Omega
II (2003)1, 51-64

The Resurgence of the Design Argument in the Twentieth Century

- ***Sarojini Henry***[1]

The design argument, despite its several inherent inadequacies, has fascinated scholars and non-scholars alike from antiquity. Many opponents and critics of theism, like Hume and Darwin, claimed to have demolished it. However, historical data seem to reduce their claim to a wishful dream. Henry discusses the resurgence of this argument in a new sophisticated form, drawing generously from recent developments in science. In particular, she discusses three cases: the anthropic fine-tuning, the irreducible complexity in molecular machines and the DNA specific problem. She also discusses some of the strengths and weaknesses of this new version of the argument.

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The classical design argument begins by observing certain highly ordered or complex features within nature such as the configuration of the planets or the architecture of the vertebrate eye. The argument then proceeds to contend that such features could not have arisen without the activity of a pre-existent intelligence or designer, often identified as God. Such a theistic argument was used even as early as 45 B.C., by the Roman lawyer and orator Cicero who pointed to the beauty and harmony of the heavenly bodies: "When we see a mechanism such as a planetary model or a clock, do we doubt that it is the creation of a conscious intelligence? So how can we doubt that the world is the work of the divine intelligence?"[2] Many Christians take inspiration from the biblical assertion that "the heavens declare the glory of God and the firmament showeth His handiwork." For many people, the idea that the

physical universe reflects the purpose or design of a preexistent mind – a Creator - serves to guarantee humanity's own sense of purpose and meaning.

The popularity of the design argument continued in the nineteenth century in the *Bridgewater Treatises* and in the work of William Paley who made the famous watch analogy. He pointed out that the intricate and delicate organization of a watch is an overwhelming evidence that it had been designed. Paley added that the argument is not weakened even if the person had never seen a watch before or the watch did not function properly. Just as the intricacies of the watch prompt one to assume a watchmaker, so from the presence of design in biological organisms one must assume the existence of an intelligent designer.

Even from the time of the Enlightenment, the design argument had come under attack, especially by the skeptical empiricist David Hume (1711-76). He rejected both the existence of God and the validity of the design argument. In his *Dialogues Concerning Natural Religion,* Hume maintained that the design argument depended upon a flawed analogy between biological organisms and human artifacts. He would agree that the human eye and the pocket watch depend upon the functional integration of many separate and specifically configured parts. But then he pointed out that the biological organisms reproduce themselves and this dissimilarity between human artifacts and biological organisms is very crucial when an analogy is made. Since organisms come from other organisms, Hume argued that organisms can come from some primeval organism (perhaps a giant spider or vegetable), not necessarily from a transcendent mind or spirit.

In the beginning of the nineteenth century, the astronomer Pierre Laplace presented copies of his *Treatise on Celestial Mechanics* to the new French Emperor Napoleon Bonaparte. In this book, Laplace had given elaborate explanation for the origin of the solar system, not as arising from a divine design but as a result of purely natural gravitational forces. When Laplace went to meet Napoleon in order to discuss about the *Treatise*, Napoleon directly asked Laplace about the role of God in his theory. "Newton spoke of God in his book", said Napoleon, "I have perused yours but failed to find His name mentioned even once. Why?"

Laplace is said to have replied, "Sir, I have no need of that hypothesis." Laplace was probably reacting against Newton, who almost a century ago had invoked God to stop the universe from collapsing on itself. Laplace's own theory was that the solar system could be self-adjusting and self-sustaining without the need for any divine intervention.

It was in 1859 that Charles Darwin published his *Origin of Species* in which he proposed a specific mechanism, namely natural selection working on random mutation that could explain the adaptation of organisms to their environment. As we saw already, even before Darwin's time there were other works like Laplace's *Treatise* on astronomy which pointed to an autonomous and self-forming world. For example, Charles Lyell explained the origin of the earth's most dramatic topographical features - mountain ranges and canyons - as the result of slow, gradual and completely naturalistic process of change. Following Lyell, Darwin in the middle of the nineteenth century argued that living organisms, which had been seen as the obvious example of God's creative power, only *appear* to be designed. According to his theory of evolution, the blind process of natural selection acting on random variations could account for the origin of new forms of life without the intervention of divine guidance.

Richard Dawkins[3] in his book, *The Blind Watchmaker,* observes rather provocatively that only after Darwin was it possible for anyone to be an intellectually fulfilled atheist. Therefore one can confidently assert that it was not the arguments of the philosophers such as Hume that destroyed the popularity of the design thesis, but the emergence of an increasingly materialistic explanation of apparent design, as explained by Darwin's theory of evolution. This means that the whole history of the universe could be taken as a seamless unfolding of the potentiality of matter and energy, which would thereby support a materialistic worldview and not a theistic one.

The Re-Emergence of the Design Argument

With the dramatic developments in physics, cosmology and biology in the twentieth century, there has come up a renewal of the design argument in the second half of the twentieth century. Given the blow

that Charles Darwin dealt to the design argument in the nineteenth century, it is significant that it has made its reappearance. Classical design arguments of the eighteenth century sought to draw analogies between whole organisms and machines based upon certain similar features that they held in common. These arguments sought to reason similar effects back to similar causes. Philosophers, including Hume, could therefore point to the flawed analogy between the watch and organic biological systems. It is believed that with the new sciences the current argument for design is directed to the realm beyond the Darwinian mechanism of random mutation and natural selection.

The current trend in design arguments is to employ some logical apparatus involving mathematical probability. One such apparatus is the Bayes' theorem which explains how one can revise the probability of an occurrence in the light of new evidence, the probability initially applied to competing systems. It is the application of probabilistic inference that distinguishes the contemporary design arguments from the analogical versions of the sort that Hume criticized. For lack of space, the logistics of the probability approach will not be attempted in this essay.

We shall consider three cases in contemporary science where the design argument seems compelling. The first is from physics, which examines the fine tuning of the universe. A striking feature of the Big Bang cosmology is that the universe ought to be finely tuned at every stage of its evolution in order that humans could arrive on the earth. From 1960 onwards physicists became increasingly aware that the physical conditions that enable life to exist are very sensitive to the values of some physical constants (such as the gravitational constant or the electronic charge) governing the earth. This idea, known as the anthropic principle, is so astonishing that it appears as though the universe had been designed for the coming of the humans.

Despite the renewed interest in the design hypothesis among cosmologists and physicists, many biologists have long remained reluctant to consider such options. Nevertheless, the rumblings of the design argument have entered the field of biology in recent times. Biologists argue that in Darwin's time, the cell and every microbiological function was an unknown black box, because no one could explain how biological

processes occurred. Scientists argue that it is the complexity within the microcosm of the cell which lies beyond the purview of the strictly biological evolutionary theory. Darwin, of course, neither knew about the intricacies of life processes nor did he seek to explain their origin.

The first example from biology is Michael Behe's contention that molecular machines offer experimental support for design inference. According to him, the cell itself and the mechanism of replication contained within it are powered by molecular structures of such tremendous complexity that the question whether all these could have arisen from chance poses difficulty. Using the concept of irreducible complexity, Behe presents a strong argument for design in the cell.

Some biologists like Stephen Meyer, have taken up the complexity found in the proteins and in DNA. The crucial factor is the information content in the protein and in the DNA, and scientists are not able to figure out how such a complicated process could arise due to chance alone. The specific sequencing of amino acids in the protein and in the DNA, and thus the information passed on, lies at the heart of the current crisis in chemical evolutionary thinking.

Anthropic Fine-Tuning: A Designer Way to God?

In the 1960s physicists made a significant discovery that the existence of life in the universe depends upon a highly improbable balance of physical factors. The constants of physics, the initial conditions of the universe and many other contingent features appear delicately balanced to allow for the possibility of life. It is believed that even a small change in the physical constants would have resulted in an uninhabitable universe. These remarkable coincidences have led to the articulation of the anthropic principle that the natural laws must conform to what is needed for human life.

Some examples of anthropic balance are in fact very convincing. Stephen Hawking writes: "If the rate of expansion one second after the Big Bang had been smaller by even one part in a hundred thousand million million, it would have recollapsed before it reached its present size."[4] On the other hand, if it had been greater by a part in a million, the

universe would have expanded too rapidly for stars and planets to form. The expansion rate itself depends on many factors such as the initial explosive energy, the mass of the universe and the strength of the gravitational forces. To take another example, the early kinetic energy of the Big Bang explosion had to match very accurately the mass of the material in order that the universe may be long-lived so that galaxies could be formed. Again, two energy levels characteristic of oxygen and carbon nuclei had to be remarkably well-matched for both carbon and oxygen to be abundant as we need them to be.

The astronomer Fred Hoyle was struck by the fact that the element carbon, so crucial to terrestrial life, exists only by a lucky accident. Carbon nuclei are made by a rather delicate process involving the simultaneous encounter of three helium nuclei inside the core of large stars. For this to happen, the internal energy levels of the nuclei have to be just right, that is, there has to be what is called a resonance. If the resonant energy were a little different, no carbon could be formed. Fred Hoyle was so impressed by such a fine contrivance of nature that he exclaimed, "Nothing has shaken my atheism as much as this discovery."[5]

Physicists have discovered some seventy physical or cosmological parameters that require precise settings in order to produce a life-sustaining universe. Scientists have classified force-carrying particles into four categories: gravitational force, electromagnetic force, the weak nuclear force and the strong nuclear force. If any one of these forces did not exist, life would not be possible. Also, a slight variation in any of these values would make life impossible. For example, let us take the strong nuclear force, the force that keeps the protons and neutrons in the nucleus together in action. If this force were increased by a little, the nuclear resonance level would be so altered that all the carbon would be burned into oxygen. If the strong nuclear force were slightly less, we would have only hydrogen in the universe. Scientists point out that if gravity had been a little greater, stars would have developed into red dwarfs which would be too cold to support life. If it had been a little less, the universe would become composed entirely of blue giants which would burn too briefly for life to develop.

The above examples are not some lucky instances. Physicists

have listed an impressive array of such cases. Scientists now refer to them as anthropic coincidences, and to the convergence of all these factors as the fine-tuning of the universe. Taken together, all these "coincidences" provide impressive evidence that life as we know it depends very sensitively on the form of the laws of physics, and on some actual values that nature has chosen for various particle masses, force strengths, and the like. For many scientists, it is not the fact that there are anthropic balances, but the scale of them that raises the 'why' question.

Thus it is not surprising that the design argument has been reopened with the formulation of the anthropic principle. That the universe is fine-tuned to an astonishing degree in order that rational beings could evolve has led some to argue for the existence of a designer God. The design argument of the earlier years had failed mainly because Darwin dealt a deathblow to it. Paul Davies points out that in the anthropic principle the supposed design argument is about the underlying laws, where it is immune from the Darwinian attack. He further explains that "the essence of Darwinian evolution is variation and selection. This depends on nature's being able to select from a collection of similar competing individuals." He continues, "When it comes to the laws of physics and the initial cosmological conditions, however, there is no ensemble of competitors" because "the laws and the initial conditions are apparently unique to our universe." Hence, Paul Davies can conclude that in the case of the anthropic principle "the suggestion of design is compelling."[6]

Irreducible Complexity in Molecular Machines

Using the complexity of molecular machines found in all living cells, the Lehigh University biochemist Michael Behe has clearly articulated an empirical case for design. Molecular machines are incredibly complex devices that cells use to process information, build proteins and move materials back and forth across their membranes. In his book *Darwin's Black Box*, Behe calls these systems irreducibly complex and points out that neo-Darwinists have failed to explain the origin of these complex molecular machines. In his opinion, whatever the Darwinian evolution can explain successfully, it cannot account for the biochemical complexity of the cell.

In Behe's view, the molecular machines belong to what he calls the irreducibly complex systems. He defines this term as "a single system composed of several well-matched intersecting parts that contribute to the basic function, wherein the removal of any one of the parts causes the system to effectively cease functioning."[7]

Then he points out that there are several microscopic machines that are irreducibly complex, namely the cilia and flagella that produce cell movement, and the cascade of blood-clotting proteins. He claims that irreducible complex systems could not have arisen within the universe by the Darwinian process of natural selection, and so must be explained supernaturally.

In order to explain an irreducibly complex system, Behe takes the example of the mousetrap. A mousetrap has five parts, namely a spring, a wooden base, a metal hammer, a sensitive catch and a holding bar that are put together to produce a snapping motion when the trigger is activated by a mouse lured by the bait. Since every part of the trap must be in place for the mousetrap to function, partial mousetraps where one or two parts is missing is useless. Since the mousetrap has come through the conscious intent and action of a human designer, Behe argues that "irreducible complexity" is a feature of systems which are intelligently designed.

According to Behe, irreducible systems cannot evolve in a Darwinian fashion. This is because if an irreducible system misses just one of its parts, it cannot function. The argument, simply put, is this: in complex systems each component plays an essential role in the functional whole such that only when all the components are present and functioning correctly does the functional whole exist. Since natural selection can only work on functioning systems, it cannot work with any part of an irreducible system. Thus it is impossible for natural selection to produce such a system in a stepwise fashion since all the parts must already be present for it to function. Behe is sure that an irreducibly complex system cannot be produced by the modification of a precursor system, because any precursor of an irreducibly complex system that is missing a part is by definition non-functional. It follows that natural selection, if it is

going to produce an irreducibly complex system, has to produce it all at once or not at all.

Behe argues that if the biochemical machinery of the cell cannot be produced by natural selection, then there is only one alternative, namely design by an intelligent agency. He concludes that his argument is solid because it depends on what one knows, and not from what one does not know.

DNA by Design

From the middle of the twentieth century, advances in molecular biology and biochemistry have revolutionized our understanding of the miniature world within the human cell. Research in molecular biology has shown that cells - the fundamental unit of life - store, transmit and edit information and use that information to regulate their most fundamental metabolic processes. Most of the functions of the cell involve proteins which provide much of the structure of the cell and also regulate the chemical reactions by which the cells maintain themselves. Proteins are thus the machinery of the living tissues that build the structures and carry out the chemical reactions necessary for life. A typical cell contains many different types of proteins to perform the many tasks necessary for life.

In 1951 Fred Sanger, a molecular biologist, made it clear for the first time that each protein found in the cell comprises a long non-repetitive sequence of amino acids. According to scientists, these amino acids, the building blocks of protein, do not make protein any more than letters alone make words, sentences or poetry. Rather, it is the sequencing of the twenty different amino acids that determines the function of the protein. Thus the function of all proteins (whether as enzymes, signal transducers or structural components in the cell) depends upon the specific sequencing of the individual amino acids, just as the meaning of an English text depends upon the sequential arrangement of the letters.

In the same decade, scientific research on the structure of the protein showed that proteins also exhibit a surprising three-dimensional

complexity. Again scientists realized that in addition to their complexity, proteins also exhibit specificity both as one dimensional arrays and as a three-dimensional structure. Further, it is the specific sequencing of the amino acids in protein that gives rise to specific three-dimensional structures so that the protein is seen as a twisting, turning, tangled chain of amino acids. For a functioning protein its three-dimensional shape gives it a hand-in-glove fit with other molecules in the cell enabling it to build structures within the cell. Proteins can perform functions only by virtue of their three-dimensional specificity to fit with other equally specified and complex molecules within the cell. Because of the specificity, each protein is unique and any one protein cannot be substituted for another. It is the complexity and specificity of proteins as one-dimensional arrays and three-dimensional structures that raise important questions.

In 1953 James Watson elucidated the structure of the DNA (deoxyribonucleic acid) molecule as a double twisted strand in the form of a double helix. Each strand is a linear arrangement of repeating similar units called nucleotides, and information is stored in the form of specifically arranged nucleotides. There are four nucleotide bases, namely, Adenine (A), Thymine (T), Cytosine (C), and Guanine(G). The particular order of the bases (the A's, T's, C's and G's) is called the DNA sequence.

In 1955 Francis Crick proposed the 'sequence hypothesis' suggesting that the specificity of the amino acids in proteins derives from a prior specificity within the DNA molecule – from information in the DNA molecule stored in the specifically arranged nucleotides along the spine of the DNA strands. Just as the letters of the alphabet of a written language convey a particular message depending on their sequence, so also the sequence of the nucleotides in the DNA molecule conveys precise biochemical instructions that direct protein synthesis within the cell.

It was also found that specific regions of the DNA molecule called coding regions have the same property of 'sequence specificity' or 'specified complexity' that characterizes protein molecules. The nucleotide bases of the DNA produce a functional protein depending upon their precise sequential arrangement. Thus, developments in

molecular biology have raised the question of the ultimate origin of the specific sequencing, namely, the information content in both the DNA and the proteins. Scientists point out that the probability of achieving a functioning sequence of amino acids in several functioning proteins at random is extremely small. Further, the informational content of DNA defies the explanation by reference to the physical and chemical properties of the constituent parts.

In his book, *The Design Inference,* William Dembski points out that systems or sequences that have the joint properties of high complexity and specification invariably result from intelligent causes, not from chance or physical–chemical necessity. According to him, events are specified if they exhibit an independently given pattern, and events are complex to the degree they are improbable. Therefore, Stephen Meyer could say that design theorists in biology "infer design not just because natural processes cannot explain the origin of the biological systems but because these systems manifest the distinctive hallmarks of intelligently designed systems."[8] This would imply that intelligent design can be taken as the best explanation for the origin of the specificity and complexity found in the DNA and in the protein.

The Design Argument Reassesed

One of the shared interests between science and theological reflection is the design argument, that there is a designer — may be God — who created the world according to some definite purpose. Nature exhibits such beauty and intelligibility that scholars often speak of reverence, awe and wonder. Many believe that such intricacies could not have arisen by chance. However, the place of the design theory in an intellectual environment is rather ambiguous. First of all, the design theory is untestable. It is also not falsifiable. A pertinent question is whether the design argument really deserves to be considered as a scientific alternative to Darwinism. The scientists, however, are always unhappy with the teleological approach of the design thesis, positing a purpose for the universe which they feel is questionable. The philosophers warn that after all the design argument can arise from mere ignorance. The Christians are worried whether the designer God can be the loving

biblical God. They point to the natural evil in the world and question if a benevolent God would allow so much pain and suffering.

It must be admitted that the claims for the design thesis put forth in this essay have been taken to task by many scientists, who pose strong counter arguments, contradicting the design theory. To start with the fine-tuning argument, there are three interpretations which have been proffered to explain why the universe appears to be fine-tuned. The first is that the fine tuning is a mere coincidence. The second interpretation is in terms of the weak anthropic principle. The third relates to the possibility of the existence of a multiple universe. And finally there is the prospect of design. Often the first is discarded considering the immense improbability of fine-tuning. There are too many cases of fine-tuning that make appeal to chance untenable. The advocates of the weak anthropic principle claim that if the universe were not finely–tuned to allow for life, we humans would not be here to observe it. In such a case the argument is, that fine tuning needs no explanation.

Scientists also predict the possibility of the existence of many worlds, not necessarily an infinite number but a finite set. The philosopher John Leslie[9] argues that the fact that our universe meets the extremely improbable yet necessary conditions for the evolution of life supports the thesis that there exist very many universes. In the many "possible worlds" scenario, any event that has a positive probability, however small, must happen somewhere in the universe. Hence, given a multi-universe, it is not surprising that at least one universe in the vast ensemble is fit for the production of life. Thus the many world hypothesis stands as the most popular naturalistic explanation for the anthropic fine-tuning.

But in contemporary times, there is much skepticism towards the many-world hypothesis. First, we have no evidence for any universe other than our own. The most common reaction is that the many-universe hypothesis is *ad hoc,* a sort of backhand compliment to the design hypothesis. There is also the principle of Occam's Razor, according to which entities should not be multiplied unnecessarily. Some argue that for the many-world hypothesis to suffice as an explanation for anthropic fine-tuning, there must exist an exhaustively random distribution of physical parameters, and hence an infinite number of universes to insure

that a life-producing combination of factors will eventually arise. But scientists affirm that we can have only a finite and non-random set.

The biological examples favouring design have also come under attack. The main contention is whether there can be a serious non-Darwinian explanation for the production of the biological structures. The very concept of an irreducible complex system is often under question. First of all, scientists affirm that it is possible to build a mousetrap with less than five parts. Further, they claim that the multiple parts of complex interlocking biological systems do not evolve as individual parts as Behe claims; rather they evolve together as systems that are gradually expanded and adapted to new processes. Kenneth Miller's[9] contention is that the components of an irreducibly complex system can have other selectable functions against Behe's argument that the components cannot be functionable. According to Miller, biological functionality is defined only in the context of an environment. As far as the biological evidence for design is concerned, one important question would be whether the existence of a few biological structures that have not been given step by step Darwinian explanation makes much of a case against a naturalistic evolution.

Another important point is that many theologians are not comfortable with the design argument since it often leads to what Charles Coulson called the 'God of the gaps,' the God who provides explanations precisely at the point where science fails. Thus the 'God of the gaps' refers to the positing of a God when science is not able to prove something, as Newton did when he asserted that God occasionally stepped in to correct the irregularities in the motion of the planets. With Einstein's new physics explaining the solar system, Newton's 'plumber' God was found to be unnecessary. Many scientists point out that to infer design is to give up on science and that it constitutes an argument merely from scientific ignorance. Thus the 'God of the gaps' has come to refer to the positing of a God, to fill the gap whenever science is not able to explain some data. The problem is that when science begins to explain more and more, the 'God of the gaps' will have to be pushed from out of the gap.

Another opposition to the design argument is from the fact that it

is almost always characterized as involving anthropocentrism, as in the case of the anthropic principle. The question is whether the human person is at the centre of the universe and whether the universe is made for the sake of the human person. The universe indeed consists of almost infinite complex and fascinating life processes beside the sentient beings. The animal lovers and the environmentalists would not be happy with the present understanding of the anthropic fine-tuning.

When all is said and done, the pertinent question is whether the chief source of our belief in the world as the work of God is due to the logical reasoning of the philosophers or our intuitive faith. Many would opt for a 'theology of nature,' where the starting point is not science but religious experience and historical revelation. Thus, irrespective of the arguments for or against the design theory, many people tend to believe instinctively in a divine origin since such a belief alone can give meaning to life. They would go along with Newman who seems to have claimed "I do not believe in God because I look at nature and see design; rather, I look at nature and see design because I believe in God."[10]

Notes

1 Dr. Sarojini Henry was former Professor of Mathematics at St. John's College, Palayamkottai, Tamail Nadu and Professor of Theology at Tamil Nadu Theological Seminary, Chennai.

2 Quoted in David Wilkinson, *God, the Big Bang and Stephen Hawking* (Crowborough: Struik Christian Books, 1993), p. 104.

3 Richard Dawkins, *The Blind Watchmaker* (New York: W. W. Norton and Company Inc., 1996), p. 6.

4 Quoted in Ian Barbour, *Religion in an Age of Science* (London: SCM Press, 1990), p.135.

5 Quoted in David Wilkinson, *God, the Big Bang and Stephen Hawking*, p. 108.

6 Paul Davies, "The Unreasonable Effectiveness of Science," in *Evidence of Purpose,* ed. John Mark Templeton (New York: Continuum, 1994), p. 51.

[7] Michael Behe, *Darwin's Black Box: The Bio-Chemical Challenge to Evolution*, (New York: The Free Press, 1996), p. 39.

[8] Stephen C. Meyer, "DNA and Other Designs," *First Things*, April 2000, p.36.

[9] Quoted in Neil A. Manson, ed., *God and Design: The Teleological Argument and Modern Science* (New York: Routledge, 2003), p. 229.

[10] Ibid, p. 349.