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CHAPTER 1

Introduction

"Any coincidence," said Miss Marple to herself, "is always worth noticing. You can throw it away later if it *is* only a coincidence."

AGATHA CHRISTIE

1.1 Overview

It is no secret that science-based arguments for the existence of God have become increasingly unpopular during the past few centuries. Although the majority of scientists and philosophers during this period were sympathetic to the cause of natural theology (especially in England), the advent of Darwinism in the latter part of the nineteenth century, with its extreme emphasis on naturalistic explanations for the rise of life, had a devastating impact on the credibility of the natural theologian's arguments. Since the existence of the present universal order could now be conceived almost entirely in naturalistic terms (or so it seemed), God was no longer needed as a vital explanatory hypothesis.

The vast increase in our scientific understanding of the world during the present century has only served to exacerbate the decline of the natural theologian's claims. Now that we can understand where we came from and what we are made of in unprecedented detail, it would appear as though natural theology has all but been extinguished as a viable means of shedding light on the possible existence of a Creator.

However, just as certain depressed economical markets have a strange way of turning around to the upside at precisely the time when they appear to have fizzled out completely, certain intellectual movements seem to behave in a similar manner. Such appears to be the case with natural theology. At the very time when many moderns have been prepared to bury this important historical movement once and for all, it has suddenly appeared back on the intellectual scene, this time armed with an imposing array of new scientific support.

Most of this support has inadvertently come from within the ranks of modern theoretical physics, which itself has taken a very interesting turn in recent years. For in the midst of their almost routine foraying into the underlying structure of the physical realm, physicists and cosmologists have stumbled upon a collection of physical "coincidences" that seem to pervay a

deep truth about the nature of the universe: In spite of the many complex requirements for the existence of carbon-based life forms, the physical universe nevertheless displays a remarkable fitness for the evolution of life.

At first this observation seems almost tautologous; *of course* the universe is fit for life, otherwise we wouldn't be here to observe it! On a deeper level, however, this fitness turns out to be utterly mysterious, because it involves the apparent fine-tuning of a wide range of seemingly unrelated physical parameters. It is this cooperative fine-tuning that demands a larger explanation, because the resultant life-supporting character of the universe has turned out to be exceedingly improbable.

In an effort to account for these remarkable life-facilitating "coincidences," physicist Brandon Carter in 1974 devised a multi-faceted explanation he called the "Anthropic Principle," which attempts to relate the structure of the physical universe to the specific requirements of *human* existence. Carter's initial aim was to "argue against (an) exaggerated subservience to the Copernican principle." For while Copernicus was justified in his assertion that we not "assume gratuitously that we occupy a central position in the cosmos," Carter argued that it does not necessarily follow that our position on this planet cannot be privileged in *any* way. To the contrary, our location in the universe "is necessarily privileged to the extent of being compatible with our existence as observers."¹

In the years since Carter's initial anthropic limitation of the Copernican dogma, several versions of the so-called Anthropic Principle have subsequently been put forth by the scientific community. The "weak" form, known as the Weak Anthropic Principle (WAP), has been formulated by John D. Barrow and Frank J. Tipler in the following terms:

WEAK ANTHROPIC PRINCIPLE: The observed values of all physical and cosmological quantities are not equally probable but they take on values restricted by the requirement that there exist sites where carbon-based life can evolve and by the requirement that the universe be old enough for it to have already done so.²

The WAP thus seeks no deeper level of explanation than to note that, given our current existence, we could never expect to observe a universe significantly different from our own. Obviously, though, the WAP does not seek to explain *why* or *how* the universe actually came to be structured in this life-supporting manner; it simply notes that, while the universe is the way it is for unknown reasons, given our current existence it could not have been otherwise.

At its most fundamental level, then, the WAP follows the widely accepted principle that whenever one measures anything, one must always take into account the particular properties of the measuring instrument.³ In this case,

the "measuring instrument" happens to be ourselves, so our conclusions must take into account the particular set of circumstances that give rise to our privileged position as observers.⁴ Thus, the WAP asserts that, given our existence as observers, we must necessarily observe the kind of universe we presently inhabit.⁵

In an effort to provide a more satisfying explanation for the many apparent coincidences in nature, Carter also devised the Strong Anthropic Principle (SAP), which has been formulated by Barrow and Tipler in the following terms:

STRONG ANTHROPIC PRINCIPLE: The universe must have those properties which allow life to develop within it at some stage in its history.⁶

Although the SAP does not attempt to explain *why* the universe must be such as to eventually allow life to form, it nevertheless affirms that this must be so.⁷

As John Casti has pointed out, the gap separating the SAP from the traditional Design Argument for the existence of God⁸ is no more than a "hairsbreadth, omitting only an explicit invocation of a Designer."⁹ This leads us to the first corollary of the SAP, which can be stated as the following:

There exists one possible universe "designed" with the goal of generating and sustaining "observers."¹⁰

A second corollary of the SAP is derived from the findings of modern quantum mechanics. Dubbed the Participatory Anthropic Principle (PAP) by physicist John A. Wheeler, its principal originator, it asserts the following:

PARTICIPATORY ANTHROPIC PRINCIPLE: Observers are necessary to bring the universe into being.¹¹

The PAP follows from the idea held by many quantum physicists that a living consciousness is necessary to collapse the various wave functions of physical reality, so as to impart a definite quantum determinacy to them.

The third and final corollary of the SAP has been dubbed the Final Anthropic Principle (FAP) by Barrow and Tipler. It can be stated as the following:

FINAL ANTHROPIC PRINCIPLE: Intelligent information-processing must come into existence in the universe, and, once it comes into existence, it will never die out.¹²

Casti's version of the FAP adds the following:

Once life is created, it will endure forever, become infinitely knowledgeable, and ultimately mold the universe to its will.¹³

The FAP thus has an obvious religious quality to it, in that it affirms a positive universal purpose to human evolution which cannot be thwarted by any possible power.

The SAP in all its forms seeks to account for the utterly improbable nature of the many "coincidences" in nature by asserting that the universe *had* to have been such as to admit life at some point in its history. It correctly surmises that the odds for these "coincidences" to have independently happened by chance are so vanishingly small that they must have been in some sense deliberate. The FAP even goes so far as to generalize from this extreme improbability to the point of asserting that intelligent life will eventually grow to the point of becoming almost godlike.

Overall, the SAP implies a strong sense of necessity as far as the evolution of life is concerned, due to its claim that the universe *must* contain those properties that are conducive to life's evolution. We will now consider three possible ways of interpreting this strong sense of cosmic necessity. Only the final one, however, holds up under scrutiny:

1) *Life does in fact exist; therefore the universe "must" possess those properties that are capable of giving rise to it.* This assertion, however, reduces to the WAP, because of its possibly contingent status. For while the present existence of life compels us to conclude that the universe "must" be biocentric in nature, this is far from a necessary truth, because the universe might not have existed at all, or if it did happen to exist, it might not have been biocentric.

2) *There is only one logically possible universe; therefore, since life is known to exist, the universe "must" be biocentric in nature.* This too falls short of a necessary state of affairs, because it is always possible that this one logically consistent universe might not have ever existed.

Clearly, then, if the SAP is to be valid (i.e., if the universe is to be such that it had to have brought about life at some point in its history), a factor must be found that would have made the existence of the universe a *necessary* truth from the very beginning. Such a demand for absolute cosmic necessity is very difficult to imagine apart from the existence of some sort of necessary being or principle that would have made the evolution of life inevitable. This leads us to consider the final way of interpreting the SAP:

3) *The universe must be such as to admit life at some point in its history because of the action of a necessary being or principle that rendered this outcome inevitable.* This is the only explanation for the SAP that holds up under scrutiny, because there is no way to guarantee the inevitability of life's

evolution apart from the invoking of some sort of principle of absolute cosmic necessity. Traditionally, this vehicle of cosmic necessity has been called "God" (although it is possible to conceive of it in impersonal terms, as some Hindus and others have done).

In general, the anthropic family of principles reverses the pattern of logic typically employed in scientific reasoning.¹⁴ Normally, scientists begin with an initial situation and the various laws of nature, and then come to predict a future state of affairs. "Anthropic" reasoning, on the other hand, proceeds in the opposite direction: One starts with the final observed state (the present) and then acts to constrain or limit the initial conditions in such a way that they are consistent with our existence as observers.¹⁵

Not all thinkers, however, are impressed by the various "anthropic" formulations. Martin Gardner, for instance, was so disgusted by Barrow and Tipler's grandiose claims regarding the Final Anthropic Principle that he renamed it "the completely ridiculous anthropic principle, or CRAP!"¹⁶ Although one cannot help but sympathize with Gardner's exasperation regarding some of these formulations, the ultimate question at issue here is whether or not there is an element of truth in this kind of "anthropic" thinking. As we will see in the coming pages, the answer to this question is an unqualified "yes."

As Barrow and Tipler have pointed out, there have been surprisingly few attempts to work out a precise statement of the Anthropic Principle in the years since it was initially formulated.¹⁷ Astrophysicists have apparently wanted to leave a little flexibility in its formulation so that its deeper significance might become more apparent in the future.¹⁸

One of the major goals of the present study is to work out a scientifically and philosophically accurate treatment of the Anthropic Principle in all of its various manifestations. I seek to do this for two reasons: 1) because of the intriguing nature of the subject matter, and 2) because such an analysis promises to help increase our understanding about the universe in which we live.

Many commentators on the Anthropic Principle have intuitively felt that it contains a deep element of truth about our overall position in the cosmos, but most have been at a loss to describe what this truth might actually be. In the following pages I will attempt to explore the many "hidden recesses" of the Anthropic Principle, so as to determine what it can possibly tell us, if anything, about our role in the cosmos.

1.2 The Humanoid Principle

Interestingly enough, none of the individual manifestations of the Anthropic Principle is specifically committed solely to the existence of human

life *per se*. Each can be understood as referring to intelligent *humanoid* forms of life, and not necessarily to humans only. Thus, there could very well be intelligent humanoid observers on other planets who could easily contribute a significant amount to the overall validity of the "Anthropic" Principle.

In this sense, the "Anthropic" Principle is something of a misnomer, since there is nothing intrinsic to it that requires the existence of distinctly human observers. The WAP only requires *some* form of intelligent observership in the universe, while the SAP only requires that the evolution of *life* itself be inevitable, not the evolution of human or humanoid life *per se*. Even Wheeler's Participatory Anthropic Principle (PAP) can be understood in a non-anthropocentric sense, since other forms of life are also presumably capable of observing the universe into existence (granting the truth of this theory). Even the first corollary to the SAP—which states that there is one possible universe that has been deliberately designed by a Higher Power so as to allow observers to come into being—can be understood in a non-anthropocentric sense, since other forms of intelligent life could just as easily fulfill its lofty requirements. The same can be said to apply to the Final Anthropic Principle (FAP): other forms of intelligent life could survive forever, and amass an infinite degree of knowledge in the process.

Properly speaking, then, the Anthropic Principle should be called the *Humanoid Principle*, since other human-like forms of intelligence are equally capable of rendering it valid. The fact that we have no direct proof of the existence of these humanoid extraterrestrials does not seriously affect this distinction, because: 1) there is always the chance that they *might* exist, and 2) there is nothing in any of the Anthropic Principles that requires the existence of human life in particular. At best, then, the Anthropic Principle as it currently stands only supports a *moderate* anthropocentric view of reality, which sees humans as only *one* source of importance in the universe.

In deference to this new terminology, we can devise humanoid versions to the Weak, Strong, Participatory, and Final Anthropic Principles, in which the word "humanoid" is simply substituted for the word "anthropic." This would result in the Weak Humanoid Principle (WHP), the Strong Humanoid Principle (SHP), the Participatory Humanoid Principle (PHP), and the Final Humanoid Principle (FHP).¹⁹ The point is simply that human-like beings on other planets are just as capable of rendering the co-called Anthropic Principle valid as humans are.

With this in mind, there are two possible alternatives that could be taken as far as the terminology of the Anthropic Principle is concerned. On the one hand, the word "anthropic" could simply be dropped altogether in favor of the word "humanoid." This would result in the Weak, Strong, Participatory, and Final Humanoid Principles, as noted above. On the other hand, the meaning of the word "anthropic" could simply be extended beyond its

traditional meaning of "human" to include possible human-like observers on other planets (or even other forms of intelligent life on *this* planet, such as whales or dolphins).

In order to remain consistent with existing convention (and thereby to simplify matters as much as possible), I have chosen to retain the word "anthropic" in its larger descriptive sense throughout the remainder of this manuscript. Its meaning will thus be extended to include all possible human-like observers, both on this planet and throughout the universe.

1.3 An Anthropic or Biocentric Universe?

Before we move on to consider the actual evidence for the Anthropic Principle, it will be instructive to distinguish between two possible interpretations of the physical evidence: an anthropic interpretation, which holds that human and human-like beings are the "reason" why the structure of the universe is so conducive to supporting biological life, and a more general biocentric interpretation, which holds that generic biological life (and thus not necessarily humanoid life) is the "reason" for this life-supporting structure.

Thus far, most authors who have written on this subject have simply assumed that any cosmic "intention" to evolve life must have had intelligent human life as its ultimate goal; hence the "Anthropic" Principle. However, it could be argued that the cosmological evidence that has been recruited in support of the Anthropic Principle can properly be said, in and of itself, to support only a *Biocentric Principle*, and *not* any type of Anthropic Principle *per se*.

Strictly speaking, this contention is correct: there is no way to derive any type of Anthropic or Humanoid Principle directly from the so-called anthropic evidence. The *most* that one can do, given the evidence at hand, is to argue for *Intelligent Contrivance* in the universe, which, at most, can only be said to support the existence of a *biocentric* universe, and not necessarily an anthropic one *per se*. Thus, the declaration of an anthropic universe amounts to an *additional* argument beyond the one for Intelligent Contrivance, because there is no way to infer from the physical evidence alone whether a deliberately contrived universe has been designed explicitly for humans, or whether it has been designed merely for biological life in general. The theoretical jump from a Biocentric to an Anthropic Principle thus involves an anthropocentric generalization from the scientific evidence that isn't grounded as much on the empirical evidence as it is on a variety of philosophical and theological intuitions about humanity's importance in the overall universal order.

While some may consider this distinction to be irrelevant, given the irreducible fact of our own existence, there is always the chance that we were

never directly intended to exist by the creative powers that exist in the universe. It is possible that only life in general was originally intended, and that we only evolved as a kind of unforeseen "happy accident."²⁰ In this case, we would only be justified in arguing for a Biocentric Principle, and for the Intelligent Contrivance that necessarily accompanies it. As a consequence, it behooves us to draw a clear distinction between a general state of biocentric contrivance in the universe, on the one hand, and a more specific state in which human and human-like beings themselves are directly intended as the chief locus of value.

Because of the distinctness of these two arguments, they will be examined separately throughout the remainder of this book. To begin with, I will seek to show that the existing scientific evidence argues convincingly for a deliberately contrived (and therefore biocentric) universe. Once this assertion has been reasonably established, I will move on to consider the various interpretations of the cosmological evidence that have been proposed over the years. From there I will move on to consider whether or not the Biocentric Principle constitutes a legitimate "proof" of the existence of God. At this point I will move on to consider whether or not an anthropic generalization from the biocentric evidence is in fact justifiable. This will be followed by a detailed examination of the various theological implications surrounding the "anthropic" evidence. Finally, I will seek to defend the practice of natural theology in general, so that a suitable "bridge" can be built between the disciplines of science and religion. First, however, I will seek to place the current discussion of the cosmological evidence in context by providing a brief history of teleological thought. Having done this, I will move on to develop a new form of the Design Argument, which will be based upon the most recent scientific evidence to date surrounding the Anthropic Cosmological Principle.

Notes

1. Brandon Carter, "Large number coincidences and the anthropic principle in cosmology," *Confrontation of Cosmological Theories with Observation*, ed. M.S. Longair (Dordrecht: Reidel, 1974), p. 291.
2. John D. Barrow and Frank J. Tipler, *The Anthropic Cosmological Principle* (New York: Oxford University Press, 1986), p. 16.
3. John L. Casti, *Paradigms Lost* (New York: William Morrow and Co., 1989), p. 479.
4. *Ibid.*, p. 480.
5. Although some have argued that the self-referential quality of the WAP renders it tautologous by its very nature, the true significance of the WAP can be found in its ability to cause us to question *how* and *why* the universe originally came to be such that it was capable of supporting intelligent life.
6. Barrow and Tipler, p. 21.
7. It is instructive at this point to note that the SAP as formulated here only refers

to a biocentric, or life-supporting, universe, and not necessarily one that supports *human* observers, as does the WAP. We will have more to say on this important distinction later.

8. Indeed, the strong version of the Anthropic Principle is so closely associated with the teleology of Intelligent Design that physicist Heinz Pagels once quipped that it is "... the closest that some atheists can get to God."
9. John L. Casti, *Paradigms Lost*, pp. 481–482.
10. Barrow and Tipler, p. 22.
11. Ibid.
12. Ibid., p. 23.
13. Casti, p. 482.
14. Ibid., pp. 480–481.
15. Ibid.
16. See Martin Gardner, "WAP, SAP, PAP, and FAP." *The New York Review of Books* 33(8 May, 1986):22–25.
17. Barrow and Tipler, p. 15.
18. Ibid.
19. My motivation here is simply to work out a series of accurate definitions of the various Anthropic Principles. However, this does not necessarily mean that I affirm any of them.
20. Interestingly enough, this is the only proper use of the word "accident" in cosmological theory. An "accident" is normally understood as being a malfunctioning, and therefore unintended, byproduct of a purposive system that has been initiated by some sort of intelligent creative force. That is to say, the very concept of an "accident" *presupposes* a pre-existing world of volition where some things happen expectedly, and others do not. It would thus be correct to say that an individual who had intended a certain consequence with his behavior *accidentally* produced another, unexpected event.

With the random origin of the universe, however, we aren't talking about the accidental production of an unintended effect by a volitional being; we are rather talking about the spontaneous origin of the entire cause-and-effect realm by pure happenstance. While we may be justified in calling such a hypothetical event a product of chance, we are *not* justified in calling it a bona fide *accident*. As a consequence, it is inappropriate to refer to the universe itself as being an "accident," even hypothetically, because this sort of use removes the notion of an "accident" from a purposive system to one of absolute, non-purposive chaos, and this is a concept that the word "accident" was never intended to cover.