability to extrapolate lends science a unique and powerful predictive power. For example, after the planet Uranus was discovered by Herschel in 1781, astronomer Le Verrier used Newton's Law of Gravity to deduce the existence of another planet perturbing its orbit. Based on mathematical analyses, he was able to predict exactly where this new planet, Neptune, would be discovered.<sup>5</sup> As ecologist Hugh Gauch states in a book on the scientific method, science builds on "deductive and inductive logic" to make "bold claims of rationality and truth."<sup>6</sup>

In the area of climate change, the scientific method can document how climate is changing. Science can test all of the hypotheses that could explain the observed change and identify the one that is most consistent with the data: humans are responsible. Physical principles regarding the infrared absorption by heat-trapping gases and the exchange of heat between the atmosphere and ocean form the basis of complex earth system models. These models are what we use to understand the implications of the choices our society makes: What will the future look like if we continue to depend on fossil fuels for energy, compared with a future where we transition to other, cleaner energy sources?

What science cannot do, however, is tell us which choice is the right one. As the American Association for the Advancement of Science states, “There are many matters that cannot usefully be examined in a scientific way.”<sup>7</sup> This concept is amplified by the K–12 science standards, which say that, “Science and technology may raise ethical issues for which science, by itself, does not provide answers and solutions.”<sup>8</sup> The limitations of science were expressed even more vividly by Erwin Schrödinger, the Nobel prize-winning Austrian physicist, when he said, “[Science] puts all our experience in a magnificently consistent order, but it is ghastly silent about all and sundry that is really near to our heart ... it knows nothing of beautiful or ugly, good or bad, God and eternity.”<sup>9</sup>

To answer the difficult questions (How should we respond to climate change? Is genetic engineering acceptable? Why are we here? Is there hope for the future?), we need to look beyond facts, data and observations. To paraphrase the author of Hebrews, science is the evidence of things seen; faith, on the other hand, is the “evidence of things not seen” (Hebrews 11:1, King James Version).

Our ultimate significance in life, the inner sense of the infinite that we possess, our final purpose and destiny: These are topics on which science is silent, but our faith is loud. As N.T. Wright points out in his lecture “Can a Scientist Believe the Resurrection?” neither historical evidence alone, nor scientific evidence alone, will

convince someone to become a believer.<sup>10</sup> We have to be open to ways of knowing suitable to the new creation: hope, faith and love. Our knowing is based on the hope of a new life, faith in the risen Christ and experiencing the Father's love for us. Wright concludes, "All knowing is a gift from God, historical and scientific knowing no less than that of faith, hope, and love; but the greatest of these is love."<sup>11</sup> That love is what leads us toward the answers to our deepest and most difficult questions.



Katharine Hayhoe is Associate Professor and Director of the Climate Science Center at Texas Tech University. Her work has resulted in over 100 peer-reviewed publications and key reports on climate change. In 2014, she was named to TIME's 100 Most Influential People and Foreign Policy's 100 Global Thinkers. She holds a Ph.D. and master's degree in atmospheric science from the University of Illinois at Urbana-Champaign and a bachelor's degree in physics and astronomy from the University of Toronto.

W. Douglas Hayhoe is Associate Professor of Education at Tyndale Seminary where he received his Masters of Divinity. He also holds a Ph.D. and master's degree in education and two bachelor's degrees from University of Toronto. His research focuses on teachers' understanding of science curriculum topics related to the environment, and teachers' engagement with sustainability and stewardship from a Christian perspective.



# **Questions That Faith Asks Science**

John Ortberg

IS SCIENCE THE ONLY WAY TO RELIABLY KNOW SOMETHING?

**B**ecause science has made such amazing progress in fields like medicine and technology, some people claim that the scientific method is the only way to reliable knowledge. This belief is sometimes called “Scientism.” Cambridge University physicist and Anglican priest Sir John Polkinghorne offers a helpful illustration in response:

Imagine someone asking: “Why is water boiling in that kettle?” One person answers: “Because burning gas is heating the water.” Another person answers: “Because I want a cup of tea.” Which answer is right? They both are.

One answer deals with non-personal causes; that’s generally what science does. The other answer deals with the intention or purpose of a person; it is non-scientific, but true. Science involves a method that is enormously useful for investigating large chunks of reality. Scientism is a dogma that says any dimension that can’t be exhaustively explained by that method doesn’t exist.

HAS SCIENCE PROVEN THAT THE UNIVERSE HAS NO PURPOSE?

Astronomer Carl Sagan has written that we live on “an insignificant planet of a humdrum star lost in a galaxy tucked away in some forgotten corner of a universe in which there are far more galaxies than people.” The idea is that science, by showing us how immense the size and age of the universe, has also shown us that human beings do not have unique dignity and value in the ways that faith has taught. However, the contrast between the immensity of creation and smallness of human beings is not a new thought. The psalmist said:

When I consider your heavens, the work of your fingers,  
the moon and the stars, which you have set in place,

what is mankind that you are mindful of them,  
human beings that you care for them? (Psalm 8:3–4)

The psalmist does NOT go on to say: but people are HUGE. The earth is HUGE. The stars are TINY. WE WIN! The psalmist agrees that the heavens make human life look puny. But it's not! God has invested human beings with his own image and given us a capacity to learn, create and care for the earth. Any worldview or system of thought that cannot account for the inescapable weight, dignity and value of human existence must be found wanting.

WHAT DOES THE APPARENTLY INEXTINGUISHABLE  
HUMAN DESIRE FOR MEANING TELL US ABOUT EXISTENCE?

The universe itself evokes a sense of wonder in us that just won't go away. Wonder is this inextinguishable realization; not simply that something *is*, but that it's *good*. Wonder moves us dangerously close to worship. Is our hunger for wonder and meaning a clue to something beyond just material reality?

C.S. Lewis wrote that:

Creatures are not born with desires unless satisfaction for these desires exists. A baby feels hunger; well, there is such a thing as food. A duckling wants to swim; well, there is such a thing as water. People feel sexual desire; well, there is such a thing as sex. If I find in myself a desire which no experience in this world can satisfy, the most probable explanation is that I was made for another world.<sup>1</sup>

HAVEN'T SCIENCE AND RELIGION ALWAYS BEEN AT WAR?

The notion that science and religion have historically been at war with each other is a myth. Baylor University's Rodney Stark says that of the 52 leading scientists in 17th century Europe, 62 percent were devout believers, 34 percent were

conventionally religious, and only two of them were skeptics.<sup>2</sup> Not only were they not enemies, there are a host of folks in the history of science who contend, like Paul Chamberlin of Trinity Western University, that “the scientific enterprise as we know it would probably not exist had it not been for Christianity.”<sup>3</sup>

Scientist Sir John Houghton points out there is a false notion in our day that belief in God originated from our inability to understand things scientifically. Faith in God is not based on the gaps that science hasn't yet filled in but based on observations of meaning and value and order that actually underlie science itself.

The rise of science required a worldview that posited a world that is orderly and will reward rational investigation. That worldview arose from faith in an all-powerful rational God. In “Chemical Evolution,” the Nobel Prize-winning biochemist Melvin Calvin said, “This monotheistic view seems to be the historical foundation for modern science.”

#### HASN'T SCIENCE DISPROVED GENESIS?

This has become a huge hot-button topic. The best book I have ever read on the Genesis creation account is by Wheaton College professor John Walton.<sup>4</sup> He notes that in studying the Bible, one has to begin by asking how it would be understood in that day in that culture. He also shows that Genesis was part of a great conversation in the ancient world that was asking very different questions than we ask.

Genesis is about the one true God inaugurating the cosmos into a functioning temple where he would take up residence and deploy his image bearers to extend his reign so that all the earth would be sacred space, Walton said. It is not about the role of mutation or natural selection in 21st century terms.

I have seen too many young people in too many churches exposed to bad science in the misguided idea that someone was defending the Bible; then they go off to college and find out they were misinformed and they think they have to choose between the Bible and truth.



Faith in God is not based on the gaps that science hasn't yet filled in but based on observations of meaning and value and order that actually underlie science itself.

On the other hand, sometimes secularists will misuse the theory of evolution to make claims about human identity. You are a ceaseless spiritual being with an eternal destiny in God's great universe. That claim cannot be settled by proportion of shared DNA.

DOESN'T SCIENCE SHOW THAT THE UNIVERSE DIDN'T NEED A CREATOR?

Actually, it's almost the opposite. A hundred years ago scientists assumed the universe had always existed. Scientists now believe the universe had a beginning. This was astounding. Francis Collins, director of the National Institutes of Health, who was once an atheist and became a vibrant believer through reading "Mere Christianity," says that "the existence of the Big Bang begs the question of what came before that, and who or what was responsible. It certainly demonstrates the limits of science as no other phenomenon has done."<sup>5</sup>

#### SUPPORTING SCIENCE IN OUR CONGREGATIONS

A few years ago, at a conference with Francis Collins and a number of other scientists, I was struck by how many of them spoke about how lonely they were. They said that when they are with scientific colleagues, they have to be guarded about their faith. But too often when they are with their spiritual communities, they are considered suspect due to their science.

Those in your congregation who are doing science — teaching, research, technology, medicine, engineering, chemistry, biology, neuroscience, physics — are doing a noble thing. They are reading the book of nature and the book of Scripture together. They are obeying God's command to exercise dominion, to learn about and steward the earth. Those of us who are not scientists should be grateful and admiring. We should be cheering them on.



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# Worshipping God Through Discovery and Science

Dorothy F. Chappell

*“Love the Lord your God with all your heart and with all your soul and with all your mind.’ This is the first and greatest commandment. And the second is like it: ‘Love your neighbor as yourself.’ All the Law and the Prophets hang on these two commandments” (Matthew 22:37–40).*

CREATION IS FOR CHRIST, WHO CREATED IT AND SUSTAINS IT

**S**ound biblical theology gives scientists a proper basis for a robust study of nature. In fact, Christians hold closely to God’s self revelation in the holy Scriptures, known as special revelation, and his unique imprint upon nature, known as general revelation. Christ created everything that scientists examine with the tools of scientific inquiry, and he continues to sustain all facets of the universe. Christ’s unique role with his creation is affirmed throughout Scripture, and it is eloquently articulated in Colossians. Paul states that Christ is the creator and sustainer of creation, and it was created for him. He writes, “The Son is the image of the invisible God, the firstborn over all creation. For in him all things were created: things in heaven and on earth, visible and invisible, whether thrones or powers or rulers or authorities; all things have been created through him and for him. He is before all things, and in him all things hold together” (Colossians 1:15–17). Both special and general revelation disclose a creation that is good, vast, intricate and worthy of study.

Acquiring knowledge of the creation provides an occasion to recognize, thank and praise the creator God. Scientists who affirm this biblical teaching and orientation to reality — that Jesus Christ created the physical, spiritual and moral dimensions of the entire universe — cherish the special role human beings possess as God’s image bearers. Therefore, by faith, they enjoy exploring the natural world where they can see God’s glory and respond through worship.

By his own evaluation in the Genesis account, God provided an extraordinarily “good” cosmos of matter and energy, a vast realm over which humans preside —



Both special and general revelation disclose a creation that is good, vast, intricate and worthy of study.

exploring, studying and marveling. Natural scientists probe the frontiers of this created realm using the established methods and tools of their respective domains of inquiry and knowledge. The thrill of scientific investigation captivates and ignites a propensity for sustained exploration, including serendipitous investigation, carefully trained observation and well-designed experimentation. All of this yields new data, concepts and theories within the scientific community. And the realm of science — practical and theoretical — does not go beyond the natural realm for explanations; nevertheless, many scientists eagerly engage the verifiable processes of scientific discovery while at the same time affirming a dimension of insight and understanding that remains distinctly spiritual — through eyes of faith.

#### DISCOVERY INTENSIFIES OUR WORSHIP OF GOD

Scientists can discover, study and contemplate the complexities of the created order while apprehending God's glory, which remains resplendent throughout the creation; in other words, they can worship and interact with God as they do their own professional work. This represents a profound discipline: doing good science and practicing vibrant faith. A natural outcome that results when scientists explore the mysteries of creation from a biblical worldview is a greater capacity for wonder, awe and humility. These, after all, are the traits of effective scientists and devout Christians. Imagine, for example, the remarkable and exciting progress that has been made on several scientific fronts: the modeling of minute atoms, cell structure or patterns of disease epidemics, understanding and manipulating nucleic acids, the mapping of the oceans' floor and the realm below the Earth's crust, the prediction of new weather patterns in the atmosphere, and the projection of planetary atmospheres in our own solar system and beyond. As the mysteries of creation are discovered and studied, scientists of Christian faith find opportunities to express their love for God, simultaneously considering ways to express their love for neighbors through very tangible acts of compassion.

It is in bringing the greatest requirement of the gospel — loving the Lord with all of one's heart, soul and mind and loving neighbors as oneself — into daily focus that faithful scientists can fully respond to God in meaningful worship. Such worship includes gratitude, reverence and delight. The psalmist's eloquent recognition of God's glory exhibits the right disposition. "The heavens declare the glory of God; the skies proclaim the work of his hands" (Psalm 19:1). Furthermore, the psalmist sees value in God's works and urges reflection upon them: "Great are the works of the LORD; they are pondered by all who delight in them" (Psalm 111:2).

#### CO-LABORERS WITH GOD CAN USE SCIENCE AS A MEANS OF GRACE

Scientific investigations yield an extensive inventory of facts that connect to other facts over time. This universal library of facts is dependent upon the development of technology, which is essential to the practice of science. Scientific studies of the Earth and its atmosphere, including its constituents and inhabitants as well as the examination of outer space, all are made possible by cutting-edge instruments and new knowledge applications. Technology is a tool of science. It also is a means for the transformation of nature to improve the welfare of humans, to repair environmental damage and to preserve natural resources. Consider the astonishing advances that have been made in medicine or food production. Yet, sadly, there are many who still perish from disease or malnutrition when science and technology may not have been applied to address these problems, applied unwisely in offering solutions, or may not have advanced to a level of sophistication to solve the enigmas that arise when addressing these very complex issues. Consequently, the opportunities are immense for scientists to improve conditions under which humans live, whether related to the environment or nutrition, hunger or disease. Hence, the motivation for developing and implementing effective models to sustain healthy lives and the welfare of our planet represent scientific concerns and Christian concerns.

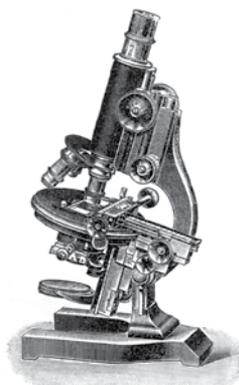
“In addition to the delights of worship and practice found in the study of creation, devout scientists recognize expressions of common grace, not saving grace, to creatures and to all people everywhere, regardless of whether they follow Christ.”<sup>1</sup> Science used in good and positive ways for humans and creatures can be a means of common grace. This often involves applied scientific work in which sophisticated technology is used to alleviate suffering. Such work often involves unselfish acts of benevolence in an effort to eliminate the factors that give rise to a poor quality of life. To provide scientific expertise toward specific altruistic goals, to offer excellent medical practices on behalf of the sick, to produce healthy food for those who are hungry, to offer assistance in the preservation of the environment and to strive for the stewardship of natural resources — all of these things demonstrate a high calling, extending common grace around the globe. This kind of activity is a means of fulfilling the creation mandate, to care for what the Lord has made. “These expressions of common grace, offered by Christians and non-Christians to all creatures and humankind, serve as tangible forms of God’s provision, and can have mitigating effects on evil in creation.”<sup>2</sup>

Conducting science as a form of exploration at the frontiers of knowledge, all the while affirming God’s glory, as is revealed in creation, represents the unusual vocation of the scientist devoted to Christ. Such a scientist, in doing important investigative and experimental work, can choose to extol God’s splendor and also alleviate human suffering, thus fulfilling the Great Commandment.

How can we dare to do less with our knowledge of God and his world?



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## **Science as Christian Calling**

Ian Hutchinson

**M**y pastor was recently interviewed about me for a documentary on scientist-Christians. He remarked, “He’s not an *insufferably* arrogant scientist.” That was meant as a compliment, but it’s a rather backhanded one! Scientists are often arrogant, and even if they aren’t insufferable, they can easily seem intimidating because of their deep knowledge of a subject that to most people is baffling. When I tell someone what my specialty is (plasma physics), it can easily be a conversation stopper.

A calling, or vocation, to most people today, means a devotion to a worthy occupation. A large proportion of scientists, whether they are Christian believers or not, regard their science as a vocation in this sense. In part, that’s because to be an effective scientist requires devotion: years of education to understand what is already known in the discipline, and apprenticeship to master its techniques, before one can even begin to make original contributions. Also, it is because we see science as worthy — offering a uniquely powerful and insightful knowledge of nature that has potential for great good.

There are roughly half as many natural scientists in the United States as there are physicians; and scientists probably have no less a sense of this secular calling than doctors. Yet, the meaning of vocation comes originally from the Christian idea of a literal call by God to service. There are certainly far fewer missionary scientists than missionary doctors. Yet many physicists I know are motivated by a sense of service to God and man. I see no reason why natural science should be any less a Christian calling than medicine.

Robert Boyle (of Boyle’s Law) was also of this opinion. He was a leading scientist during the early years of the scientific revolution, one of the founders of the Royal Society and a dedicated follower of Jesus. He wrote a book on this topic, published in 1690, whose extended title was “The Christian Virtuoso: shewing, that by being addicted to Experimental Philosophy a Man is rather Assisted than Indisposed, to be a Good Christian.” The title encapsulates the concerns he addressed.

A scientist or Experimental Philosopher of the day was often called a Virtuoso — reflecting the skills that, not unlike a master musician, he had acquired by dedicated study. Boyle acknowledges that for such enthusiasts, the pursuit of natural science becomes almost an addiction. But he argues this preoccupation is not contrary to spiritual commitment and development, but rather assists the Christian in it. Natural philosophy does not lead to atheism, Boyle says, it leads to a greater wonder at the power and majesty of God. Nevertheless, the fact that Boyle needed to make this argument shows that some people were concerned about science undermining faith, even then. Boyle and many of the greatest scientists of history showed by their personal dedication to Christ that there is no contradiction between a lively Christian faith and the most rigorous exploration of the natural world.

James Clerk Maxwell, for example, was arguably the greatest theoretical physicist of the two centuries between Newton and Einstein. His famous equations governing electromagnetism, published in the 1860s, are still the foundation of our theoretical and practical understanding of much of nature. He was brought up in a Christian home and attended the finest educational institutions of Victorian Britain. He had a strong sense of calling to pursue science — eventually persuading his widowed father to give up the ambition that James should follow him into law. James's determination, as an undergraduate at Cambridge University, was to excel in mathematics and science and to plumb the intellectual depths of his Christian faith.

In the summer of his third year, he had a transformative spiritual experience that confirmed his Christian commitment. Shortly afterwards he wrote in a letter to the minister who had helped him in this time, saying, "If I escape [from sin], it is only by God's grace helping me to get rid of myself, partially in science, more completely in society, but not perfectly except by committing myself to God." For Maxwell, science was a calling from God, and indeed even a part of God's plan for his salvation. The intermingling of spiritual endeavor with his professional and

occupational activities continued throughout his life. He voluntarily taught weekly Working Men's classes as a Christian service for many years. And when at home in the Scottish estate of which he was "Laird," he would lead nightly Bible reading and prayers for the entire household.

Today too, Christian commitment informs, influences and motivates the activities of many scientists. Among academics, scientists are, if anything, more likely to be Christians than non-scientists. At my university (MIT) I know dozens of Christian faculty members. And the number of Christians in its academic leadership is remarkable. The previous president was a Christian, and over the years I've noticed on many occasions how active Christian faculty are in the running of the Institute. Perhaps this is because, at its best, academic administration and committee service call for a selfless effort to assist the achievements of others — a trait that does not come naturally to anyone, least of all ambitious academics, but that does come from Christian teaching (Philippians 2:3). Certainly in my own career I've come to appreciate that scientific leadership calls for many skills that go far beyond the knowledge of scientific phenomena and the detached impersonal interrogation of nature that we learn in the classroom and at the lab bench. For me, Christian spiritual study and growth have been the most important source of those other vital skills and attitudes.

What do scientists want from their church? First, fellowship. It's not important that our pastor or congregation should understand our science, but it is important that they should appreciate us as individuals, as fellows in the Christian life. We are people whose professions present to us daily challenges, and, like everyone else, we need help to work them out in accordance with God's will. We come to church, in part, because we think God's word and God's people are essential resources in those challenges. So, in a sense, we want what everyone else wants: to worship with others and experience the encouragement of that shared experience.



It's not important that our pastor or congregation should understand our science, but it is important that they should appreciate us as individuals, as fellows in the Christian life.

Second, we want respect and acceptance. We have some highly specialized knowledge and skills. These don't make us more spiritually worthy than anyone else, but they provide real knowledge of God's real world, not to be overruled by theological or church authority. We don't need sermons to be artificially based on "science," especially not poorly understood natural science or speculative social analysis purporting to be science. But we do want to be encouraged by hearing an intelligent exposition of the faith consistent with a sympathetic understanding of science's value, methods and achievements. And we are interested on occasion to hear well-informed theological critiques when science is misused, perhaps to dismiss religion or to transgress Christian ethics. We ourselves know — and disapprove — of scientists who arrogantly puff up their knowledge of nature into materialistic metaphysics, or who claim that science trumps all non-scientific moral restraint.

Finally, at church we want our children to hear the gospel in a way that, with respect for both God's word and God's works, will not alienate them either from the church or from science.

My pastor knows all this. I am grateful to God for him.



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# **Creativity and the Development of Technology**

Randy Isaac

**W**e love to passionately sing, “Oh Lord, my God, when I in awesome wonder consider all the works thy hands have made ...” as we marvel at God’s glorious creation. We also love to admire the works of humans. We flock to music concerts, art museums and sports arenas. We admire grand architecture from the Great Wall of China to the Hoover Dam, gothic cathedrals and daunting urban skyscrapers. We delight in the discoveries of science and the products of technology that make our lives easier and more interesting. Is there some connection between the works of our creator and the works of humans?

When God created human beings, he made them “in the image of God” or the *imago dei*. That phrase has spawned volumes of discussion on its possible meaning. Surely one aspect of its meaning is that God has endowed us with the ability to create.

Human creativity is evident in both science and technology. Science usually refers to our knowledge of nature, our understanding of how the world works. Technology usually refers to our making tools and instruments, the production of machines. Science and technology are intimately tied together. Successful technology is possible only with the proper understanding of science. Scientific advances are possible only with specialized technology that enables observation beyond that which is possible with our five senses directly. Both activities occur only within the context of a high degree of creativity, the ability to perceive novel concepts and relationships as well as the ability to design and construct innovative objects.

Throughout the accounts of creation in the Bible, we read how God created a wide range of material objects. The many different verbs used in these accounts reflect God’s creativity. These include “separated the light from darkness,” “Let the water under the sky be gathered,” “Let the land produce,” “planted a garden” and “formed a man” (Genesis 1 and 2).

It is noteworthy that one of the key distinguishing characteristics of humans that scientists use is the ability to make tools. Archaeological discoveries of stone tools comprise the earliest indicators of the existence of humans. Small stones

with dabs of color imply the fabrication of beads for possible use as simple tools of communication. Since then, the ability of humans to make tools has grown dramatically. Although some animal species, like ravens and chimpanzees, are remarkable for their ability to fashion and utilize twigs and leaves as tools to get food, the tool-making ability of humans is truly distinctive. It reflects our God-given ability to be creative in both science and technology.

Among the most spectacular tools of scientific value that humans have been able to construct are those that extend our powers of observation. Our eyes can perceive only a very small portion of the light around us. Tools of many different types have now been constructed that enable the detection of billions of times more light. We can only perceive objects that are larger than about the width of a hair. But tools like microscopes open our eyes to dimensions that are billions of times smaller than that. The rapid rate of creative insight and the development of novel tools are some of the most exciting aspects of science and technology.

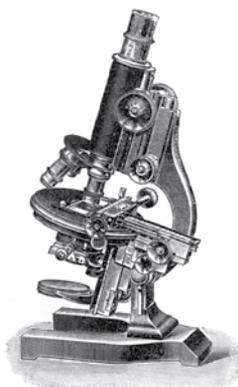
Alas, humans have also eaten of the fruit of the tree of knowledge of good and evil. In contrast to God's creativity, our knowledge and our tool-making ability encompass both good and evil. Our knowledge is neither complete nor pure nor fully accurate. Our technology products are not all good and useful but may be harmful. Internet technology, for example, has transformed our lives by enabling efficient commerce and communication. But it has also enabled terrorists to plan their attacks more effectively and for hackers to threaten our privacy. On the other hand, the good benefits of technology can be shown to be a major factor in alleviating pain and suffering. Seemingly intractable problems of shelter, food production and distribution, and medical health have been significantly addressed through technology. Our creative minds constantly seek better understanding and solutions to life's problems. Technology offers one path to improve our lives. Medical technology has saved countless lives. Transportation technology has enabled global travel and efficient food exchange. Communication technology helps us keep in touch wherever we are.

It is tempting to consider technology development as ethically neutral, leaving the moral responsibility on the shoulders of those who use the resulting products. That was my attitude in participating in the development of advanced computers. We were well aware that computers could be used for evil as well as for good, but we felt this was not our responsibility. The fact that significant benefits could be realized with the computers was sufficient to justify our work. Recently I have become aware that technology development is not so clearly beyond the conflicts of ethical dilemmas. The responsibility that God has given us as stewards of his creation means that we must proceed thoughtfully and with care. Not everything that can be made should be made. And often there are many different ways to make what should be made. The selection of materials and processes that cause destruction of habitat and endanger the lives of many people is but one example of ways in which technology can run afoul of ethical issues.

The career of a scientist is driven by an intense desire to know more about the world we live in as well as the excitement of using new tools. The career of an engineer is driven by a love of making things as well as a desire to solve problems and needs of our society. Both vocations are possible, because we as humans possess creativity as part of our image of God. As Christians in the sciences, we have not only an awareness of the source of our creativity, but a realization that we have a profound responsibility to use that creativity wisely to help our fellow human beings and to carry out our role as stewards of creation.



Randy Isaac is a solid-state physics research scientist and Executive Director of the American Scientific Affiliation (ASA), where he has been a fellow since 1996. Isaac received his bachelor's degree from Wheaton College and his Ph.D. in physics from the University of Illinois at Urbana-Champaign. He joined IBM to work at the Thomas J. Watson Research Center in 1977 and most recently served as Vice President of Systems Technology and Science for the company.



# Genetics, Medicine and the Image of God

Jay Hollman

**A**dvances in science appear to call into question the importance of man. Humanity is thought to have only been on earth for a tiny fraction of the earth's long history. The earth, contrary to medieval cosmology, is not seen as the center of the universe but rather as a small planet orbiting a medium-sized star. The sun is one of about 200 billion stars orbiting the black hole center of our Milky Way galaxy. Our galaxy is only one of 100 billion galaxies in the observable universe. If God created all this as our theology teaches, why should a person on the earth matter to him? It would seem pretentious to think man of any importance. To say man is made in the "image of God" would seem to be patent buffoonery.

Man's unique place in creation, justifying the image of God designation, is challenged by a secular science and its commitment to naturalistic explanations for the origin of man. My own concepts of the origin of man and the first 11 chapters of Genesis have changed greatly since I started college over 40 years ago. I would expect these ideas to continue to change, but it does not change reality of my faith. I am equally skeptical of those who try to read Scripture as a science text and atheists who claim that science proves there is no God.

As believers we know of our "image of God" uniqueness from the inspired revelation of God to us through Scripture. Science cannot ultimately confirm or deny this truth.

Although the above science seems to diminish man, recent discoveries regarding the human body have left scientists in awe of its complexity, integration and design. The human body is a marvelous organism: Each cell is an intricate miniature machine, producing all the components needed for cell maintenance and reproduction. The growth of a human from a single cell to adulthood is a carefully coordinated process with cellular multiplication, differentiation and regression. Even though each adult human cell contains all the genetic code, it limits its genetic expression to serve the needs of the organ in which its functions. Cells interact



I am equally skeptical of those who try to read Scripture as a science text and atheists who claim that science proves there is no God.

with each other through intercellular messages. Individual organ functions are coordinated with hormones, proteins, cytokines and nerve signals. The human brain is at the apex of complexity in the living world with nearly 100 million neurons each of which interconnects with other neurons through 150 trillion electrical and chemical connections known as synapses. Complexity is increased beyond these numbers when we realize that there are over 100 different transmitter molecules (e.g., dopamine, serotonin and epinephrine) each delivering a unique signal. How all these signals lead to consciousness will require decades of research and might never be completely understood.

The hyped revolution that would result from the completion of the Human Genome Project has disappointed many. The common diseases of the developed world are due not to a single rogue gene. Most are polygenetic — meaning that several genes contribute a variable amount to risk. Although more than 50 genes have been associated with cancer they account for probably only 5 to 10 percent of all cancers.

Environmental factors such as smoking, obesity and diet are more important. Heart attacks and strokes, which kill most people in the developed world, have a genetic predisposition, but the risk is spread over multiple genes that contribute variably. Environmental factors such as diet, obesity and physical activity contribute more than genetics. The long running nature v. nurture debate is more complex now that we understand how the environment alters gene expression. Genetic expression is modified through signaling proteins and epigenetic factors. Thus genetic expression can improve with healthy habits. To a certain extent we can train ourselves in right living.

Another disappointment has been the lack of progress in the treatment of genetic disease. Although most Western killers have many genes contributing a small amount to their disease, there are single gene defects, which can be life defining. Cystic Fibrosis, Huntington's chorea, and Tay-Sachs disease are just three

relatively rare diseases that are caused by a defective gene. While we know exactly where the gene is placed, it is usually not possible to “knock out” this gene and replace it with a normal gene.

The advances in medical science over the past century are indeed remarkable. Understanding the agents of infectious diseases (viral, bacterial and parasitic) and developing effective treatments has revolutionized human existence. No longer are smallpox, polio and plague terrorizing human populations. This does not mean that infectious diseases have been eliminated. HIV-AIDS, tuberculosis and malaria still kill millions in the developing world; Ebola at present is highly contagious and without a specific treatment. The world will rely on medical research to find cures.

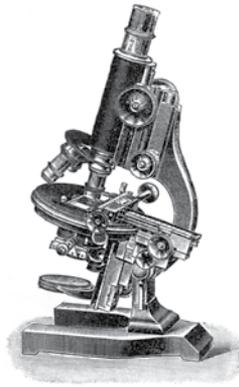
How our Christian faith affects our health has not been particularly well studied. Systematic reviews have shown that faith is in general favorable for both physical and mental health. The effect of intercessory prayer on healing has been studied in 10 randomized studies with mixed results. Studies that use evangelical interceders are positive while studies that recruit mixed faiths (Christian, Muslim and Buddhists non-discriminately) are neutral. Although the Christian faith has not been well studied by medical science in general, the weight of evidence supports the conviction that believers are healthier and more mentally stable due to their faith.

Knowledge gained through scientific research should not be feared. Properly understood, it results in a more complete knowledge, which should strengthen our faith. Modern cosmology shows the greatness of God and the triviality of man. Yet we know he cares for us because of the life, death and resurrection of Christ. We should welcome a greater understanding of life through medical science not just because it can result in better health but also because it allows us to understand the creativity and the majesty of our Maker.

## When God and Science Meet



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## **Tending God's Earth**

Christopher J. H. Wright

THE FIRST GREAT COMMISSION

Christian mission is often connected to Matthew 28:18–20, “The Great Commission.” But we need to start at the beginning with creation.<sup>1</sup> In Genesis 1:26–28 and 2:15 we have God’s first commission given to humanity as a whole. It has two complementary aspects.

The first is “to rule over the earth.” God gave to humankind the delegated responsibility of exercising dominion over the rest of creation. For that purpose God made us in his own image, so we were to do so under God’s authority and in God’s way. This means the godly and wise stewardship and use of the earth’s resources: animal, vegetable and mineral. So the creation mandate validates human activities such as agriculture, mining, manufacturing, architecture and all other activities that support and enrich life on earth in human societies.

For this enormous task God gave us almost inexhaustible gifts of intelligence, creativity, discovery and inventiveness. Science and technology are therefore legitimate tools in our God-given mandate within creation. It is not surprising that science emerged within a culture founded on a broadly Christian worldview and a biblical understanding of creation. Sadly, because we are also fallen and sinful, science and technology (like all God’s good gifts) can become perverted and idolatrous when we use them with arrogance to deny or ignore God himself, or when we trust them to deliver ultimate solutions to all our problems (which they cannot do). But they are not, by themselves, hostile to God or to faith in God when they are exercised with humility and integrity as gifts of God that we can use to honor God our creator. Job 28 celebrates the wonders of human technology exercised in mining and exploration, but acknowledges the spiritual and moral source of true wisdom: “The fear of the Lord — that is wisdom, and to shun evil is understanding” (v. 28).

The second is “to serve and keep the earth.” That is the literal meaning of the two verbs that Genesis 2:15 uses for the task God gave to “the man” (Adam). Initially this mandate related to the garden in Eden, but it surely applies to the way God

wanted humans to live on the earth as a whole in the exercise of their dominion over the rest of creation. Dominion is a kind of “kingship.” But our kingship in creation is to reflect God’s kingship, which, as Psalm 145 makes clear, means loving care, compassion and provision for all his creatures — not exploitation, tyranny and destruction (which is the way sinful kings behave). Christ is the perfect image of God, and he demonstrated his lordship through servanthood. That is the Christ-like model for us in creation too. We are to rule over creation, yes, but we are to do so by taking good care of it — as God would (and does).

The Cape Town Commitment (a global evangelical statement from the Lausanne Movement) affirms:

All human beings are to be stewards of the rich abundance of God’s good creation. We are authorized to exercise godly dominion in using it for the sake of human welfare and needs, for example in farming, fishing, mining, energy generation, engineering, construction, trade, medicine. As we do so, we are also commanded to care for the earth and all its creatures, because the earth belongs to God, not to us. We do this for the sake of the Lord Jesus Christ who is the creator, owner, sustainer, redeemer and heir of all creation.<sup>2</sup>

#### THE FIRST GREAT COMMANDMENT

What is our first and fundamental human duty? Jesus agreed with Moses. It is to love God with all our heart and soul and strength (Deuteronomy 6:4–5; Matthew 22:35–40). If you love somebody, you take care of what belongs to him or her. The earth belongs to God (Psalm 24:1; Deuteronomy 10:14; 1 Corinthians 10:26). It is God’s property, not ours. He is the landlord; we are the tenants. How can we claim to love God and trash his property? Or how can we have no concern that others do so at a distance in order to satisfy our consumerist greed?

We Christians have very clear responsibility in creation care. This is so, not just because we share that responsibility with all human beings (being a Christian



Creation care is part of our obedience to the gospel once we understand that the gospel encompasses creation as a whole.

does not remove our humanity under God). It is also because we know the story we are in. It is the gospel story. “The gospel” is not just a formula through which I can make sure I go to heaven when I die. According to the Bible, the gospel is the good news contained in the whole story of all that God promised (Old Testament) and accomplished (New Testament) through Christ to save the world.

And the biblical gospel includes creation, for it is God's purpose to bring all things in heaven and earth (all creation) into unity under Christ (Ephesians 1:9–10), and to reconcile all creation through the atoning work of the cross of Christ (Colossians 1:15–20). The imagery of destruction (e.g., 2 Peter 3) speaks of the purging of the earth from sin and evil (as in the Flood — note the parallel between vv. 6–7 and 10), not the obliteration of creation altogether. Revelation 21–22 bring the Bible to a close, not with us going to heaven, but with God coming down to unite heaven with earth in the new creation.

Creation care is part of our obedience to the gospel once we understand that the gospel encompasses creation as a whole. The Bible begins with creation and ends with new creation. And the gospel embraces and unifies both ends of the whole Bible story. Our responsibility is to live on earth now, using and caring for the earth, in accordance with that overarching biblical story, past (creation) and future (new creation).

#### THE SECOND GREAT COMMANDMENT

“Love your neighbor as yourself” has always been understood in holistic terms. In the Old Testament law and prophets, it included social and economic life (read Leviticus 19, the context of the commandment Jesus quotes). In the life and teaching of Jesus and the apostles, it included caring for the needs of the body (particularly sickness and hunger) and challenging poverty and injustice. The early Christian church and the apostles, Paul, James and John, all took this very seriously.<sup>3</sup> For that reason, Christian mission through the centuries has always engaged in (for example) education, medical work, the relief of poverty and hunger, and challenging injustice, alongside evangelism and church planting.

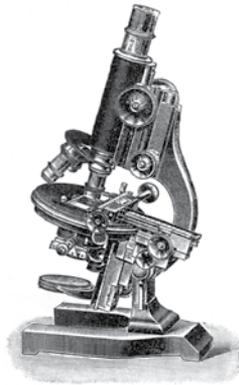
Loving our neighbor must also include being concerned with the conditions in which people live. And today we know more acutely that that includes physical environment. When creation suffers, people suffer. Some Christians denounce environmental concern, saying we should be more concerned about poverty and hunger. But to glibly say we should “feed the poor rather than save trees” is a very false dichotomy. For whatever damages creation hurts the poor, and whatever properly tends the earth also benefits the poor. The two are inseparably linked. This has been proved all over the world. Ecological issues and the injustice of poverty and hunger are deeply connected. It is the poorest parts of the world that are being most affected by environmental destruction.<sup>4</sup> That makes it a matter also of international justice.

We should heed the call of The Cape Town Commitment, which echoes a growing consensus among evangelicals worldwide:

We repent of our part in the destruction, waste and pollution of the earth’s resources and our collusion in the toxic idolatry of consumerism. Instead, we commit ourselves to urgent and prophetic ecological responsibility. We support Christians whose particular missional calling is to environmental advocacy and action, as well as those committed to godly fulfillment of the mandate to provide for human welfare and needs by exercising responsible dominion and stewardship.



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## Reasons to Engage in Science

Ed Stetzer

I've always been a bit of a science nerd, and it appears I have passed that attribute on to my children. As I start this essay, my daughter has just shown me her clay model of the surface of the skin, complete with labels of the various layers.

Obviously, your first assumption is that this is for a school project. But actually, it's simply because she loves science. For her, creation speaks to the wonder and glory of the creator, which means science is an avenue for worship.

However, it appears we live in an age when many evangelical Christians are unsure where science fits. Perhaps that is because many evangelicals presume scientists are disproportionately unbelievers. In a way, that is true. A 2009 Pew Research study found scientists are more than 10 times as likely as the general public to disbelieve in God or a higher power.<sup>1</sup>

Scientists themselves are starting to lose the trust of many Americans, who, according to researchers at Princeton, believe scientists are highly competent, but not particularly trustworthy.<sup>2</sup> People believe seeking grant funding or pushing a particular agenda motivates many scientists, instead of an unbiased pursuit of truth.

Because Christians see statistics like these, many Christians assume there is no spiritual value in believers pursuing a career in the sciences, and that doing so could, in fact, be detrimental to their faith. While it is true scientists are less likely to believe in God (that's just math), it is not true there are no scientists who believe. There are actually a significant number of scientists who are Christians, including many prominent believers.

In 2014, Rice University along with the American Association for the Advancement of Science conducted the largest study of American views on science and religion. While scientists are more likely than the general population to be atheists and less likely to be Christians, there are still substantial numbers of believing scientists. Out of the nearly 12 million scientists, 2 million are evangelical Christians.<sup>3</sup> That is significant.

The sciences should not be reserved only for atheists. There can and should be fields where Christians are actively involved. Here are three reasons I believe Christians should be deeply engaged in science.

*First, creation speaks to a creator.* Because we know there is a creator, we should be the ones most concerned about his creation. By this, I don't just mean caring for creation in a stewardship sense, though it certainly would include that. Creation speaks to the fact that God is, and he has created.

In Romans 1, Paul points out that attributes of God are made clear in creation. We can know his eternal power and divine nature, because they have been clearly seen since the creation of the world.

If Scripture says creation, and therefore the sciences that explore it, point to God, why would we run away from that? We, above all others, should love, study, explore, examine and care for the creation that provides evidence of God and his character.

*Second, dismissing science undermines our witness.* But many evangelicals are backing away from science. In a society driven by scientific achievement, it is unwise and counterproductive to our mission for Christians to embrace an anti-science label.

I do understand there are parts of scientific endeavor that appear to be undergirded by or have often produced a skeptical naturalism. However, that merely reminds us of the need for more Christians to show that studying the creation should not drive us away from the creator.

If we think being anti-science is a good platform for the Church, it should give us pause that Christians abandoning the sciences is a particularly modern phenomenon. In centuries past, people of faith, including pastors, often engaged in scientific study because they were pursuing greater knowledge of the creator, and it granted them greater influence within the culture.

Scientists of faith (sometimes pastors) have played a significant role in the founding of various scientific disciplines such as astronomy, genetics and chemistry.

And in doing that they demonstrated to the culture at large that God is concerned and can be trusted with truth. If God is not trustworthy, he is not worth following and not very compelling to non-Christians.

*Third, science can better society.* When I was a child, I sat in front of the TV and watched episode after episode of Carl Sagan's "Cosmos." (For the record, I didn't turn out to be an atheist.)

Of course, Sagan was an ardent atheist, but he also represented something of significance. The show captured the fascination people have with science and how it is often seen as a great liberator of the world from future pain, problems and challenges.

They are, in many ways, right, and this is one reason Christians should be engaged in the sciences. The fact is, as we find better ways to farm, powerful new medicines to heal and more effective ways to power our society, the poor benefit, societies are transformed for the better and the world looks and is more of what God intended it to be.

Christians are to champion the good of their city and society as a whole. Leveraging scientific study and achievement for the betterment of people is an entirely Christian thing to do.

I've never mentioned, in print, my academic focus in college, perhaps because I did not pursue my original plans. I ended up being a pastor, earned a Ph.D. in missiology and became a researcher.

Yet, my major was in natural sciences. I had the privilege of studying with people of faith — and people of no faith — about what the creator created. For me, it simply reinforced my deep awe at God's power and goodness.

God would later redirect my life, but having an undergraduate degree in natural sciences has given me a better understanding of God as creator. When I think about mitochondria, RNA, wave theory, and every other little thing I learned in my undergraduate education, I'm grateful it allowed me to pass on to my children a love for science.



Leveraging scientific study and achievement for the betterment of people is an entirely Christian thing to do.

I'm thankful for the time I spent in science and for my children sharing my appreciation of it, because I'm hopeful they will not be afraid of knowledge, but they, along with many other Christians, will reclaim the great Christian tradition of scientific engagement, achievement and advancement for the glory of God and the good of his creation.



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# Endnotes

## Introduction

<sup>1</sup> Saint Augustine, *On Christian Doctrine*, II,18,28.

## The Wonder of Creation

<sup>1</sup> See also: The behemoth (Job 40:15-19) and the leviathan (Job 41:1-43) bring God glory; the heavens, earth, mountains, forests and trees praise God (Isaiah 44:23, Psalm 8:1, Revelation 14:7, Psalm 65:9-13); the created world shows God's might (Psalm 65:6-8).

<sup>2</sup> John Muir, *My First Summer in the Sierra* (Boston: Houghton Mifflin, 1911),166.

<sup>3</sup> Daisy Yuhas, "Curiosity Prepares the Brain for Better Learning," *Scientific American*, October 2, 2014, <http://www.scientificamerican.com/article/curiosity-prepares-the-brain-for-better-learning> (accessed January 26, 2015).

<sup>4</sup> Marie Curie, during a debate in Madrid, "The Future of Culture" (1933), quoted in Eve Curie, Marie Curie and Vincent Sheean, *Madame Curie. A Biography* (Garden City, NY: 1937), 341.

<sup>5</sup> William Federer, *George Washington Carver: His Life & Faith in His Own Words* (St. Louis: Amerisearch, Inc., 2002), 68.

## The Competencies and Limitations of Science

<sup>1</sup> Galileo Galilei, "Letter to the Grand Duchess Cristina of Tuscany, 1615," *Internet Modern History Sourcebook*, <http://www.fordham.edu/halsall/mod/galileo-tuscany.asp> (accessed on August 12, 2014).

<sup>2</sup> In her book for elementary science teachers, *Primary Science* (Portsmouth: Heinemann, 2001), Wynne Harlen uses these steps to frame her chapters.

<sup>3</sup> Karl Giberson, *The Wonder of the Universe: Hints of God in Our Fine-Tuned World* (Downers Grove, IL: IVP Book, 2012), 139.

<sup>4</sup> *Ibid.*, 133.

<sup>5</sup> *Ibid.*, 56-59.

<sup>6</sup> From the publisher's description of Hugh C. Gauch, Jr., *Scientific Method in Brief* (Cambridge: Cambridge University Press, 2012) <http://www.cambridge.org/ca/academic/subjects/life-sciences/life-science-professional-development/scientific-method-brief> (accessed on August 12, 2014).

<sup>7</sup> F. James Rutherford and Andrew Ahlgren, *Science for All Americans* (Washington, DC: American Association for the Advancement of Science, 1989), 26.

<sup>8</sup> "DCI Arrangements of the Next Generation Science Standards," *Next Generation Science Standards*, November 2013, <http://www.nextgenscience.org/sites/ngss/files/NGSS%20DCI%20Combined%2011.6.13.pdf> (accessed August 12, 2014), 102.

<sup>9</sup> Erwin Schrödinger, *Nature and the Greeks* (Cambridge: Cambridge University Press, 1954) quoted in Walter J. Moore, *Schrödinger: Life and Thought* (Cambridge: Cambridge University Press, 1992).

<sup>10</sup> N.T. Wright, "Can a Scientist Believe the Resurrection?" *The Faraday Institute for Science and Religion*, May 15, 2007, [http://www.faraday.st-edmunds.cam.ac.uk/CIS/Wright/pdf/Wright\\_lecture.pdf](http://www.faraday.st-edmunds.cam.ac.uk/CIS/Wright/pdf/Wright_lecture.pdf) (accessed January 26, 2015).

<sup>11</sup> *Ibid.*, 13.

#### **Questions That Faith Asks Science**

<sup>1</sup> C.S. Lewis, *Mere Christianity* (San Francisco: Harper San Francisco, 2009), 136-137.

<sup>2</sup> Alex William, "The Biblical Origins of Science: A Review of *For The Glory of God: How Monotheism Led to Reformations, Science, Witch-hunts, and the End of Slavery* by Rodney Stark," *Creation Ministries International*, <http://creation.com/the-biblical-origins-of-science-review-of-stark-for-the-glory-of-god> (accessed January 26, 2015).

<sup>3</sup> Paul Chamberlain, *Why People Don't Believe: Confronting Seven Challenges to Christian Faith* (Grand Rapids: Baker Books, 2011), 100.

<sup>4</sup> John H. Walton, *The Lost World of Genesis One: Ancient Cosmology and the Origins* (Downers Grove, IL: IVP Academic, 2009).

<sup>5</sup> Francis S. Collins, *The Language of God* (New York: Free Press, 2007).

#### **Worshipping God Through Discovery and Science**

<sup>1</sup> Dorothy F. Chappell, "A World of Discovery Through the Natural Sciences" in *Liberal Arts for the Christian Life*, ed. Jeffrey C. Davis and Philip G. Ryken (Wheaton, IL: Crossway, 2005), 188.

<sup>2</sup> *Ibid.*, 188.

### **Tending God's Earth**

<sup>1</sup> Actually, however, Jesus himself starts with creation even in the Great Commission. His opening statement (before the command to go and make disciples) affirms his lordship over heaven and earth, that is, over the whole of creation including the earth ("heaven and earth" was the characteristic Jewish way of referring to the whole created universe).

<sup>2</sup> "The Cape Town Commitment," *The Lausanne Movement*, 2011, <http://www.lausanne.org/content/ctc/ctcommitment> (accessed January 26, 2014), Part IIB.6.

<sup>3</sup> Acts 2:44-45, 4:32-38, 11:27-30; Galatians 2:10; 2 Corinthians 8-9; 1 Timothy 6:17-19; James 2:14-17; 1 John 3:17-18.

<sup>4</sup> Dorothy Boorse, *Loving the Least of These: Addressing a Changing Environment* (Washington, DC: National Association of Evangelicals, 2011).

### **Reasons to Engage in Science**

<sup>1</sup> "Scientists and Belief," *Pew Research Religion & Public Life Project*, November 5, 2009, <http://www.pewforum.org/2009/11/05/scientists-and-belief/#fn-12952-1> (accessed January 16, 2015).

<sup>2</sup> Julie Borg, "Poll: Americans Don't Trust Scientists," *WORLD News Service*, November 3, 2014, <http://www.christianheadlines.com/blog/poll-americans-dont-trust-scientists.html> (accessed January 16, 2015).

<sup>3</sup> Christine Herman, "Study: 2 Million U.S. Scientists Identify as Evangelical," *Christianity Today*, February 20, 2014, <http://www.christianitytoday.com/ct/2014/february-web-only/study-2-million-scientists-identify-as-evangelical.html> (accessed January 16, 2015).

# On the Same Page: Faith and Science

“As laypersons we sometimes wonder if we know enough about science or religion to ask the right questions of either. As scientists we may welcome serious conversations but wonder if others tilt more toward controversy or more toward truth. As pastors we often keep silent on science, because we don’t know what to say or because we don’t want to engage or escalate unwanted debates.

“The National Association of Evangelicals asked a small cadre of authors to bring faith and science on to the same page. ... Our goal is not to answer all the questions but to unite the conversation in a way that values and respects both faith and science.”

Leith Anderson