On being a scientist and a Christian

Dr. D.W. Snoke

Department of Physics and Astronomy

University of Pittsburgh

Many people ask me how I can believe in the Bible "literally" and also be a practicing scientist. Doesnt modern science say the Bible is full of myths and errors? In many ways, it makes me sad that people even ask this question, because there is a great tradition of scientists who were Christians, and it tells me that this tradition is largely lost in our day. Yet just as the founders of science did not see any contradiction with their Christian faith, neither do I.

The Christian roots of science

First, I want to talk about that tradition, the Christian roots of science. Since this is a Reformed group, I will talk in particular about the Reformed roots of science. Have you ever stepped back to wonder why science arose first only in Europe, in particular, mostly in the countries of the Reformation? Is it just because of physical things like economics, communication, and transportation? The historian Stanley Jaki has done a marvelous job of researching why science arose only in Europe. In fact, there have been many empires

in history that accumulated great knowledge and had advanced mathematics, etc. These include the Greeks, the Muslim empires, the Chinese, and the Incas in South America. They had libraries and scholars at the main cities of the empires that were quite advanced. Yet this scholarship made very little impact in the lives of the people, and died with those empires. The Roman Catholic empire of the middle ages was like that too. In what ways were all these societies similar? One can identify several things:

1. The knowledge was kept "secret" by its owners as a way of exercising power over the masses of poorer people. Often it was part of the religious ritual, used to create fake miracles to impress the masses. There was little interest in elevating up the common man.

By contrast, in the Reformation, and even earlier in several Christian movements, there was a great interest in "applying" knowledge to help the common man. Roger Bacon, who I consider the father of modern science, was a monk of the order of Francis of Assisi, the monk of "love," and was primarily interested in applying knowledge to help people.

2. The people were superstitious, seeing the behavior of nature as mainly following the whims of demons or various gods. How could you do science if you were afraid of offending the spirits, or if you had no certainty that an experiment you did one day would give the same result the next day?

In contrast, in the Reformation, great emphasis was put on the sovereignty of God over all things. Nature was seen as orderly, reflecting an orderly Creator, even though affected

by Sin. Christians were taught not to fear demons or to be superstitious.

3. History was seen as static or cyclical. Any improvement would be a threat to the traditions of their parents, and possibly bring the wrath of these parents, who could still exist as ghosts.

In contrast, the Bible teaches that history has a beginning and an ending, and the growth and progress can occur. We do not hearken back to the traditions of our forefathers, but look forward to the Kingdom of God. In the days of the Puritans and the Reformation, many people believed that Christ would return after an earthly period in which the Church expanded to triumph and fill the whole world ("postmillenialism"). This led them to go about building long-lasting structures for society.

4. The "trades" were not valued, but rather despised. Without "engineering," that is, someone to build the devices, science has little value. Yet in most non-Christian societies, someone who built something was viewed as a lower class of person. Even more, doing experiments, which is essential for science, requires working with your hands. So few "philosophers" wanted to dirty their hands with seeing whether their theories were really true– they wanted to do "pure" philosophy, i.e., just sit around and think.

In contrast, the Bible teaches that we should "make it our aim to live a quiet life and work with our hands." The Reformation taught that all people had a "calling" (vocation) to their work, and that even the work of our hands is "holy," not just the work of the priests.

One still sees a contrast today between the countries that were influenced by the Reformation and those that were not. In the countries that were not touched by the Reformation, there is much less pride in "hand work" such as making trains run on time or making things clean and neat. People who do those jobs do as little as possible just to get paid, since society tells them that work is not "important." There is a saying: "A society that values poor philosophy more than good plumbing, will get what it deserves: neither its theories nor its pipes will hold water."

5. These societies had myriads of "authorities" that could not be contradicted, but in fact those authorities frequently contradicted each other and led to great confusion. Their scholarship filled libraries. Yet with no absolute standard of truth except Tradition, it was very difficult to tell the true from the false.

By contrast, the Bible gives us an absolute and sweeps away the traditions of men. The Reformation allowed men to reject generations of tradition, when experiments showed they were wrong, without fear that the leaders of the Society would condemn them. This was a real fear in many societies– you could get killed for contradicting an authority. This would sure put a damper on the practice of science.

Roger Bacon, scientific reformer

Let me talk more about Roger Bacon, who lived in the 1200s. As I said, I consider him to be the father of modern science. One reason we do not hear about him so much is that his books were banned by the Catholic church. But we know that many important people read his books, including Francis Bacon (no relation), who lived a few hundred years later and who was a Reformed Christian, who is considered the father of the "scientific method." I will list three things that Roger Bacon taught:

1. He taught that the Bible is without error, and therefore is far superior to all writings of men. In many ways, Roger Bacon belongs to the Reformation– and that is one reason why his books were banned. He followed the teaching Augustine of Hippo very closely– who was also a favorite author of the Reformers. Here is a quote from Roger Bacon that shows how he valued the Bible, and rejected the authority of mere church tradition:

> Augustine says in answer to Jerome that he is willing to believe that the authors of the sacred Scripture were the only ones who wrote without error, but that in the writings of others, however great their sanctity and learning, he is unwilling to consider there is truth unless they are able to prove their statements by the canon, and by other authors, or by adequate reasons....Likewise to Fortunatus, "Nor ought we to regard the disputations of any, although they be catholic and

> praiseworthy men, in the same light as canonical Scriptures, so that we may not, while retaining the respect due those men, call in question and reject anything in their writings, if perchance we find that their views have been at variance with the truth as understood by Gods help either by others or by us. My attitude toward the writings of others is the same as I desire my readers to assume toward mine.

By modern standards, Roger Bacon would be called a "fundamentalist"! Yet he saw no contradiction in studying nature and learning from non-Christian philosophers. This is because he, like the Reformers, saw God as sovereign over all things. He did not have to fear new knowledge, that it would contradict his faith.

2. He taught that all truth is Gods truth, that we have nothing to fear from studying non-Christian systems, if we use Gods word to sift out the chaff. Here is a quote from Roger Bacon on the value of studying non-Christian scholarship:

> For if Christians ought to snatch from the philosophers as from unlawful possessors the useful facts contained in their books, even as in the beginning I have quoted from Augustine, it is evident that philosophy is wholly worthy and belongs to sacred truth. In the same book he says that the gold and silver of the philosophers did not originate with them but are dug out of certain mines as

it were of divine providence, which is present everywhere, and he shows that this has been prefigured, saying, "Just as the Egyptians possessed vessels and ornaments of gold and silver and raiment, which that people on its departure claimed for itself on the ground that it would make better use of these things; so the systems of the Gentiles contain liberal instruction better adapted to the service of truth and moral precepts of the most useful kind, and some facts are discovered in these philosophers concerning the worship of God himself, and this gold as it were and silver of theirs the Christian should take from them and apply to good use in preaching the Gospel.

3. He taught that study of nature is a worthy task for the Christian, that the physical world is not "below" us. Here are some quotes on the value of studying nature:

Yet in general [Augustine] says in regard to all the natural science, "That man would indeed do the Scriptures a kind service who should collect the characteristics of times and places, of stones and the rest of inanimate things, of plants and animals."

But the whole purpose of philosophy is to evolve the natures and properties of things, wherefore the power of all philosophy is contained in the sacred writings; and this is especially clear, since the Scriptures far more certainly, better, and

more truly comprehend the creatures than philosophical labor would know how to define them.

I wish to show...that there is one wisdom which is perfect and that this is contained in the Scriptures. From the roots of this wisdom all truth has sprung. I say, therefore, that one science is the mistress of the others, namely, theology, to which the remaining sciences are vitally necessary, and without which it cannot reach its end. The excellence of these sciences theology claims for her own law, whose nod and authority the rest of the sciences obey. Or better, there is only one perfect wisdom, which is contained wholly in the Scriptures, and is to be unfolded by canon law and philosophy. I make this statement since the exposition of divine truth is made through those sciences. For it is itself unfolded as it were in the palm of these sciences, and yet it gathers within its grasp all wisdom; since all wisdom has been given by one God, to one world, for one purpose.

In this last quote, Roger Bacon calls theology "the queen of the sciences" yet says that without the study of the other sciences (natural science, languages, etc.) we can not really understand the Bible, and therefore theology becomes empty.

Roger Bacons accomplishments are truly amazing. Because he was not afraid to study the practices of witches, the Chinese, and Arabs, he took many of their devices and put

them to practical use:

1. He saw in Chinese fire crackers a way to defend the church of God from her enemies. At that time in history, the Muslim empire threatened to destroy Christianity. Shortly after Roger Bacon developed gunpowder, the tide was forever turned. This was the first use of applied chemistry in Europe.

2. He used Greek and Arab science to estimate the radius of the earth. Quotes from Roger Bacon which told of the size and spherical nature of the earth were printed on the "Mappo Mundi" were read by Christopher Columbus. Since Bacons work was still banned, no credit was given to him.

3. He advocated the study of astronomy in order to set the times and dates of Scripture accurately. His writings were a direct influence on Copernicus to accurately set the calendar, which led to the Copernican revolution that put the sun at the center of the solar system.

4. He used Arab magical optics to start the field of optics, and predicted the invention of the telescope. The earliest lens makers in Europe may have been his students. He also started the study of magnets, which led to compasses. These and the science of astronomy led to the success of navigation across the oceans, and ultimately the great mission expansion of the church.

5. He started study of ancient languages, so as to better understand the Scriptures; in particular, he was greatly concerned with accurate translations of the orginal writings. This

had influence on Erasmus, and the Reformation. He also started the study of comparative religion, and advocated world missions on the basis of understanding other cultures and their languages; he opposed the Crusades.

6. He started study to study herbs and healing medicines. Before, the use of herbs was reserved to mystical witches and magic men, but Roger Bacon made the study of medicine respectable.

7. His writings were widely published following the Reformation (the first time this was allowed since the ban by the Catholic church) and his writings influenced Francis Bacon and others to abandon Aristotle and start the Experimental method.

I have gone on about Roger Bacon because he is often neglected in history. As I said, this is because later writers for many years could not give credit to him, because his works were banned. But it seems clear that Roger Bacon was the father of science in Europe, and that he did what he did explicitly for Christian reasons, seeing no fear of contradiction with the Bible. Quite the opposite, he saw the Bible as the reason for his science!

Most later great scientists up to this century were also Christians. These include: Johannes Kepler, Isaac Newton, James Maxwell (a Scottish Presbyterian), Blaise Pascal, and Lord Kepler. Many great theologians were also scientists, such as Jonathan Edwards. It is really a false picture to say that the Church has been at war with science since the beginning. All of these men saw no contradiction between their faith and their science; in fact, most

of them tried to show the truth of the Bible through their science. In addition, many great scientists who were not Christians were believers in God, for example Benjamin Franklin and Albert Einstein.

The Humanistic Slide

What happened then? Why is there the perception today that science is the enemy of religion? Francis Schaeffer is one person who has documented the changes over the last few hundred years.

As mathematics grew more and more improved, many people became very impressed with the exactness with which it "proved" things. Many people started to feel that if you couldnt prove something "mathematically" then it just wasnt valid. In particular, people wanted to prove the existence of God in a "mathematical" sense.

Most people trace the origin of modern philosophy to Descartes (or, "des Cartes"), who was a Christian. He believed that he could prove things "absolutely" or "mathematically." He is the one who came up with "I think, therefore I am" as the starting point of philosophy– a statement which is apparently absolutely certain in a "mathematical" sense. He believed he could prove the existence of God in the same way. As Francis Schaeffer discusses, Descartes followed in the footsteps of Thomas Aquinas (who was a contemporary and an enemy of

Roger Bacon,) who in turn followed Aristotle.

Now, many people associated this kind of mathematical certainty with science, but in fact, it is the enemy of science, even though science uses a lot of math. Science is based on "inductive" reasoning, that is, gathering information through experiment and making theories that are provisional based on the data. They can become very certain but never "perfectly" certain. By contrast, mathematical proof and Cartesian philosophy are based on "deduction." Once you have a starting point (the axiom), you deduce your way to a conclusion and there is no need to do any more experiments– since your conclusions are already absolutely certain, by logic. This kind of reasoning has its roots in Aristotle. Aristotle never did any experiments– and people who read his books did bad science for hundreds of years, before Francis Bacon, who rejected Aristotle and Descartes, came along!

In the 1600s David Hume started to publish attacks on the Bible and Christianity. Basically, he said that there was no way to "mathematically" prove the existence of God, as Descartes wanted. He rejected all kinds of "inductive" reasoning– even though this was the basis of modern science, which Hume loved! Immanual Kant, a famous Christian theologian, first started out to refute Hume. But he ended up concluding that Hume was right.

This capitulation by Kant was a watershed event in Europe. Since the existence of God could not be proved with "absolute certainty," many people had the sense that the existence of God was "uncertain" – that there was no proof at all. Of course, in this debate, other

forms of proof, such as personal experience or observation, were left out, since they all involve non-mathematical reasoning.

Kant, and later, Soren Kierkegaard, accepted the premise that there was no way to "prove" the existence of God and therefore tried to define Christianity in new terms. Kierkegaard said that one can not give reasons for belief in the Bible– one just "chooses" to believe in it. This is called Kierkegaards "leap of faith." It is essentially non-rational. Notice how that in this view, Christianity has become independent of reason, i.e. "unscientific." Karl Barth essentially argued the same way– he argued for orthodox Christian beliefs while refusing to give any good reason other than personal choice. This kind of Christianity (from Kant, Kierkegaard, and Barth) is often called "liberal" Christianity, or "neo-orthodoxy."

Now, since the Christian philosophers were abandoning Reason, the atheists took up the mantle and claimed it belonged to them. In the late 1700s through the 1800s, there was a movement variously called the "Enlightenment," "Humanism," or "Modernism," led by atheist scientists and philosophers like LaPlace, Mach, and Bertrand Russell. They had great optimism that science and math would replace religion, and they created this myth that Christianity had always been the enemy of science.

Now we know the results of this "modern" movement. The French Revolution, the Communist Revolution (which was a lineal descendent of the French Revolution), and the Nazi and Fascist movements, all rejected religion and instead based themselves on the "exact

results" of science. Modern science would give us all the answers to life! Millions of people were killed, and society broke down.

As I said before, real science is based on induction and experience, and does not claim to have absolute answers. As an experimentalist, I can certainly tell you how hard it is to get exact answers! In order to equate Descartes exact reasoning with modern science, the Humanists also had to create a myth about how science works. This is the idea that the real world works like a machine, following blind "laws," like a clock. Nothing ever happens that is not determined by the laws of the machine. This is different from the idea of an orderly God, which was the original basis of science. In the old view, the basic reality was the work of God, and equations were merely helpful descriptions of His work in certain cases. There was no claim that the equations described everything, and no problem if you wanted to revise the equations. In the new view, the equations caused everything to happen. They are more "real" than anything else, and are unchanging. Of course, in such a system, there is no room for miracles. One also expects that once one knows the equations, one knows "everything." Even today, there are many scientists looking for a "Theory of Everything."

Unfortunately, at the time of the birth of Humanism, there were very few great Christian minds who stood up for Reason. Jonathan Edwards is one, but he died young and had little influence outside America. Most of the Christians went for one of two forms of "anti-Reason" – either liberalism, which accepted much of what Humanism said, but then said "I believe

anyway," or separatism, which simply avoided the discussion, and formed little communities that did not engage the Humanists in debate. The latter tended to reject science (they accepted that it said what the Humanists said it did), and therefore became victims of a stereotype, of the "stupid fundamentalist."

Many Christians who I know in the sciences tend to live in "two worlds." For six days, they accept the view of science as "blind laws." This is sometimes called "methodological naturalism." On Sunday, they accept the Bible, but believe it has nothing to say about science, that is, it has nothing to say about the "real world." They would say it speaks only about "spiritual" things.

Modern Christian Arguments

In this century, people like C.S. Lewis, Francis Schaeffer, Josh McDowell, and R.C. Sproul have been very effective in debating Humanists while not rejecting Reason. One thing they point out is that Christianity is founded on miracles. If the miracles of the Bible did not really happen, then we are all idiots and we may as well forget about Christianity– as Paul says. But if the miracles did happen, then since they happened in the real, physical world, this must have implications for science! For instance, suppose you were at the miracle of the feeding of the 5000. There was bread left over! Couldnt a scientist have measured the

amount of bread? It would be possible to be very "scientific" at that moment (writing down testimonies, etc.,) but it would be impossible to describe the event with "equations." And if life was created by a miracle, wouldnt we expect to find evidence of that?

David Hume argued that belief in miracles was "unscientific" and Kant and many others since then have agreed with him. But several Christian writers like those I mentioned above have pointed out failures in Humes arguments. I will point out three failures of Humes arguments here:

1. Hume said that if I have never seen a miracle, then by induction I would never expect to see one. That is not the same as expecting that there never has been one, however. In fact, if I believe that God exists, then it would be very surprising if He never made Himself known, never did a miracle.

2. Belief in miracles does not imply a view of the world as chaotic and random, in other words, superstition. We believe the world is not chaotic because God is orderly, but we do not believe the world must always follows laws like a machine. God has the right to "intervene" in His creation and change the laws, to testify to Himself. In the same way, I can write a good and orderly computer program, but I can also change it if I want. The fact that I can change it shows my lordship over it.

3. Hume did not understand the role of "authority" in science or religion. There are many things that we never see that we nevertheless believe in (such as other galaxies, or

bacteria, or atoms) because we are told they exist by people we trust. In the same way, we can believe in miracles if the messenger is trustworthy. For instance, is he willing to die for the sake of his message? C.S. Lewis was converted from atheism to Christianity by studying the lives of the people who testified that Jesus rose from the dead.

The authors I mentioned, C.S. Lewis, Francis Schaeffer, Josh McDowell, and R.C. Sproul, insist that we can argue with the non-Christian in a reasonable way, and not just call him to a "leap of faith." I should mention that there is a debate in the church about how to argue with the non-Christian. People called "presuppositionalists," (e.g. Cornelius van Til, Gordon Clark, and John Frame) say that we should start with the Bible– that certainty in Gods word is what gives us certainty about science and experience. The "evidentialists," which would include the above four writers, and myself, would say that we start with the persons experience, which must necessarily have God in it, since God testifies to every person that He exists (Romans 1). We then commend the Bible to them as something that is true testimony about events in the real world of their experience.

Despite the disagreements, there are several areas of agreement. First, we agree that man naturally wants to "shut out" God. No amount of reasoning or reading the Bible will make a person believe if his heart is closed to God. Second, we agree that we can know nothing about God until God first comes to us and awakens us with His Holy Spirit. I think the disagreement is whether God speaks to us first via a "word," or "opens our eyes to see." To

put it another way, does God change us primarily through an "idea" (a presupposition) or through "experience" (evidence.) Both sides also agree that for the Christian, there is no contradiction between science and the Bible– we live rationally, not irrationally.

Another area of modern controversy is whether my science can affect the way I interpret my Bible. Roger Bacon and Augustine thought so, as I showed in the quotes earlier. That means that if I find an early meaning of a Hebrew word, it might change the way I look at Scripture. It also means that if I find that the world is round and not flat, I may need to rethink some passages, as the church did at the time of Galileo. What if I find that the world looks like it is a billion years old? Can this be reconciled with the Bible?

I dont think that everything scientists tell us must be forced to fit with the Bible. Often, scientists present things as certain that actually have very little evidence. I personally dont believe in evolution, the idea that life could arise entirely through random and chaotic actions. But I am open to the idea that the "days" of Genesis 1 could have been longer than 24 hours, perhaps millions of years.

Living with Tension

Just a little more about apparent contradictions. I have said above that I, like Roger Bacon, assume that there are no contradictions between the Bible and science. I would like to be

able to say to you that I have studied all the issues and that I do not see any contradictions between science and the Bible. Unfortunately, I do see many apparent contradictions in all of the following areas: (1) between the Bible and science, (2) between one part of the Bible and another part of the Bible, and (3) between one part of science and another part of science. What do we do when we come across a problem like this?

When faced with apparent contradiction, a person has only three choices. First, one can reject one side or the other. For instance, in a contradiction of the Bible with science, one could throw out the Bible ("liberalism") or throw out science ("fundamentalism.") In a contradiction of the Bible with itself, one could throw out part of the Bible, e.g. Luthers desire to throw out James. Or in contradictions in science, a person could choose to ignore certain experiments.

A second approach is to reject the idea of contradiction. This can involve mysticism, which directly embraces contradictions, or some kind of view of "complementarity" such as the theology of Barth which puts the Bible and science into two different, non-overlapping worlds (also represented in the modern church by authors like Howard van Til.)

Both of the above make a trivial resolution of the conflict. The third approach is to attempt a resolution based on greater understanding. This is a much more difficult task, and it requires being able to say, in many cases, "it appears contradictory, but I dont believe it really is." On faith, one believes that with further information one could resolve

the apparent contradiction; in other words, that it is not a real contradiction, but only an apparent contradiction due to ones ignorance of all the facts. In the meantime, one lives in "tension," i.e. confusion.

In science, this is often the most honest approach. It often happens that a new experiment is reported that seems to contradict earlier ones. I could simply ignore that new experiment (option 1, above) but if the experiment was well done and documented, that would be dishonest. Instead, I need to look for ways to understand the theories that explain the experiments. In the case of quantum mechanics, certain experiments have not yet received a good explanation for over 80 years. Since the experiments are very reliable, scientists have simply learned to live with apparent contradictions.

Karl Popper, a famous philosopher of science in this century, has a famous saying that just one single contradictory datum can overturn a theory, but no amount of consistent data can prove a theory. This is simply not the way real science works. For one contradictory datum to overturn a theory, the scientist would have to have absolute confidence that the new datum was recorded and interpreted correctly. In reality, scientists continue to believe in very trustworthy theories despite apparently contradictory data, because of an enormous amount of the consistency in other data. It usually takes a huge amount of contradictory data to overturn a successful theory.

In the same way, if we have other good reasons for believing the Bible, a few apparent

contradictions should not sway us. Instead, we should set about trying to resolve those contradictions. We can do this in faith, confident that we will make progress, knowing that God promises to give wisdom to those who ask. I can testify that in my own life, although I have not resolved all the apparent contradictions I have come across, I have resolved many of them.

It has been said that all of education is resolving contradictions. I hear something that my teacher says and it seems to contradict something he said before, or that I read in a book, or in my own experience. This is where I spend most of my time studying– the parts that "make sense" dont give me any trouble, only those parts that seem contradictory.

In studying the Bible, we can often make headway the same way. R.C. Sproul has said that to mature in your understanding the fastest, you should study mainly those parts of the Bible that you like the least. Those are the parts which seem contradictory– which you do not understand– and when you understand them you will have gained wisdom.

The Breakdown of Science

At the beginning of this talk, I mentioned several characteristics of societies that were non-Christian that prevented science from appearing. It is also true in a society where science exists, if those things come back, then science will disappear. Unfortunately, I see this

happening in Western society, since belief in the Bible has started to fall off.

Since World War II, intellectuals in the West have not generally held to the same optimistic Humanism that the communists and fascists did. They have seen too clearly the evils of these systems. Instead, they have had a basically pessimistic outlook, called "Existentialism." They reject the idea that Science can provide all the answers to life. Instead, this system follows the arguments of Kierkegaard, but does not take the same path of orthodoxy. Instead, they say they can "choose to believe" (Kierkegaards leap) in anything they want.

In practice, this usually means sexual promiscuity and "living for today" (since they believe there is nothing good to look forward to in the future.) It also means a rise in paganism, since that is often a more "fun" kind of religion. So there is a rise of elitism, superstition, pessimism, empty philosophy, and endless bookwriting and quoting of authorities– all the evils I mentioned at the start. A lot of the science I see today is totally useless– just someones intellectual playground. The quality of engineering and workmanship is going down, since those are "low class" jobs, even while we mass produce more and more things. People are afraid to contradict the authorities, so they suppress experimental results that they dont like. Society is becoming stratified into "workers" and "intellectuals" again. Scientists, who are the new "high priests" of society, say " a study has shown..." and everyone accepts it without question because no one really understands what is good science and what isnt. I fear that this cannot last forever.

In conclusion, I want to say that I hope you encourage your children to become scientists, and philosophers and authors, if they have the abilities for these things. We need more Christians to engage the world in debate, who know what the world is thinking. This means they must have the strength to not just accept everything the world teaches, but to examine it in the light of the Bible, and "take the silver and gold from the Egyptians" as Roger Bacon said, that is; to "take every idea captive," as the Apostle Paul said, and have the courage to debate as Paul did, on Mars Hill.