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Is Science Enough? Faith, Reason, & the Human Need for Certainty | Dr. Troy Van Voorhis

September 20, 2019



The Veritas Forum

Dr. Troy Van Voorhis, a chemist at MIT, speaks to an audience at the University of Florida about whether science is enough to give us the reason and certainty we seek in life. ~~ Please like, share, subscribe to and review this podcast.

Transcript

~~~ Welcome to the Veritas Forum. This is the Veritas Forum Podcast. A place where ideas and beliefs converge.

What I'm really going to be watching is which one has the resources in their worldview to be tolerant, respectful, and humble toward the people they disagree with. How do we know whether the lives that we're living are meaningful? If energy, light, gravity, and consciousness are a mystery, don't be surprised if you're going to get an element of this involved. Today we're here from chemist.

Dr. Troy Van Voorhis with the Massachusetts Institute of Technology in a talk titled "Is Science Enough? Faith, Reason, & the Human Need for Certainty." So as many of you know, probably know I am here tonight because I belong to a group that has somewhat dubious historical origins. So early practitioners of my tradition often claim to have supernatural powers. And they also claim to have esoteric knowledge that was only granted to the worthy.

And as a result, they tended to communicate their messages in the form of cryptic allegorical parables so as to hide that knowledge from the uninitiated. And in those early days, the practitioners of my tradition were often persecuted and marginalized before ultimately gaining acceptance in the wider world. And I'm of course at this point speaking of my heritage as a chemist.

Perhaps some of you think I was going to say something else. But no, in fact, chemistry has its historical origins in the study of alchemy. And I think yes.

All right, so if we go forward here and then one more. So this is an example of one of those alchemists, Maria Profitesma, and see what alchemists thought was they thought that by contemplating certain philosophical ideals, things like reason and truth and beauty, that you could come to understand things that we now call chemicals. And contrary wise, they thought that by studying chemicals, you could come to understand these higher philosophical truths to a greater degree.

So Maria Profitesma is somewhat famous because she was the first person to describe the distillation of compounds. She was also famous because she was the first person to describe how you could use that distillation apparatus to extract gold from plants. Jibir Ibn Hayan was another alchemist.

He was an Arab in the eighth century. He's famous for presenting the first synthesis of citric acid and also the first description of crystallization. He's also famous because he was the first person to describe the synthesis of live snakes and scorpions from inanimate matter.

Next we have Francis Bacon, Roger Bacon. He was a 13th century alchemist in England. He's famous for presenting the first western recipe for gunpowder, also famous for making the first recipe for turning lead into gold.

And finally we have Paracelsus in this parade of ignominy. Paracelsus is actually a famous modern chemist. He's the father of toxicology.

He arrived at many of his conclusions about toxicology, how chemicals act in the body based on his observation that the motion of the celestial bodies influenced how chemicals act within the human body. So it was astrology. And so backing up then and looking at these, it's kind of strange to the modern mind that these two disciplines, alchemy and chemistry, grew up together.

But then again, if we think of the paradigm for a chemist, it's someone who mixes things in strange reaction vessels and wears a funny coat. And if we think about the paradigm for an alchemist, it is also someone who mixes things in a strange reaction vessel and wears a funny coat. It's just that on the right we have a lab chemist and on the left we have a wizard.

And now I am a Christian and the historical narrative of Christianity is eerily similar to that of chemistry. Historically, religion has had to work hard to disentangle itself from mythology on the one hand and superstition on the other. So mythology is the practice of inventing fictional tales to explain phenomena for which there's no reasonable alternative explanation.

So when you see lightning, you invent a god Zeus who hurls that lightning down to earth. Superstition is the belief that one type of event causes another type of event in a way

that runs contrary to reason and observation. So for example, superstition tells us that when we find a four leaf clover, it will bring us good luck.

And historically, science has been one of the key tools by which we expunge mythology and superstition from religious thought. So when we see lightning, we can now explain how that occurs in terms of chemistry and physics without having to invoke bearded deities. And as for superstition, we can test superstitions.

We can test whether four leaf clovers really do bring luck. Like what if I overexpress the mutation that brings about four leaf clovers? Does that mean that they become more lucky? What about a five leaf clover? How does the amount of luck that I have scale with the number of leaves? These are all things that I can test with science. And so the question becomes after applying the scalpel of scientific inquiry to something like religious faith, is there anything left? Does religion still play a role in human thought or does science explain it all? Is science by itself enough? Does it explain everything? And that's what we are going to discuss tonight.

I'm going to talk for a little while and then we're going to have some questions and answers so it really will be a discussion. So is science enough? Well, lurking behind this question is a particular philosophy which is called metaphysical naturalism. So metaphysical naturalism is the conviction that the natural world is all that there is.

And if metaphysical naturalism were true, then it would clearly imply that yes, science is enough. If the physical world is all that there is, then one can only search for scientific answers, explanations of physical events in terms of natural causes. Supernatural agents like gods and angels and demons would not even exist and therefore could hardly be used as an explanation for anything.

Contrary wise, if it turns out that in some sense science is incomplete, that's going to cast some doubt on the fundamental tenent of methodological naturalism, which is that the natural world is all that there is. If science is incomplete, it suggests that maybe the natural world is actually not all that there is. And in discussing this, I think there are really two subtly different questions being asked.

So the first question is whether science is enough to explain all of the evidence that we observe. And on the other hand, we want to know if science is enough to act as some kind of an overarching life philosophy, can we use science as a guide for life? And so I want us to tackle these two questions in turn. So first things first, is science enough to explain all evidence? Well, here we need to realize that science only gives us at most one explanation to any particular question we ask.

And that explanation is in terms of what we would call efficient physical causes. It's a mechanistic explanation. So when we need to decide, and when we get that answer, we need to decide if that answer is always complete or satisfying.

So for example, consider this question. Is the universe governed by random chance? So if I was to give a scientific explanation of that, I might note that there is a variable known as entropy that measures the amount of disorder, the amount of randomness in a system. And there's even a scientific law, the second law of thermodynamics, that says that the universe, or at least the part of the universe we could observe, is constantly evolving from a state of order toward a state of disorder.

Entropy increases with time. And this drive toward higher entropy or higher disorder can be used to explain countless chemical phenomena. It explains why ice cubes melt.

It explains why iron rusts. It explains why balloons deflate. And so in a scientific sense, the answer to this question is yes.

The universe is largely governed by random chance. But there are actually different layers of meaning to a question like this. Because on the other hand, we could ask the same question, is the universe governed by random chance, but meaning random chance in the sense of being haphazard or having no purpose? Now purpose is an idea that exists outside the physical order.

And so according to metaphysical naturalism, asking any kind of question about purpose is out of bounds. Because things outside of the natural order don't exist. Only the mechanistic explanation is real.

But from a theistic perspective, the existence of order is one of the strongest arguments for the existence of God. We observe that the universe is tending from a state of order toward one of disorder. And so the obvious question is, where did the initial ordered state come from? To put it in a colloquial state, or colloquial sense, your dorm room might have a tendency to go from a state like this to a state like this.

But if you come along and you see a room that started out like the top room and ended up like the bottom room, you can be pretty sure that there were someone who came along and organized it in the first place. We could probably even infer some things about their character, what they're interested in, what they like. And so the theological question as to whether the universe is governed by random chance would be, no.

The universe is not governed by random chance. Because it started out in some ordered state, we could infer potentially that it was created and governed by a God of order. And so we see that while science can in some sense always explain the evidence, the explanations of science sometimes are unsatisfying.

They feel incomplete. They only ever explain part of what we might want to know about a given phenomenon. And so we're left feeling like there might be something more.

Whoa. Okay. All right, so I was going to go back to the second question at this point.

So we'll just fly by. There was another question there. And that question was whether science is enough to act as an overarching life philosophy for us.

Can I use science to guide my decisions, my choices and my actions in a way that does not depend on faith? Well, in this endeavor, we immediately run into a problem because scientific evidence is always incomplete. The conclusions that science gives us are always uncertain. Only in pure mathematics, oh, hey, we're back.

Okay. Only in pure mathematics is evidence enough alone enough to lead to certainty. You know, because if we look at the proof of Fermat's last theorem, we're sure that is correct.

We are sure it is true. But in science, as Richard Feynman once said, we have found it of paramount importance that in order to progress, we must recognize ignorance and leave room for doubt. Scientific knowledge is a body of statements of varying degrees of certainty, some most unsure, some nearly unsure, none absolutely certain.

In science, we are pretty sure that things like the standard model of particle physics are correct, but we're not certain. Because no matter how much scientific evidence we gather, there's always more evidence to bring in. And that new data could change our conclusion.

And this lack of certainty is a problem if we want to make science our life philosophy. And to illustrate why this is a problem, I have a little story to tell. It had some pictures with it, but I'll ask you to now just visualize the story.

Oh, wait, we're back. Okay. So here we go.

I have a story to tell them, assuming it stays up. We'll see. Oh, there we go.

All right. So this story is about a friend Sally. And Sally is out hiking.

And she got lost. So she's been hiking for a number of hours longer than she thought she's going to be. She's eaten all of her trail mix, and she is very hungry.

And she knows she's at least several hours from base camp, if she could even make it there. But thankfully, she notices that across a very deep valley, there is a plate of bacon. You saw the bacon though, right? Because science and faith might not be in either or position proposition, but bacon is definitely either or, either you like bacon or you're wrong.

So you've got the picture in your head. So Sally is really hungry, and she really wants the bacon, but she can't hike to the other side of the valley. It is too far for her to jump in the valley walls or too steep for her to hike down and back up.

But fortunately, if you notice, there was a bridge, right? There was a bridge across the

valley. And she has to decide if she is going to cross that bridge. But unfortunately, it's a rather sleazy looking bridge.

It's missing some slats. The rope is fraying. The bridge sways violently back and forth every time the wind blows.

Should, if will the bridge hold if Sally attempts to cross it, or will it collapse, leaving her to plunge to her death? She may think it will hold her, but how can she be certain? Well, this bridge gives us the ultimate definitive test of certainty, because if Sally attempts to cross the bridge, it indicates that she must be certain that the bridge will hold her. Unless she is suicidal, she would have no motivation to step onto a bridge that she didn't think was going to support her weight. Likewise, if she chooses not to cross the bridge, then it proves that she is not certain that the bridge will hold her.

And ultimately, I think this is the key measure of certainty. Certainty is certainty to act. Purely based on science, we can never attain this kind of certainty.

There's always going to be some evidence that suggests the bridge is going to hold up Sally's weight, like the fact that it hasn't fallen down just yet. There's always going to be some other evidence that suggests it's going to collapse, like the fact that the rope is fraying by the second. And in this situation, science remains uncommitted to either option, but Sally has to make a decision.

And in making that decision, she has to place a form of conviction, a form of sureness, a form of certainty in one side of the proposition or the other. You know, she asked, she maybe is going to hope that the bridge will hold her, in which case she might cross, or she might despair that the bridge will not hold her, in which case she would not cross. Or contrary, why she might hope that she can make it back to base camp without any more food, or she might despair that she's going to survive either way and therefore attempt the crossing just to get a quick resolution to her dilemma.

But no matter what decision Sally makes, she has to invest herself in a proposition that from a scientific standpoint cannot be fully justified. Thus in making decisions, we need a kind of sureness, a kind of certainty that science is not equipped to give us. And this certainty can take many different forms.

It can take the form of hope, despair, cynicism, optimism, pessimism. But we need certainty in some form. In all of these forms of certainty, share one thing in common.

They require some form of faith. Because faith is how we know that something is going to turn out a certain way even when the evidence is incomplete. Now we've seen that science can give us greater and greater confidence in a particular proposition, but it never gets us all the way across the gap from indecision to certainty.

It may be that science gets us almost all the way there and there's only a small gap. It

might be that science only takes us a little bit of the way and there's a big gap, but there's always a gap. And that last step across the gap is always the step of faith.

Now this need not be religious faith. You can have faith in the goodness of humanity, faith in a person, faith in the law of gravity. You need, it can be in many things, but decision making requires faith.

Because faith is the thing that leads to decisive action in the face of incomplete evidence. And so by itself science doesn't really form a good working life philosophy. So if science isn't enough, then what is? Or to put it another way, if we have to place faith in something in order to make decisions, how do we know if we're placing our faith in the right things? And so in doing this and evaluating our faith choices, there are a number of questions we need to ask.

I just want us to discuss two questions. So the first question is whether the faith that we are holding is consistent with science. It's question number one.

The second question that we need to ask is whether that faith is also universally effective. And we're going to discuss both of those questions. We'll take them in turn and I'll lay my cards on the table and say that as a scientist and a Christian, I'm going to pay special attention to the faith system of Christianity and evaluating its suitability by those criteria.

But I would argue that any faith tradition, any faith framework needs to be subjected to this kind of scrutiny. So first, we have to look at a given framework of faith and decide if it is consistent with science. So here we're acknowledging that while science by itself isn't enough on its own, still science isn't nothing.

It's still a very important component of human thought. And so a faith principle that runs counter to science should really be viewed with fairly hefty skepticism. And there's actually a fairly general misconception that Christianity actually fails on this point.

That Christianity is in and of itself at its roots inconsistent with science. So to put it one way, there's a myth that believing in Christianity means you can't believe in filling the blank with your favorite controversial topic. You can't believe in the Big Bang or Evolution or Climate Change, whatever you want to say.

And the general idea seems to be that there are observable facts that Christians are supposed to stand for. How old is the universe? What are the origins of species? Does the earth revolve around the sun or the sun around the earth? And the pre-proposition, or the perception, is that the difference between science and Christianity is just which description of events you think is correct. Scientists think the earth is this many years old, Christians think it's this many years old.

Scientists believe in trilobites, Christians don't believe in trilobites. Scientists drink coke,

Christians drink Pepsi. And I want to emphasize from the outset that this is a myth.

It's false. Christianity is not all incompatible with science. And the mistake here is equating both Christianity and science with a set of observable facts.

This is not an accurate characterization of either Christianity or science. Now some of you might disagree with me. Some of you might say, well, isn't science just factual observations? Things like there are 206 bones in the human body or sodium reacts vigorously with water.

Isn't that what science is? And I have to admit that it's a failing of our scientific education system that you have probably spent a lot of time in your science classes memorizing facts exactly like that. But unfortunately, those facts by themselves are not science. As Henri Poincare said, science is made up of facts.

Just as houses are made of stones, science is made of facts. But a pile of stones is not a house. And a collection of facts is not necessarily science.

Because science is more than just a catalog of observations about the physical world. Science is a framework for taking those observations and shaping them and giving them a kind of meaning. Likewise, Christianity is more than just observable facts.

Christians, by and large, believe the Bible is true. And the Bible does contain a number of facts about God's action in the natural world. But these facts by themselves are not Christianity.

Christianity is a framework for taking those facts and giving them meaning and purpose. Now, what is certainly true is that the interpretations offered by science and the interpretation of scientists are often in conflict. But they shouldn't really shock us.

Because at the same time, the interpretations offered by one scientist are also in conflict with the interpretations offered by other scientists. These conflicts are not a sign of some kind of fundamental incompatibility. Rather, these conflicts are the way that we learn things.

And so don't let anyone fool you into thinking that science and religious faith are somehow incompatible. So that was the first question. Is whatever faith framework you're working with compatible with scientific thought? The second question is whether, and that one wasn't very useful in terms of narrowing things down.

Because as we've now established, there are actually a lot of different faith frameworks that you could use that would be consistent with science. So the second question is the one that's more significant. We need a framework that's going to be effective.

It has to work and has to work for us. And what is more if I'm going to say that some



framework is enough, then I need something that's going to work all the time. A faith that only works part of the time is by definition incomplete.

So it needs to be universally effective, effective all the time. And what the Christian faith recognizes is that for something to be universally effective, what matters to humans in the face of incomplete information is the thing that matters very much is who is making a request of us. This is not true in the case of science.

The source of the request doesn't matter. It only matters what is written in the paper. It doesn't matter who wrote it.

But in the case of action decisions, the source is always critical. So if my wife texted me and told me to leave \$100 in our mailbox, I would do it without requiring further information. But if one of you texted me and told me to leave \$100 in my mailbox, I would call the authorities because it matters who is asking.

And this is why impersonal ideals are generally insufficient as a framework of faith. They are simply not effective. So for example, suppose reason is my ideal.

The one thing I try to use to guide all of my actions, that's right, I'm asking you to suppose that I am Mr. Spock. So Mr. Spock, if you will call, I don't know if anybody didn't watch Star Trek in the room, but he was a character on Star Trek and he tried to base every single decision he made on reason and logic alone. And it was comically ineffective.

Because every episode along came James Tiberius Kirk and he would ask Spock to do something that didn't make sense. And every episode Spock caved. He did whatever Kirk asked him because Kirk was his best friend.

And all of us watching the show knew that Spock when he caved was making the right decision because his noble idea by abandoning this noble ideal and just doing what his friend asked because we recognize that the ideal simply wasn't effective at governing some of his decisions. And so what Christianity realizes is that in order for our faith to be universally effective, there needs to be a person behind all of it. A person that motivates our study of the natural world and guides our responsible conduct.

And in Christianity, that person is Jesus. As Christians, we are convinced that when we put our faith in Jesus, then the person of Christ who was raised from the dead comes to live in us. And fundamentally, what I believe as a Christian is in the power of that person to change me, to change who I am.

That is what makes Christianity effective. And this change is very important to me because I have noticed a flaw in my character. So I have a lot of moral maxims that I think are true.

Things like turn the other cheek, do unto others as you would have others do unto you, tell the truth. And I am constantly disappointed by my inability to live up to those high principles. So take for example prayer.

I think prayer is very, very important. Email on the other hand, I do not think is very, very important. But if you ask me how many times a day I check my email versus how many times a day I pray, I would not answer your question.

Because I would be embarrassed by the answer. And this has been a problem for me for a long, long time. You see, when I was in junior high and high school, I was a geek.

Now I know it's shocking. You are probably thinking you are a quantum chemistry professor at MIT and you were a geek in high school. Shut the front door.

It's hard to believe, but it is true. I was too smart from my own good. I was socially awkward.

I was unathletic. And to boot, I grew too quickly. So you could count on it that six months out of the year, my clothes were too small.

And the unfortunate reality is that chicks don't dig tall, scrawny awkward dudes who don't know how to dress themselves. [ Laughter ] So in the social structure of my high school, there were the popular kids. And then there were kids like me.

And I was one of those unpopular kids who desperately wanted to be cool. I thought if I could just get into the in crowd, then I would be content. And it didn't make me a very nice person.

I shunned the people who I thought were lower on the social ladder than I was. All the other people who didn't have the money to wear the right kind of clothes or all the other members of my chemistry Olympiad team who in my defense were far nerdier than I was. And life outside of high school didn't really turn out all that differently for me.

As time went on, I simply found myself replacing popularity with any of a host of other ultimate goals. Good grades, success in my career, wealth, fame. And I knew that none of them was likely to make me a good person.

I even suspected that none of them was really going to make me a happy person. But I wanted them just the same. Because the problem isn't with high school or the in crowd or academia.

The problem is me. The things that I want. And no matter how hard I work, that's never a problem I'm going to solve because I am the problem.

And science doesn't really help me with this. I mean, an even theistic naturalism doesn't provide me any aid. Because if God just set the universe in motion and then hung out a

sign that says be back in 25 billion years, then I'm stuck.

Whatever I am is whatever I am. And most religions are even less help on this point because they tie our acceptance by God to our ability to live by a certain set of rules or accomplish a certain set of tasks. Only in Christianity is God provide the means to change who we are.

In Christianity, you don't do good as a way of sucking up to God and proving how much better you are than all the non-Christians out there. In fact, you know, it's not as if morality in Christianity is a ladder that we have to ascend to get to God. In fact, the whole narrative in Christianity isn't about people ascending to draw close to God.

The narrative of Christianity is about God drawing near to us. In Christianity, the same God who set the universe in motion. The same God who works in and through the natural laws, the same God who set up the principles of ethics.

That same God provided the means, the bridge in the person of Jesus who can get us from who we are to who we were meant to be. And that, for me, is enough. If you like this and you want to hear more, like, share, subscribe, and review this podcast.

And from all of us here at the Veritas Forum, thank you.

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