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Can Science Explain Everything? | Ard Louis & Pascal Wallisch

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The Veritas Forum

Theoretical Physicist, Ard Louis of Oxford University and Neuroscientist, Pascal Wallisch of New York University explore whether our reality is all simply an invention of the brain and within that, pondering if we can know what is objectively true. From the NYU Veritas Forum: Is There Truth Beyond Your Brain? • Please like, share, subscribe to and review this podcast!

Transcript

(instrumental music) - Welcome to the Veritas Forum. - This the Veritas Forum podcast. - A place where ideas and beliefs converge.

- What I'm really gonna 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. In this episode, we hear from New York University neurologist Pasco Wallach, and Oxford physicist Art Louis. As they ask the question, can science explain everything? From the stage at New York University.

(audience applauding) - So, I'm gonna talk to you today about what can science do for you? But yeah, so thanks to the Veritas Forum for inviting me inexplicably, and thanks all of you for coming. So yeah, so what you see here on this slide is basically a inflation adjusted graph of the world GDP over the last 2000 years. And what you can see here is that there was a scientific revolution around here, followed by an industrial revolution here, and to summarize the whole slide, and this is by the inflation adjusted.

Yeah, basically nothing much happened for like thousands of years, and then all of a sudden things took off. And this actually underestimates the real progress, because technology, like I said, like this is the very slide you're looking at. The Facebook group you set up with, like everything that you use to come here, every of value that you use

on the database was created in the last 500 years, which is not coincidentally in the immediate aftermath of the printing press, which basically made the industrial scientific revolution possible.

So anyway, to make a long story short, science has been amazingly beneficial to human endeavors. So I guess the first answer to our question, but yes, science can do a lot for us. Without science, we'd all be still be in a hopeless meltheussian trap, just all kind of fighting each other, I guess, which we did for thousands of years.

But before we go into other pros and cons, I wanna just briefly touch upon what science is. I would argue science is a formalized process with the goal of understanding natural phenomena. So basically you have down here the physical world, reality on the bottom, and what we do there is we observe and describe that physical reality, we also have observations, scientists called us measurements.

And then we have a world of ideas in the clouds, we make theories that form an understanding of the natural world. And what links that is a user process in induction actually, we try to explain these observations, they're just random with a theory. And then very important, this is the most critical part, this is like a cycle, it's kind of like a water cycle.

So just like a mother, a scientist's job is never done. You go through this cycle over and over and over again, because this last step to hear the prediction, based on your understanding of these observations, you make a prediction, and if I'm right, X should happen. And you make new observations in a very target way, usually make a experiment, to test yourself.

And that is what science does, that to my knowledge, no other human end of a really does, because otherwise we're often just caught in like, confirmation bias, trying to confirm what we already know. But science, deliberately as if it's, at least it works well, is supposed to like challenge yourself, challenge ideas. And again, so you go pre cycle over and over again.

And so in this sense, actually the German word, Wissenschaft captures it better than the Latin word, Ciencia, Ciencia is a body of knowledge, a bunch of facts, that's not true, it's a process, it's a never ending process. This, we're writing the manual of life, and it's ever, always a draft. All right.

And I'll give you a specific example of biology. So science, for instance, would catch a bug, and we would count its, the number of hair science legs, as science does. There's a lot of things we say only in science, would a grown man ever in, ever such a thing, right? And then we capture a bunch of them, and we make, and this is describing, we're making like a family tree of the, phylogeny of the bugs, like Linnaeus did, that's pure descriptive.

We're describing all the bugs, kind of different from each other, right? But over time, we're gonna, you know, finesse together a theory that explains why the bugs, different from each other, in the case of lady bugs, there will be an evolutionary theory of lady bugs, how like one lady bug, you know, relates to other lady bugs, and then we can make predictions. If that is true, with these illusion pressures, we should see these changes. And of course, we can't do it with lady bugs, but with bacteria, we can actually do an experiment, we can do it in a dish, we can say, if we introduce these evolutionary, these environmental changes, we're gonna predict that that's what's gonna happen to the bacteria, other kinds of bugs, in the dish.

And so, one thing that's underappreciated, and I'll walk you through slide in a moment, science formalizes, institutionalizes what people do anyway. You are an organism, art's an animal, it's kind of harsh, but you're an organism that's made out of matter, that takes in energy to process information. But you're not doing this randomly, you make observations, like in this case, observation one, two, three, this makes it more precise, let's say you observe, Madison is mean to Alex, that's over the observation one.

Observation two is, Madison's mean to Brett, and observation three, Madison is mean to Corey, say. So you could realize that your explanation is, Madison is a mean person, okay? That's my explanation. So my prediction is, Madison, so that's my theory of Madison, my theory is Madison will be mean to me.

And so my prediction and then action is, I will stay away from Madison, because Madison is a bad and mean person, okay? So that is what people do anyway, all of you have done this, okay? But why is this not enough? There's two issues that I'm gonna raise, why we need science, we can't just use lived experience. The first one is, individual experience might not be representative. We did in our lab a study on bodybuilders, and we asked them, what proportion of people do you believe take anabolic steroids? What, with the population, not of your friends, and it ends with something like 80, 90%.

It's everybody. And this is called, this is called the false consensus effect. Your lived experience, as rich as it might be, might not be representative.

As a matter of fact, in this day and age, where everybody watches their own shows, and watches cat videos on YouTube, and whatnot, your lived experience probably just represents a view. Only the most delusional of us would think that really represents anybody else. And this is like an increasing problem.

The second thing is what I would like to call, in general, individual condition, that's what half of our field is about, to suffer some all kinds of biases, the most pernicious property confirmation bias, and let me just watch you through it. For thousands of years, people thought swans are white, Aristotle, wrote a whole book about that, he, on swans, like it's the nature of the swan to be white, right? And for thousands of years, people believe that, who are we to argue with the master, right? And for thousands of years, people saw

swans, and yes, sure enough, they were white. However, as you know, that is not true.

There are black swans, there's one staring down at you. And this is no joke. Confirmation, we all have a tendency in human affairs to confirm our beliefs, to feel smarter, can really almost destroy Western civilization as famously happened almost 10 years ago, over 10 years ago.

So what happened on Wall Street was that, housing prices in other models had always gone up every year, housing prices have gone up. And now, the prediction was, they're gonna get up next year. And they did, and we made a lot of money, and the Wall Street people placed bets, risky bets that the house prices will always go up every year, it's confirmed every year, until one year it didn't.

And we almost inadvertently destroyed Western civilization as we know it. So these black swan events are very real. And by the way, the real black swans kept and cooked, sail to Australia, where swans happened to be black, sadness at traders is the biological name.

So yeah, so basically, it doesn't come natural to do falsification, it's the science does it institutionally. Now, what makes science so special is, all of us here who have grown up with science, all of us have grown up with science, it wasn't invented in our lifetime. We kind of take for granted what happened for us, is that for most of the time before science, most beliefs were just flat wrong.

So for instance, here is the telematic worldview, as you might see, and as I could point out, let's click the word. The earth is in the center. That is not what we leave.

The sun is kind of here the third planet out, that's exactly the other way around. We are the third planet off from the sun, okay? But for thousands of years, the telematic worldview seemed to explain observations. And then this actually has a renaissance now, the flat earth belief for thousands of years, people believe that the earth is flat.

Just to be clear, why do people believe these things to be true? 'Cause that's from lived experience, it looked like, it looked like the sun is revolving around us, it looked like the earth is flat. So science is transcending these obvious, common sense beliefs. And just to throw it on from neuroscience, for thousands of years, people thought that, well, people thought that cognition has to do with the brain of the head, 'cause if they cut it off, it stops.

So people knew that. But they weren't sure which part does what? What they did realize that was that in dead people, they found these holes, which are French trickles we know today, they are fluid filled holes, and they thought that the ventricles that's the computation and the cognition, because in all that people that ever found, they had these holes. Sure enough, the soul must have lived there and left.

And they actually heard this whole theory. For instance, they had this memory ventricle

here, the idea was if you look up this worm between the ventricles goes up and the memories flow out. So this whole cognitive dynamic theory of fluids and so very sophisticated, it's just wrong.

This is not true. The ventricles, to our knowledge, have no direct role in computation. It seems to be the matter, the gray matter, around it, which Aristotle thought cools the blood, which is not true as far as you can tell.

And importantly, so you have to really argue a wonder about science. So as Arthur has said, the big work has been done by people like Newton and Galileo. The idea is that the world is lawful.

It's not just a bunch of random effects, which people thought before that. But you have to argue or wonder, does the world reveal itself to you? Or if this actually comes from something or not. If the world reveals itself to special people, those special people can create a following and spread the gospel or write a book.

And that's just not true in science. So this here is Darwin. Darwin had never lived.

There was someone waiting their wings, Wallace, who made similar observations and rode it together in a theory. He was just, he actually wrote a letter to Darwin. Hey, by the way, I observed these things.

What do you think is interesting? Which actually pushed Darwin to accelerate his publication plans, which he had been sitting on for 20 years. And the second thing is science does not rely on a holy text. The idea is that there is no magic manual that the world came with that explains how it works.

But we are writing a manual. So this is the Bible in my field, the principle of neuroscience. I want to draw your attention to this point here.

It's the fifth edition, OK? It's constantly in draft. I predict there will be a sixth edition. It's always changing.

And hopefully, it will be, at short, at some point. We'll actually find some principles, especially with a bunch of 1,000 random facts. But anyway, one thing that I want to add about science, I started like that.

It's very useful, but it's not the primary point. There's actually a miracle that is as useful as it is. It's not the primary point of science that we use.

So the primary point of science to understand natural phenomena. And that's actually very rare. All cultures had had engineering.

For instance, the Romans were concerned with irrigation. And it was a Roman equeduct. How do we get water in our cities? The Greeks were concerned with what is water?

Thales.

And he couldn't do everything is water. The Chinese, for instance, built walls and a lot of other people. And the idea was, well, how we can protect our civilization.

But the Greeks asked, what is civilization? Mongols, Mongol horse archers, to my knowledge, had no notion of science whatsoever. But there's a lot of engineering and technology on the slide. You have to draw messages at horses.

You have to create rudimentary forms of cells and stirrups. You have to create a company's bow. You see him saying, so technology engineering, trying to make things useful, is very common.

This passion study of the dash phenomena is very rare. And it's a miracle that it works as well. It probably suggests that there is something to that.

For most of you in history, science was too wrong to be useful. If you doubt that, read some early science, it's all wrong. But they had the right idea to try to test themselves.

And finally, it is maybe the most controversial thing. To my knowledge, science is the only framework that allows you to overcome original beliefs by the falsification emphasis. So let me give you an idea.

If time progresses, over time, science converges to one solution. I don't have time to go for this, but if you look at disease, there was a lot of diverse thoughts of what caused disease. Some people thought it was bugs, bacteria.

Other people had meosmatic, telyroid, cosmic influences in childhood for instance. Over time, they converged to one thing. So basically, they start from very different positions.

They're priors. They converge on one thing by science. Every other human endeavor, be it religion or not, splinters.

You have politics. You have sects. You basically, any other human belief, you start with a founder, a charismatic leader, a special person, a guru.

But then people have to-- then they die. And then people have to interpret what they said, or interpret what they wrote. And then people splinter.

And I know there's a lot of Christians in the room that want to be upsetting you. Actually, you pick this to be relevant. I could have done this with any other religion.

So we have this with Christianity. So about every 500 years, you have a fundamental schism. You had one in the council of Ephesus, then it creates schism in the 11th century, then the Reformation.

Actually, we actually do for another one. I don't know what to say to you. But we do for another big schism.

And if you go back, it's actually pretty crazy. Like today, we wonder why we're so upset. But people killed each other over this.

Millions will die. But for instance, in the early ones, the question was, what's the Trinity? Is-- what's the Holy Ghost? What's the nature of that? And people are like, what Holy Ghost? What are you talking about? In the Reformation, the question was, who gets to interpret the word of God? Is it the pope, or is it everybody? Or priests, or everybody? And so you have this splintering. And you see this in everything else.

Politics, you have Marxists, you have Maoists. Leninists, it gets complicated. And so to summarize, and almost done.

So if science is so great, what are some limitations of science? And one is that this works best looking for these regularities. Science is all about the-- it's like a compression algorithm. It's looking for regularities.

If there are simple elementary parts. So for instance, art here is from physics, so he can confirm this. We believe there's four fundamental forces, plus a bunch of elementary particles.

I'm not going to go into detail. I'm running out of time. But these are, as we believe, all the fundamental particles.

But that's it. And they make up all the complexity, including art, including you, that we observe. Chemistry is similar.

Johannes was Johannes. There. You have about 100 neatly arranged elements, which make up all substances.

So here's the PRT elements. And basically, the idea is that they differ in the number of protons, elements. They're not for divisible.

And by the way, this is a description. And then also an explanation. The reason they're different is because the number of electrons in a shell are different.

So we predict they have different properties. So actually, people filled this in over 250 years slowly. We could predict.

There's going to be element number 79. And that's new. And that's going to have certain properties, because there's that number of electrons in shells.

This is a very clean thing. This works best in physics and chemistry, science that are simple. All right.

But we have now run into a wall of what I call "diaplexity" in lots of fields. There's an increase in number of fields where we have just-- the fundamental elements are not simple. They're complex, and they're diverse.

Biology-- again, no time, but there's the microbiome. There's about 1,000 species of bacteria in your gut. They're always changing.

Epsonatics-- it's not just you have like a certain number of chromosomes, but the gene expression changes all the time with an interaction with the environment. And neuroscience turns out, it looks like we have about as many neurons in your head as there are stars in the galaxy, and they might all have their own genome. Psychology, people are different, and complicated, and they change economics.

I don't even know where to start. Is that even-- like-- and by the way, we can't have no make no successful predictions. We have no idea.

OK. So basically, it's complicated. It's a good summary of this, and so we might need a new kind of science to address this.

But let's reconnective art. They're even more fundamental limitations. So if this reality, there's an observable part, and I think science is very well equipped to address what questions about the observable universe.

And then there's an unobservable part that contains why questions, like metaphysics, why are we all here, and morality? What do we owe each other, or how should we treat each other? And science is not doing so well on that, because it's relying observations. And these things are not observable. In the interest of time, I'm not going to go for this, but there are some specific questions we can talk in the Q&A.

Why is there anything? Why is there not just nothing? Why is this this specific thing, nothing else? What are you? Why are you you, and why are you not me? Why are we not art? Why is-- so maybe the most radical act of any entity that is waking up today. Why today? All the choices that you made, and all your answers are made, and all your answers are traverse and art's answer made, will all let you hear with me. Why? Why today? Why now? It's very, very claustrophobic.

And what's the point of all this? Maybe we are all living in alien zoo. Who knows? Maybe this is already-- or you are all dying, very in hell right now, making it hard for each other. And this is from my field.

We can figure out the correlates of conscience, but why would I-- art set is, why would a sack of chemicals be conscious? A certain special sack with a certain conversation, that's bizarre. Johannes, the chemist can't tell you that. And I can not.

So there is a place for faith in society, collective art. The simple model was that religious

bad superstition for thousands of years, now we have science, now things are good. I think there-- it's made a more-- a more complicated model is more appropriate.

There is good science that focuses on observable and increasingly complex natural phenomena to improve the human condition. There's bad science that encroaches on metaphysics and morality, scientism, because we can't observe these things and we cannot bridge this gap. There's also good religion that focuses on pro-social morality and promoting virtues that help society.

There's bad religion that encroaches on absurd realities, for instance, I don't know, like all kinds of stuff. I don't want to get details. But basically, most things that are written in the Bible about the nature of the world is wrong.

It's not flat. There's not-- the brain isn't mentioned. Or religions that promote hate or vice.

So I think that's more sophisticated, more realistic. And with that, I thank you. All right.

[APPLAUSE] So it's a great pleasure for me to be here in New York. I have a great love for New York. I actually got married in New York, too far from here, a little while back.

It was a destination wedding for our wife and our wife and I. I grew up in Gabon, Central Africa. She worked in South America. So people-- New York, everybody wants to fight in New York, it turns out.

And so, so do I. So I'm really happy to be here. Because part of us brought you here as well. Everybody wants to be here.

It's a great place to be. And it's also a great privilege to be here and talk about these huge topics-- science and faith. What does it mean to be human? What is life about? Those are really great questions.

I'm going to zoom in just on a small subset of these on science and faith. And really, rather than doing something very constructive, I'm going to try to wipe away a few-- do a bit of a ground clear exercise and wipe, when I call some zombie myths. I call them zombie myths because it's like a zombie.

We keep chopping at them and they keep coming up. So I call them some zombie myths about science and faith. So one of them is the idea that conflict is the correct metaphor for the history of science and faith.

And it goes a little bit like this. Back in the dark ages, we did bad things to each other and we didn't really understand things very well. And then we thought God's caused the thunder.

And now we have science and enlightenment and rationality. And everything is getting

better. And this is a popular trope, which I've put up a bit as a straw man.

But some version of it floats around. Now, I'm not a historian of science, although I've spent a lot of time reading history of science. But most of my friends who are stories in science really get really-- they get very upset by this story because they feel that it really doesn't do justice at all to the complexities of their interaction and science and faith.

So you just might call it Peter Harrison until recently at Oxford who said, those who argue for the compatibility of science and religion will draw a little comfort from history. The myth of a perennial conflict between science and religion is one to which no historian of science would subscribe. So Peter's one of the world's great historians of science.

And I'm just basically quoting him here to point this out. In fact, a series of historians, including Peter and others, put together a book. If you like this kind of stuff called Galileo goes to jail, and 25 other myths about science and religion try to put the rest, this idea that religion and science are a conflict.

In fact, modern science, as we know it, arose very much in a Christian context by people who took their Christian faith extremely seriously. It turns out that you need certain kind of premises about the way the world is, that the world is repeatable, the world is rational. Those are ideas that came historically from theological thinking about the world.

And in that kind of fertile set of ideas, that's where science arose. It may no longer really worry that much about where the roots came from, but definitely that is a one important thing you think about where science comes from. So science has a deep historical roots in Christianity.

I'll just leave that there. Second kind of zombie myth is that believing in God is like believing in a pigule corner or a flying teapot. So every so often, I'll say, you know, I'm a scientist, and I'm a Christian, a very serious Christian.

I take my faith very seriously. And people will say, oh, how could that be possible? Aren't you believing a bunch of impossible things before breakfast? And I have another colleague in Oxford, Richard Dawkins, who has this quote on believing in God. He says, if you want to believe in teapots, unicorns, or tooth fairies, Thor or Yahweh, the onus is on you to say why you believe in it.

The onus is not on the rest of us. Let's say why we do not. We who are atheists are also atheists, a teapotist and a unicornist, but we don't have to bother saying so.

And so what's coming in this argument, which is what I hear quite frequently, is an asymmetry argument. The idea that if I believe in God, I need to give you evidence for it.

And the default option is that there is no God.

The first thing about this is we have to ask ourselves what kind of God are we speaking about. So if I come to you and say, I've discovered a new virus in my laboratory, you're justified in me skeptical in saying, I have an aid new viruses until you give me evidence for it. That's how science works.

And that's a great thing about science. But God is not some kind of object out there. We don't think that God is an animal like ourselves, only bigger and smarter than us.

God is the reason why the-- Christians believe that God is the reason why the universe exists. If God would stop existing, it's not like the universe is grinding to a halt. It would also stop existing.

So something fundamentally different. And one way of unpacking that is to ask very simple questions. Like, why is there a universe? Why are there the laws of nature? Where they come from? Well, there are various options.

One option would be the laws of nature, as we know them today, the ones that creates our current universe from a big bang, came from some previous sets of laws of nature. So some previous have laws of nature, cause those, which then in turn were caused by another one. You get an infra-- regressive causes.

That could be possible, but it's extremely odd. Obviously, it's very odd. It's because where they come from? And what does it mean to have an infinite regress of causes? Another option is the laws of nature, as we know it, came into being from real nothingness.

And by that, I mean ontological nothingness. Nothing nothingness. No laws of logic.

No laws of mathematics. True nothingness. It's also possible, but it's kind of weird.

The third option is that the laws of nature, nature itself, comes from something outside of nature, perhaps a being who cannot not exist, the kind of God of classical theism. Now, you may also find that odd. My only point is that all three of these options are in one way or the other odd.

The world is actually odd, thinking about things are odd. And it's not always a priori, which of those three, or maybe there's two, one of them has no God, one does have a God, you shouldn't start from. But the point is they're not an asymmetric one.

There are something that you can think about. And in fact, how should you think about them? This is John Polkehorn, a famous mathematical physicist at the other place, as we like to say in Oxford. If we are to understand the nature of reality, we have only two possible starting points, either the brute factor of the physical world, or the brute factor

of a divine rule and purpose behind that physical world.

In other words, what Professor Polkehorn is saying is either the world has a divine origin or it does not. And the way that you think about these questions, not by trying to find evidence for one or others for the other, you actually start from the perspective, perhaps there's a God in this world and look at the world and ask yourself, does that make more sense to the world? Or you can start from the idea maybe there is no God, then look at the world in all its complexity and ask yourself, does that make more sense to the world? And that's the best way of thinking about these things. But asymmetry is a kind of simple, simplistic, and incorrect way of thinking about it.

All right, and the last zombie myth, which is the one closest to the title of today's discussion, which I'm really looking forward to. I had a very nice dinner with Pascal already, where he told us some amusing stories. So I'm looking forward to hearing from you, no pressure, but it was fun.

Science is the best avenue, the best way to also get truth for ultimate questions. And I think this is often why are a lot of people here tonight to listen to two kind of academics drawn on about science and big questions? Because I think, besides the fact that perhaps my co-speaker is extremely well known for his teaching, and other things in this situation, I'm not that well-known at all here, I'm assuming. So why did you come? I think it's because fundamentally we know that science has brought us great advances.

So science has brought us this little miniature computer that I can fit in my pocket, which is incredibly powerful. It can do all kinds of-- can communicate with my family instantaneously all the way across the water. It can do all kinds of amazing things.

And use it to watch cat videos, all the kinds of things that people do. And so clearly there's been enormous advancement in technology. There's been enormous advancement in medicine.

And it's not unnatural to think, well, given those great advances that we've had, the fact that we're much healthier than we were before, the fact that we have a little technology around us, surely that way of thinking is good to also answer the big questions, like, who am I? And what does it mean to be human? And what does it mean to be a good life? And who's right and who's wrong about various questions? Now, I think science is a fantastic, amazing thing. I think it's the greatest invention that human beings have ever made. But-- and he'll quote another Oxford professor, Peter Metavar at Atheist, actually, who won the Nobel Prize quite a few years ago for him in medicine, who said this, that there is indeed a limit on science is made very likely by the existence of questions that science cannot answer, that no conceivable advance of science would have power to answer.

These are the questions that children ask. The ultimate questions of Karl Poper, Poper is

a famous philosopher. I have in mind his questions as, how did everything begin? Shall we just touch on? What are we all here for? What is the point of living? It is not the science there, from what the metaphysics imagined that you're a religion, that it was turned for answers to questions having to do with first and last things.

And this comes just after a very flowery quote about how great science is. Science is a great thing, fantastic, but it can't answer these questions. And to make it also answers questions is wrong.

Fundamentally, we're all philosophers of theologians. We have ideas about what is right and wrong, what the world is like, and whether we have those ideas very consciously or whether we kind of picked the note from the environment around us, we are philosophers of theologians. And that means that we have to think a little bit about a whole series of scientific questions.

And I'm going to give you one. Just to give you an example of something how you might think about some kind of scientific question and what it means to the big question. So let's say I treat the question of what I'm made of.

So you can imagine the following scenario. You are out with a very-- let's say I'll pick on-- I won't pick anybody, actually. But one of you young men is out with a beautiful young lady, and it's a nice time in Greenwich Village, and you've got a really nice restaurant, and the light is low, and there's all the kinds of things that you have to have some candles and some flowers, and she says to you, what am I really made of? And you know this is, of course, a very dangerous question.

And so you panic a little bit, because if you get it wrong, that might be bad. And so you think you're made of chemicals. In fact, we're all made of chemicals.

In fact, we're about 60% water. You're in a phosphorus for 2,000 matches, and enough iron for runnail, and enough chloride is a bacteria swimming pool, and enough fat for 10 bars of soap, at which point you will get a big slap. And if you make a one bar of soap, that is the end.

So I advise you not to do so. But the point is, of course, none of this is not true. We are made of chemicals.

And I am a bag of chemicals. I am a wet computer. I am a kind of machine.

I am also an animal. All of those things are true about myself. But the idea that I'm nothing but one of those things is a very easy way to make science somehow give answers to things that it shouldn't give answers to.

Here's another example that I wanted to kind of play out to help you think about this. Let's say one day you come to my house, and there's some water boiling on the stove.

And you ask me, why is the water boiling? And I say, well, the water is boiling, because there's a heat source that's transforming thermal energy across the container wall into the water.

That increases the mean square velocity of the water molecules. And once that's direct and proportional to temperature. And once that temperature reaches 100 degrees Celsius, there's a phase transition from a condensed phase to an expanded phase.

And that's what we call boiling. The other option would be, I fancy a cup of tea. Would you like some? Now, both of those are true.

And I give you a mechanistic answer to something. This means that I've therefore exhausted all the meanings. There's multiple levels of meaning, multiple ways of thinking about something that are equally valid and important.

And the last example I'm going to give in my last slide is just give, I think, a more important question about how science could ascertain an important question of value. So just take an incredibly pertinent, important question. What is the value of a human being? Do humans have value? Well, this underlying underpins our modern society, our modern legal system, our modern political system, how we interact with another.

And I hope most of you in this audience believe that humans have some kind of intrinsic value. Their value is because they're humans. But how would you measure that? Well, what would you do if you were a chemist? Would you measure the value of the elements? Or if you're a psychologist, the size of your brain, or a physiologist, or a psychologist, how smart you are.

Or an economist, how much you produce. All those are options, but none of them are the right way of measuring the value of human being. In fact, I go further and say it's dangerous to start relating the value of human being to some kind of measurable trait.

When you start doing that, some kind of scientifically measurable trait, you do that. You actually devalue humans and it's dangerous. So Christians would say the value of human beings comes fundamentally from the fact that they are a world and loved by God.

Therefore, it's independent of any of these measurable qualities. You may believe, as many of my family members are humanists, and they believe this is just a brute fact about the world. They don't believe in God.

They think it's just the way it is. There's no reason for it. Just the way it is.

I think that's very valuable. That's also a valuable way of thinking about it. But it's incredibly important that you don't think that science is going to answer this question because it wants.

And so I thought I'd give you those little examples to help you think a little bit and hopefully inspire some questions. The Q&A is often the funnest part of these events. So hopefully you agree with some of what I've said.

Hopefully you disagree with some of it. You can come and talk to me later about it. And that's it.

That's the I would say is-- oh, this is going to be funny on this website. But I've recently made a documentary series called *Why Are We Here? Why Are We Here?TV?* You can read it if you want to see more of these kinds of questions. I always like to plug it.

I always like to just come out. And with that, thank you very much for your attention. [APPLAUSE] If you like this and you want to hear more, like, share, review, and subscribe to this podcast.

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

(gentle music)