

LAWRENCE H. OSBORN

A theological perspective on Barrow and Tipler's: *The Anthropic Cosmological Principle*

The role of teleology in general and the various forms of the anthropic principle in particular are lucidly summarised in this important book. This review article focuses its attention upon the philosophical and theological implications of Barrow and Tipler's work. It is argued that, in their hands, the anthropic principle becomes a vehicle for the defence of post-Enlightenment liberalism. The possibility of a natural theology based upon the anthropic principle is noted and several doubts about the wisdom of such an approach are raised.

Key Words: Anthropic principle, many-worlds interpretation, natural theology, post-enlightenment liberalism, teleology.

1. Introduction

This book is a remarkable *tour de force* of cosmological speculation. Within its more than seven hundred pages we are offered a history of teleology (itself sufficient to fill an average paperback) and a comprehensive overview of modern cosmology from an interesting (if, at times, idiosyncratic) perspective.

Their account of teleology is very wide ranging. In two chapters they attempt to cover classical Greek thought, the Judaeo-Christian traditions, non-western religious and philosophical traditions, as well as its role in twentieth century science, philosophy and theology. In spite of their claim (p. 9) that this is a detailed account, two hundred pages is sufficient only for a sketchy introduction to the subject.

Chapter 3, on teleology in the twentieth century, makes a number of interesting points. For example, they demonstrate that the methodological elimination of teleology from physics has never been more than a philosophers' dream. In reality, teleology survived the heyday of classical mechanics in the form of extremum principles. They also translate philosophical idealism into the language of abstract computer theory.

A major weakness of these chapters is their inadequate account of teleology in theology. Perhaps the explanation is that they equate teleology in theology with natural theological design arguments. As a result, they ignore the role of teleology in the Christian doctrine of providence. For the same reason they restrict their discussion of teleology in twentieth-century

theology to Teilhard de Chardin, process theology, and a handful of Anglo-Saxon natural theologians.

The strength of the book lies in its scientific chapters. Barrow and Tipler offer a comprehensive survey of the cosmological enigmas which have given rise to the anthropic principles. The result is a large body of evidence suggesting the 'fine tuning' of the universe. As such it presents would-be natural theologians with a goldmine for contemporary design arguments.

2. The Anthropic Principles

The overall purpose of the book is to commend anthropic explanations of the scientific enigmas so compendiously described by the authors. These explanations may be divided into two main classes.

(i). The Weak Anthropic Principle (WAP)

'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.' (p. 16). In other words, our existence as observers functions as a cosmological selection effect: the conditions we observe must be consistent with our existence.

The authors deny that this is tautological. They point out that it contradicts the Perfect Cosmological Principle (which asserted that the gross structure of the universe was independent of both location and time). Thus the WAP could have been used as a counter-argument to the early steady-state theories of Bondi, Gold and Hoyle (p. 17).

However, on its own, this does not take us very far towards an explanation of the universe's anthropic features. In conjunction with a conventional big-bang cosmology, the WAP merely gives the impression that our existence is an accident of vanishingly small probability. In practice, its adherents present it in conjunction with a cosmological model which allows them to assert that there is a sense in which all possible universes actually exist. Three such models are found in the literature: the cyclic big-bang cosmologies; a spatially and temporally infinite cosmic chaos in which 'bubbles' of order appear and disappear at random; and, the many-worlds interpretation of quantum mechanics (MWI).

The authors opt for the MWI. It was originally proposed as a way of avoiding difficulties created by the observer in the Copenhagen Interpretation of quantum mechanics. It does so by arguing that there is a sense in which every possible observation actually exists. For example, a radioactive atom may either decay or not. Its decay may be detected by a geiger counter. The wave function of the situation prior to observation is ambiguous. Instead of giving a special status to the observer, MWI asserts that the ambiguity represents reality. When the detector observes the decay it 'splits in two':

The Anthropic Principle

one detector observes a decay, the other does not. This 'splitting' of detectors effectively defines two universes corresponding to each of the choices available to the particle. Thus every quantum state consistent with the initial conditions is actualized. The result is an ever increasing ensemble of 'parallel' universes. It is thus sufficient to invoke the WAP to 'explain' our atypical cosmos.

However, this hypothesis proves too much. In spite of the authors' protestations to the contrary (p. 495), MWI's profligacy with universes to achieve economy of physical laws seems an extreme violation of Ockham's Principle. There is also a certain irony in their juxtaposition of MWI (which denies the observer's special status in quantum mechanics) with a principle which asserts the special status of intelligent life in cosmology.

The WAP does not claim to be explanatory: it is merely a selection effect. However, it is pointless unless used in conjunction with a cosmological model which postulates an ensemble of universes. Thus, in practice, it functions as a way of commending certain speculative cosmologies which have so far failed to convince by more conventional forms of scientific argumentation.

By mitigating the sense of improbability created by the anthropic features of the universe, the WAP also serves to obviate pressure for a theistic interpretation of those features.¹

(ii). The Strong Anthropic Principles

For some cosmologists, including Barrow and Tipler, the WAP does not go far enough. They invoke the existence of rational carbon-based life forms as an *explanation* of the anthropic features of the universe: 'The universe must have those properties which allow life to develop within it at some stage in its history.' (p. 21).

The authors concentrate on two important forms of the SAP: Wheeler's Participatory Anthropic Principle (PAP) and their own Final Anthropic Principle (FAP).

The PAP is characterized by its understanding of observership. Like MWI this arose from the ambiguity of the Copenhagen Interpretation. Wheeler has redefined the concept of an observer to involve the inter-subjective agreement of a community of observers. The PAP asserts that *all* properties, and, hence, the very existence of the universe, are brought about by being observed in this sense. Thus the universe may be likened to a self-excited circuit. Past and future events are so coupled by intersubjective observership as to obviate any need for a first cause.

Barrow and Tipler are critical of the PAP. In their view, its logical conclusion is that the cosmos depends on some Ultimate Observer (p. 471). The theistic implications are clear. Their non-theistic alternative is the

¹ Its use in this way has been criticized by the statistician David Bartholomew in *God of Chance*, SCM Press, London, (1984), pp. 64–65.

FAP: 'Intelligent information-processing must come into existence in the Universe, and, once it comes into existence, it will never die out.' (p. 23).

For the authors the cosmological significance attributed to life by the SAP entails the capacity to understand and manipulate matter on a cosmic scale. Granted the extreme improbability of the evolution of intelligent life, it is inconceivable to them that such life could become extinct.

They develop a non-theistic eschatology from the FAP. Humankind cannot exist forever. However, since they define life as a self-replicating system of information, they envisage human culture being preserved and developed by self-replicating intelligent machines. The transference of our cultural software to alternative forms of hardware enables indefinite growth beyond the wildest dreams of most *laissez faire* economists. Ultimately human culture expands to engulf the entire cosmos.

In spite of the metaphysical tone of much of their discussion, Barrow and Tipler insist that the FAP makes clear predictions about the kind of universe we can expect to observe. Most importantly, in order for life literally to engulf the universe, it must be closed (eventually collapsing under its own gravitation toward a final singularity). It must also satisfy the topological condition of Strong Cosmic Censorship. Thus, a particular set of initial data uniquely determines the global structure of space-time (p. 622). In effect, the FAP entails Laplacean determinism.

The evidence which leads the authors to the SAP is clearly tolerant of a theistic interpretation: an anthropic design argument. However, it is equally clear that the anthropic principles enable their advocates to evade such an interpretation.

Implicit in Barrow and Tipler's insistence on the predictive power of the SAP is a claim that they be accorded scientific status. The SAP claims that the statement, 'Observers exist', in some sense constitutes a *scientific explanation* of the anthropic features of the cosmos. In commending the SAP the authors are engaging in a campaign to reinstate teleology as a form of scientific explanation. The teleological implications of the SAP have led many scientists and philosophers to reject it out of hand.² Against such rejection Barrow and Tipler contend that the physical sciences never completely abandoned teleology. Furthermore they argue that, handled with care, teleological explanation can be a very successful strategy for simplifying complex phenomena (such as human behaviour).

3. The Underlying Philosophy

It should be noted that this book is pervaded by a distinctive philosophical position, namely, that of post-Enlightenment liberalism. The authors are staunch defenders of the Enlightenment principle of harmony, the doctrine

2 e.g., Ernan McMullin, 'How Should Cosmology Relate to Theology?', in *The Sciences and Theology in the Twentieth Century*, edited by A. R. Peacocke, Oriel Press, Stocksfield, (1981), pp. 17-57, (p. 43).

of visible progress, and individualism. In addition to this, they show an idealistic tendency to reduce everything to information.

The principle of harmony (belief in an immanent regulating principle working to bring order out of the chaos of individual freedom) comes across clearly in their support for the economic theories of Hayek. In a long aside they savage environmentalists for failing to see the structural similarities between homeostasis in ecosystems and *laissez faire* economics (pp. 169–73). However, even simple natural ecosystems are orders of magnitude more complex than economic systems. The authors fail to demonstrate that economic systems are sufficiently complex to be self-regulating.

Closely associated with the principle of harmony is the doctrine of visible progress: both are secularized forms of the Christian doctrine of providence.³ Thus it is not surprising to find the authors expressing their faith in human progress. Indeed progress is an integral part of their development of the FAP with its requirement of unlimited growth in human knowledge for an indefinite period.

As for the idealistic streak in the book, having translated philosophical idealism into the terminology of computer theory the authors feel free to use that terminology elsewhere in the book without further comment. While they do not repeat the idealist claim that the universe is indistinguishable from its simulation, they do use similar language of life. Thus life may be regarded as a self-replicating system of information and humans as rational sub-programs within the Universal Program. A similar tendency is visible in their assertion that economics is about the flow of information rather than material resources.

This idealistic streak has important implications for their understanding of knowledge. In keeping with current trends they appear to treat the activity of knowing as the collection of bits of information. The ultimate good is the amassing of such information and their concept of heaven is an infinite stockpile of facts (apparently with no regard for their importance or use). It should be noted that this approach is increasingly being questioned by philosophers.⁴

4. Theological Implications

The anthropic principles were clearly devised, at least in part, to enable their adherents to evade the possible theistic (or deistic) implications of cosmic 'fine-tuning'. However, their very existence admits the force of design arguments based on these physical features.

³ Paul Tillich, *Perspectives on 19th and 20th Century Protestant Theology*, ed. C. E. Braaten, SCM Press, London, (1967), pp. 36–43; John Baillie, *The Belief in Progress*, Oxford University Press, London, (1950).

⁴ An important critique of the epistemology advocated by Barrow and Tipler is to be found in Mary Midgley, *Wisdom, Information, and Wonder: What is Knowledge for?* Routledge, London, (1989).

Such arguments assert that the universe was designed to permit (or, in stronger forms, to necessitate) the evolution of rational carbon-based life forms. Implicit in such assertions are three assumptions which raise doubts in my mind about the wisdom of placing too much reliance on such an approach.

First, they assume that the anthropic features of the cosmos are, in themselves, improbable. However, quite apart from the difficulties of assigning probabilities to these parameters, such an assumption is far from proven. For example, it is not inconceivable that future developments in theoretical physics will render these very features quasi-necessary. In such a situation, this entire class of design argument would collapse. There is a hint of the god of the gaps about such arguments: the universe appears to be a highly improbable structure: we cannot give a rational explanation of these cosmological features: therefore, they constitute evidence of an intelligent designer. And, like the god of the gaps, the role of this deity shrinks with the expansion of scientific understanding.

Secondly, the ultimate goal of creation is taken to be the existence of rational carbon-based life forms (i.e., humankind). This is in agreement with the dominant view of western Christian theology. However, it is arguable that the anthropocentricity of western Christianity is derived from sources other than the Christian revelation. For example, instead of presenting man as the end of creation, Genesis 1 may be read as insisting that the end of God's creative activity is his Sabbath rest in the presence of *all* his creation. This trend towards less anthropocentric readings of the Bible (and Christian tradition) is a common feature of contemporary theologies of creation.⁵

Thirdly, anthropic design arguments require that the content of God's creative activity be determined by the envisaged goal. If his ultimate purpose were to create humankind, God had no choice but to design the rest of creation in just the way envisaged by contemporary cosmology. This insistence on the necessity of the global structure of the cosmos does not sit easily with any theology which wishes to maintain a strong sense of God's sovereignty.

⁵ The most important contribution to the doctrine of creation in recent years has been that of Jürgen Moltmann, *God in Creation: An Ecological Doctrine of Creation*, tr. M. Kohl (SCM Press, London, (1985). His concluding chapter is devoted to the development of this concept of the divine Sabbath as the end of creation.

Dr. Lawrence Osborn has an M.Sc. in Experimental Space Physics and a Ph.D. in Christian Doctrine from King's College, London. He is currently part of the Little Gidding Community and works part time for the 'Gospel and our Culture' project which is set up to pursue Lesslie Newbigin's plea for a 'genuinely missionary encounter with post-enlightenment culture'.