§ 4. Excursus on Natural Theology
Lecture 14
Teleological Argument

In our study of the doctrine of God we've embarked upon an excursus on natural theology or arguments for God's existence. So far we've surveyed the proper basicality of belief in God, the contingency argument for God's existence, and the *kalam* cosmological argument for God's existence. Today we are going to turn to a new argument – the teleological argument for God's existence, or the old argument for design.

The importance of this excursus was brought home to me afresh this week as I watched a video of a Veritas Forum at Ohio State University from last year featuring a Christian scientist and an atheist philosopher. The atheist philosopher's main point was that there is just no evidence for God's existence and therefore it would be unjustified to believe in him and therefore we should simply affirm that God does not exist and that there is no ultimate meaning to life in the sense of a point or purpose to our existence. It struck me that he made no effort at all to defend his position. He simply asserted it. He never examined the position that it can be rational to believe in something not on the basis of evidence – that there are properly basic beliefs – and that in fact the idea that only beliefs based upon evidence can be rational ultimately leads to skepticism and is self-defeating. Moreover he never looked at any of the arguments for God's existence that we've surveyed in this class. So it is, I think, extremely important that we as Christians, if we are to commend our faith in a culture that is increasingly secular and skeptical, be able to offer arguments for God's existence or to defend the rationality of belief in God in the absence of such arguments.

Today we want to turn to the teleological argument, or the argument for design. This is one of the oldest arguments for God's existence. Ancient Greek philosophers like Plato and Aristotle were struck with the order that pervades the cosmos. The stars and the planets in their constant revolution across the night sky were especially awesome to the ancients. Plato's Academy lavished extensive time and thought on the study of astronomy because Plato believed it was the science that would awaken man to his divine destiny.

According to Plato, there are two things that lead men to believe in God. First, the argument from the existence of the soul, and secondly, the argument "from the order of the motion of the stars, and of all things under the dominion of the mind which ordered the universe."[1] Plato employed both of these arguments to refute atheism and concluded that there must be a "best soul" who is the "maker and father of all," the "King," who ordered the primordial chaos into the rational cosmos that we observe today.[2]

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1 Plato, Laws 12.966e.

2 Plato, Laws 10.893b-899c; idem *Timaeus*.

An even more magnificent statement of divine design is to be found in a fragment from a lost work of Aristotle entitled *On Philosophy*. Aristotle, too, was filled with wonder at the majestic sweep of the glittering host across the night sky of ancient Greece. Anyone who has personally studied the heavens, I think, has to turn a sympathetic ear to these thinkers of antiquity who gazed up at the night sky, undimmed by pollution and the glare of city lights, and watched the slow but irresistible turn of the cosmos, replete with its planets, stars, and familiar constellations across their view and wondered, *What is the cause of all this?*

Aristotle concluded that the cause was divine intelligence.[3] He imagined in this work the impact that the sight of the world would have upon a race of men who had lived underground their entire lives and never beheld the sky and one day managed to escape from their subterranean prison. He writes:

> When thus they would suddenly gain sight of the earth, seas, and the sky; when they should come to know the grandeur of the clouds and the might of the winds; when they should behold the sun and should learn its grandeur and beauty as well as its power to cause the day by shedding light over the sky; and again, when the night had darkened the lands and they should behold the whole of the sky spangled and adorned with stars; and when they should see the changing lights of the moon as it waxes and wanes, and the risings and settings of all these celestial bodies, their courses fixed and changeless throughout all eternity—when they should behold all these things, most certainly they would have judged both that there exist gods and that all these marvelous works are the handiwork of the gods. (Plato, *On Philosophy*)

In his book *Metaphysics*, Aristotle proceeded to argue that there must be one First Uncaused Cause, which is God—a living, intelligent, immaterial, eternal, and most good being who is the source of order in the cosmos.

Reading the works of these ancient philosophers, one cannot help but think of Paul's words in his letter to the church of Rome: "Ever since the creation of the world his invisible nature, namely, his eternal power and deity, has been clearly perceived in the things that have been made" (Romans 1:20 RSV). From earliest times men who were wholly ignorant of the Bible have concluded on the basis of the design in the universe that God must exist. Today many astronomers, as a result of recent discoveries, are coming to a similar conclusion.

Scientists used to think that whatever the conditions of the early universe might have been like, given sufficient time and some luck, intelligent life forms like us would probably evolve somewhere in the universe. As a result of discoveries over the last fifty

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years or so, we now know that that assumption was wrong. In fact, quite the opposite is true.

Astronomers have been stunned by the discovery of how complex and delicate a balance of initial conditions must be given in the Big Bang itself if the universe is to permit the existence of intelligent life anywhere at all in the cosmos. This delicate balance of initial conditions has come to be known as the "fine-tuning" of the universe for life. We've come to discover that the universe is incomprehensibly fine-tuned for the existence of intelligent life.

This fine-tuning of the cosmos is of two sorts. The first involves the constants of nature and then there are certain arbitrary quantities.

First, the constants of nature. What is a constant? When the laws of nature are expressed as mathematical equations, you find appearing in them certain symbols which stand for unchanging quantities, like the force of gravity, the electromagnetic force, the subatomic "weak" force, and so forth. These unchanging quantities are called constants. The values of these constants are not determined by the laws of nature. There could be universes governed by the same laws of nature as ours and yet with different values of these constants. The actual values of these constants are therefore not determined by nature's laws. The laws of nature are consistent with a wide range of values of these fundamental constants.[4] Depending upon the values of these constants, universes governed by the same laws of nature will look radically different.

In addition to these constants, there are also certain arbitrary quantities that are just put in as initial conditions on which the laws of nature then operate. Because these quantities are arbitrary, they're also not determined by the laws of nature. A good example of such a quantity would be the amount of thermodynamic disorder (or entropy) in the early universe. It's just given in the Big Bang as an initial condition, and then the laws of nature take over and determine how the universe will develop from there. If those initial quantities had been different – if the level of entropy or disorder in the early universe had been different – then the laws would predict that a very different sort of universe would have evolved.

Now what scientists have been stunned to discover in recent decades is that these constants and quantities must fall into an extraordinarily narrow range of life-permitting values if the universe is to permit the evolution and existence of intelligent life anywhere in the cosmos. This is what is meant by the fine-tuning of the universe.

It is important to understand that the term "fine-tuned" does not mean designed. Fine-tuning is a neutral expression which doesn't say anything about how the fine-tuning is best explained. Fine-tuning just means that the range of life-permitting values for these

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constants and quantities is exquisitely narrow. If the value of even one of these constants or quantities were to be altered by less than a hair's breadth, the delicate balance required for the existence of life would be upset and the universe would be life-prohibiting instead.

Let's look at some examples of fine-tuning. Fine-tuning in this neutral sense is fairly uncontroversial and well-established. Physics abounds with examples of fine-tuning. Before I share a few of these examples, let me just give you some numbers to give you a feel for the delicacy of this fine-tuning. The number of seconds in the history of the entire universe since the Big Bang is said to be 10^{17} (that's 1 followed by seventeen zeroes; an incomprehensible number). The number of subatomic particles in the entire known cosmos is said to be somewhere around 10^{80}. This is simply an incomprehensible number. We have no idea, really, of what something like this means. It is beyond human imagination.

With these numbers in mind, consider the following. Both the force of gravity and the atomic weak force are so finely tuned that an alteration of their values by even one part out of 10^{100} would have prevented a life-permitting universe! Similarly, a change in the value of the cosmological constant, which drives the acceleration of the universe's expansion, by even one part out of 10^{120} would have rendered the universe life-prohibiting.

Here is a real corker! Roger Penrose has estimated that the odds of our universe's early low entropy condition (that initial condition of the low entropy in the universe) occurring by chance is somewhere on the order of one chance out of $10^{10(123)}$, a number which is so incomprehensibly large that to call it astronomical would be a wild understatement.[5]

Clearly, the fine-tuning that we are talking about here is literally beyond human comprehension. Having an accuracy of even one part out of 10^{60} would be like having an aim so accurate that you could fire a bullet at a target on the other side of the universe twenty billion light years away and nailing a one-inch bullseye! That number is insignificant compared to numbers like 10^{120} or 10^{100}. And it is not just each quantity or constant that must be finely tuned. When you multiply these together, that they must all fall into the exquisitely narrow life-permitting range, we are dealing here with numbers that are simply incomprehensible.

The examples of fine-tuning are many and various, and therefore they are not likely to disappear with the future advance of science. Their multiplicity (that is to say, the number of them) and their variety (they are different) make it highly unlikely that these numbers are going to be done away with or disappear with the advance of physics. Like it or not, fine-tuning is just a fact of life which is scientifically well-established.

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Now you might be thinking at this point, "But if the constants and quantities had had different values, then maybe different forms of life might have evolved." But that underestimates the really disastrous consequences of a change in the values of these constants and quantities.

When scientists talk about a universe's being life-permitting, they're not talking about just present forms of life. By "life" scientists mean the property of organisms to take in food, extract energy from it, grow, adapt to their environment, and reproduce. Anything that fulfills those conditions counts as life. The point is for life, so-defined, to be possible, whatever form it might take, the constants and quantities of the universe have to be unbelievably fine-tuned, otherwise disaster results. In the absence of fine-tuning not even matter, not even chemistry, would exist, much less stars and planets where life might evolve!

START DISCUSSION

Student: Just a question about those astronomical numbers – what kind of parameters does somebody use to even calculate those kind of numbers? Is there any rational basis for it?

Dr. Craig: There is definitely a rational basis for it. What they do is they simply increase the value, say, of gravity a little bit and what you would discover then when you run the laws of physics with a slightly stronger gravitational constant is that everything will collapse in on itself and the universe will collapse into a black hole. On the other hand if you just marginally weaken the force of gravity a little bit then the laws predict that the universe would just expand so rapidly that stars and planets would never congeal and so there would never be any sites on which life could exist. Because we are talking about universes governed by the same laws, physicists can alter these values and then run the laws and predict what sort of consequences would ensue. What they find is, as I say, if you alter these values by even a hair's breadth stronger or weaker, then the universe turns out to be life-prohibiting rather than life-permitting in some way or other.

Student: I was discussing this argument with some atheists at Georgia Tech once and we kind of came to a stopping point where they were discussing how you would actually come up with this probability.[6] It seemed they were making an argument from what you would call a frequentist philosophy of probability which states that you can't say something is a possibility until you've actually observed it. I wondered if this would be more like an epistemic philosophy of probability where it is a hypothetical reality.

Dr. Craig: I've dealt with this objection in my chapter on fine-tuning in *Reasonable Faith*. I wasn't going to say anything about it here, but let me say something about that. Do you understand what the objection is? The objection is that probability means that

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something will happen, say, one time out of ten. It is a frequentist analysis of what probability is. Therefore, if you've never observed, say, ten trials you don't know what the probability is of something occurring. Obviously there is only one universe so it is meaningless to talk about the probability of the universe being fine-tuned because there is only one trial so to speak. So we can't speak of the probability of the fine-tuning.

I think this is quite mistaken. In the first place a frequentist analysis of probability is mistaken. Just to give an illustration of this. Scientists are investing thousands of man-hours and millions of dollars in research looking for an event of proton decay. In reactors they are trying to detect the decay of a proton into more fundamental particles. This has never been observed even though physics predicts that it can happen. Now, on the frequentist model, that means that they are looking for an event that has zero probability because it never happens. Yet that is obviously wrong. Scientists are not wasting millions of dollars and thousands of man-hours looking for this because it is an event of zero probability. The analysis that the frequentist gives simply isn't applicable here.

How should we understand probability? John Barrow, who is a physicist at Cambridge University, gives the following illustration. He says let's take a piece of paper and put on it a red dot, and let that red dot represent our universe with its values of the constants and quantities. *[Dr. Craig draws an illustration on the whiteboard]* So this is our universe characterized by the constants and quantities that it has. Then, he says, let's alter those constants and quantities by a tiny amount, and this is a new universe. If it is a life-permitting universe then make another red dot in the vicinity of the first. If it is a life-prohibiting universe, he says, make it a blue dot. Then do it again. And do it again. And do it again until your sheet is filled with dots. What you wind up with, he says, is a sea of blue with only a couple of pinpricks of red. It is in that sense that a finely tuned universe is highly improbable. The values of the constants and quantities are such that only an exquisitely tiny number of values will be consistent with the permission of life. The vast majority of these possible universes are life-prohibiting. I think that gives us a pretty clear sense in which we can say that the existence of a finely tuned universe is incomprehensibly improbable.

Student: Could you also say that some of these numbers were created from simulations that scientists already use for other scientific inquiries that have actually yielded results, and that this would be a lot more favorable calculation therefore?

Dr. Craig: I don't know the answer to that question. Whether or not by contemplating universes where, say, the weak force in the atomic nucleus had a stronger value this would lead to some sort of fruitful prediction. I don't know whether these sorts of predictions have that kind of practical value. What they disclose, rather, instead is that these other universes would be life-prohibiting. There wouldn't be any life as we've

defined it in these kinds of worlds. It would result truly in disaster, as I say. There wouldn't even be chemistry in these worlds if you upset the balance of these constants and quantities.[7]

Student: Has anyone ever attempted to come up with the initial entropy value in contrast with what it is today?

Dr. Craig: Oh, yes, that is what Penrose does in his estimation. He calculates back to the initial entropy condition of the Big Bang and he finds that it is exquisitely low. The early universe has a very, very low entropy condition which is highly improbable, incomprehensibly improbable. It should be much higher than it is. This is something that cries out for explanation, and that scientists have tried to find an explanation of.

Student: If the rate of increase of entropy is consistent, you can almost, if there is initial value versus now, you can calculate the age of the universe.

Dr. Craig: It would be related. What you would do is you would look at the current entropy levels and then run that backwards to a universe that is this old and then stop. That would give you the initial low entropy condition.

Student: I am vaguely familiar with Dembski's universal probability bound. Could you explain that?

Dr. Craig: William Dembski is an intelligent design theorist who has tried to develop a model for making design inferences. When are we justified in inferring that something is designed? As part of his theory he sets this probability bound where anything that is more improbable than this is so outrageous that it would never happen and therefore you could say that it is impossible. His probability bound is related to that figure of 10^{80} subatomic particles in the universe. Anything that has a probability which is less than one chance out of 10^{80} is impossible. It just never happens. As you can see, the fine-tuning that we are talking about for even just one constant or quantity exceeds this probability bound that Dembski sets.

Student: Why does he equate that to the number of particles in the universe? How did he arrive that that?

Dr. Craig: I think his idea is that you would look at the chances for something to occur and if you identify a chance with a subatomic particle or position that that would give you the number of chances for this event taking place. I suppose you would have to extrapolate that in time as well, but I don't remember his exact bound but it is something on this order and is far, far below the odds that we are talking about for fine-tuning. This is in his book *The Design Inference* published by Cambridge University Press if anybody is interested in following that up.

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Student: To me, I think what we can accept is the fact that the scientific community agrees that the fine-tuning is a reality. There is no question about that.

Dr. Craig: There are scientists who will want to dispute it, and I think partially because they see where it is leading. But the majority, yes, will say that the fine-tuning is well established.

Student: It is sort of like the elephant in the room. I am not sure how you can dance around it and not see it. Really, it gets down to: it exists, but how it exists, is that where they are coming from? Would they argue around the elephant?

Dr. Craig: Yes, that is what we will be coming to. I am laying out here the data to be explained. As we will see next time there are three explanations that are offered in the current literature as to how best to explain this fine-tuning: physical necessity, chance, or design. So the debate will be, not really about the fact of fine-tuning which is pretty well established, it is going to be about how do you best explain it. As we will see, those who deny design are driven to some rather radical metaphysical hypotheses in order to explain away the fine-tuning.[8]

Student: If there is a condition that, say, if it is not equal to one then the universe couldn't exist (I'm just saying it as a hypothetical example) how can you tell the maximum number that you can reach before . . . ?

Dr. Craig: This is a very, very good question that is much discussed. Let's let this represent the range of values that a constant or a quantity might take. *[Dr. Craig draws an illustration on the whiteboard.]* What we discover is that the range of life-permitting values is exquisitely narrow – it has to fall within this range in order to be life-permitting. The question is: how far out does this wider range of possible values go? Does it go to infinity? Or is there some finite extent? That question is much controverted. Robin Collins, who is probable the best writer on fine-tuning today, says that the contrast between the life-permitting range and the possible range should be the range of values for which we can say physically whether the universe would be life-permitting or not. He calls this the illuminated range. This illuminated range will be the range of values which are possible for which we can make a judgment – yes this would be life-permitting or no this would not be life-permitting. Beyond that is a sort of dark unilluminated range and we simply don't know what is out there. So he compares the life-permitting range to the illuminated range, and that is how he comes up with these sorts of extraordinary figures about the degree of fine-tuning that is necessary in order for embodied, conscious agents like ourselves to exist.

END DISCUSSION

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Next time we will consider a couple more objections to the argument. Then we will state and begin to unfold the premises of this argument.[9]

[9] Total Running Time: 33:08 (Copyright © 2015 William Lane Craig)