§ 4. Excursus on Natural Theology
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, the *kalam* cosmological argument, and the argument from the applicability of mathematics. Today we are going to turn to a new argument – the teleological argument for God's existence, 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]

An even more magnificent statement of divine design is to be found in a fragment from a lost work of Aristotle entitled *On*

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1 Plato, Laws 12.966e.
2 Plato, Laws 10.893b-899c; idem *Timaeus*.

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. He imagined 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. But 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. (Aristotle, *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, 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 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 to permit 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. 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 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 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.

Fine-tuning in this neutral sense is well-established and fairly uncontroversial. 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^{60} 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.

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! Yet that number is insignificant compared to numbers like 10^{120}. And it is not just each quantity or constant that must be finely tuned. When you put these together, so that they must all fall into the exquisitely narrow life-permitting range, we are dealing 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.

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!

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.