

DISCUSSION

Barrow and Tipler on the Anthropic Principle vs. Divine Design

In their massive study *The Anthropic Cosmological Principle*, [1986]¹ John Barrow and Frank Tipler provide the most comprehensive analysis to date of the so-called Anthropic Principle and its relation to the classic teleological argument for a Divine Designer of the cosmos. According to their analysis, the Anthropic Principle evolved out of the traditional design argument for God's existence, particularly one version of that argument, the eutaxiological version, which was based on the presence of discernable order and mutual harmony in nature in abstraction from any anthropocentric purpose being in view. Although Barrow and Tipler believe that the Darwinian theory of evolution undermined biological, anthropocentric versions of the teleological argument, they contend that contemporary science has only served to accentuate the delicate balance, perceived in the eutaxiological version of that argument, of highly improbable necessary conditions for the evolution and sustenance of intelligent life which obtain in the universe, and the bulk of their book is devoted to surveying the fields of physics and astrophysics, classical cosmology, quantum mechanics, and biochemistry to illustrate their point. These supply the evidence for what F. R. Tennant [1930], who coined the term *anthropic*, called 'wider teleology'.

Not that Barrow and Tipler are endorsing a design argument; on the contrary, although scientists hostile to teleology are apt to interpret their work as sympathetic to theism and although I have already seen this book cited by two prominent philosophers of religion in support of the teleological argument, the thrust of the book's argument is in the end anti-theistic. As Barrow and Tipler employ it, the Anthropic Principle is essentially an attempt to complete the job, begun by Darwinian evolution, of dismantling the teleological argument by showing that the appearance of design in the physical and cosmological quantities of the universe is just that: an *appearance* due to the self-selection factor imposed on our observations by our own existence. If Barrow and Tipler are correct, then the wider teleological argument of Tennant proves no more effective than the narrow teleological argument of his predecessors.

¹ For a more wide-ranging review of this book see Craig [forthcoming].

That brings us to a consideration of the Anthropic Principle itself. Barrow and Tipler distinguish several versions of the Principle, the most basic and least disputable being the Weak Anthropic Principle (WAP):

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. 15)

Barrow and Tipler regard WAP as 'in no way speculative or controversial' (p. 16), since it is 'just a restatement . . . of one of the most important and well-established principles of science: that it is essential to take into account the limitations of one's measuring apparatus when interpreting one's observations' (p. 23). For example, if we were calculating the fraction of galaxies that lie within certain ranges of brightness, our observations would be biased toward the brighter ones, since we cannot see the dim ones so easily. Or again, a ratcatcher may say that all rats are bigger than six inches because that is the size of his traps. Similarly, any observed properties of the universe which may initially appear astonishingly improbable can only be seen in their true perspective after we have accounted for the fact that certain properties could not be observed by us, were they to obtain, because we can only observe those compatible with our own existence. 'The basic features of the Universe, including such properties as its shape, size, age, and laws of change must be *observed* to be of a type that allows the evolution of observers, for if intelligent life did not evolve in an otherwise possible universe, it is obvious that no one would be asking the reason for the observed shape, size, age, and so forth of the universe' (pp. 1–2). Thus, our own existence acts as a selection effect in assessing the various properties of the universe. For example, a life form which evolved on an earthlike planet 'must necessarily see the Universe to be at least several billion years old and . . . several billion light years across,' for this is the time necessary for production of the elements essential to life and so forth (p. 3).

Now, we might ask, why is the '*observed*' in the quotation in the above paragraph italicized? Why not omit the word altogether? The answer is that the resulting statement:

1. The basic features of the universe must be of a type that allows the evolution of observers

is undoubtedly false; for it is not logically or nomologically necessary that the universe embrace intelligent life. Rather what seems to be necessarily true is

2. If the universe is observed by observers which have evolved within it, then its basic features must be of a type that allows the evolution of observers within it.

But (2) seems quite trivial; it does nothing to explain why the universe in fact has the basic features it does.

But Barrow and Tipler contend that while (2) appears to be true, but trivial, it has 'far-reaching implications' (p. 2). For the implication of WAP, which they seem to interpret along the lines of (2), is that no explanation of the basic features of the universe need be sought. This contention seems to be intimately connected with what is appropriate to be *surprised at*. The implication of WAP is that we ought not to be surprised at observing the universe to be as it is, for if it were not as it is, we could not observe it. For example, 'No one should be surprised to find the Universe to be as large as it is' (p. 18). '... on Anthropic grounds, we should expect to observe a world possessing precisely three spatial dimensions' (p. 247). Or again,

We should emphasize once again that the enormous improbability of the evolution of intelligent life in general and *Homo sapiens* in particular does *not* mean we should be amazed we exist at all. This would make as much sense as Elizabeth II being amazed she is Queen of England. Even though the probability of a given Briton being monarch is about 10^{-8} , *someone* must be. Only if there is a monarch is it possible for the monarch to calculate the improbability of her particular existence. Similarly, only if an intelligent species does evolve is it possible for its members to ask how probable it is for an intelligent species to evolve. Both are examples of WAP self-selection in action.¹¹⁰

¹¹⁰ F. B. Salisbury, *Nature* 224, p. 342 (1969), argued that the enormous improbability of a given gene, which we computed in the text, means that a gene is too unique to come into being by natural selection acting on chance mutations. WAP self-selection refutes this argument, as R. F. Doolittle in *Scientists confront creationism*, L. R. Godfrey (Norton, NY, 1983) has also pointed out (pp. 566, 575).

Here we have a far-reaching implication that goes considerably beyond the apparently trivial WAP. Accordingly, although Barrow and Tipler conflate WAP and the implications thought to follow from it, I want to distinguish these sharply and shall refer to these broader implications as the Anthropic Philosophy. It is this philosophical viewpoint, rather than WAP itself, that, I believe, despite initial impressions, stands opposed to the teleological argument and constitutes scientific naturalism's most recent answer to that argument. According to the Anthropic Philosophy, an attitude of surprise at the delicately balanced features of the universe essential to life is inappropriate; we should expect the universe to look this way. While this does not explain the origin of those features, it shows that no explanation is necessary. Hence, to posit a divine Designer is gratuitous.

Now it needs to be emphasized that what the Anthropic Philosophy does *not* hold, despite the sloppy statements on this head often made by scientists, is that our existence as observers explains the basic features of the Universe. The answer to the question 'Why is the universe isotropic?' given by Collins and Hawking. '... the isotropy of the Universe is a consequence of our existence'

(Collins and Hawking [1973], p. 317) is simply irresponsible and brings the Anthropic Philosophy into undeserved disrepute, for literally taken, such an answer would require some form of backward causation whereby the conditions of the early universe were brought about by us acting as efficient causes merely by our observing the heavens. But WAP neither asserts nor implies this; rather WAP holds that we must *observe* the universe to possess certain features (not that the universe must possess certain features) and the Anthropic Philosophy says that therefore these features ought not to surprise us or cry out for explanation. The self-selection effect affects our observations, not the basic features of the universe itself. If the Anthropic Philosophy held that the basic features of the universe were themselves brought about by our observations, then it could be rightly dismissed as fanciful. But the Anthropic Philosophy is much more subtle: it does not try to explain *why* the universe has the basic features it does, but contends that no explanation is *needed*, since we should not be surprised at observing what we do, our observations of those basic features being restricted by our own existence as observers.

But does the Anthropic Philosophy follow from the Anthropic Principle, as Barrow and Tipler claim? Let us concede that it follows from WAP that

3. We should not be surprised that we do not observe features of the universe which are incompatible with our own existence.

For if the features of the universe were incompatible with our existence, we should not be here to notice it. Hence, it is not surprising that we do not observe such features. But it follows neither from WAP nor (3) that

4. We should not be surprised that we do observe features of the universe which are compatible with our existence.

For although the object of surprise in (4) might at first blush appear to be simply the contrapositive of the object of surprise in (3), this is mistaken. This can be clearly seen by means of an illustration (borrowed from John Leslie): suppose you are dragged before a firing squad of 100 trained marksmen, all of them with rifles aimed at your heart, to be executed. The command is given; you hear the deafening sound of the guns. *And you observe that you are still alive*, that all of the 100 marksmen missed! Now while it is true that

5. You should not be surprised that you do not observe that you are dead, nonetheless it is equally true that

6. You should be surprised that you do observe that you are alive.

Since the firing squad's missing you altogether is extremely improbable, the surprise expressed in (6) is wholly appropriate, though you are not surprised that you do not observe that you are dead, since if you were dead you could not observe it. Similarly, while we should not be surprised that we do not observe

features of the universe which are incompatible with our existence, it is nevertheless true that

7. We should be surprised that we do observe features of the universe which are compatible with our existence,

in view of the enormous improbability, demonstrated repeatedly by Barrow and Tipler, that the universe should possess such features.

The reason the falsity of (7) does not follow from (3) is that subimplication fails for first order predicate calculus. For (3) may be schematized as

$$3'. \sim S: (x) ([Fx \cdot \sim Cx] \supset \sim O_x)$$

where S: is an operator expressing 'we should be surprised that' and F is 'is a feature of the universe', C is 'is compatible with our existence', and O is 'is observed by us'. And (7) may be schematized as

$$7'. S: (\exists x) ([Fx \cdot Cx] \cdot O_x)$$

It is clear that the object of surprise in (7') is not equivalent to the object of surprise in (3'); therefore the truth of (3') does not entail the negation of (7').²

Therefore, the attempt of the Anthropic Philosophy to stave off our surprise at the basic features of the universe fails. It does not after all follow from WAP that our surprise at the basic features of universe is unwarranted or inappropriate and that they do not therefore cry out for explanation. But which features of the universe should thus surprise us?—those which are necessary conditions of our existence and which seem extremely improbable or whose coincidence seems extremely improbable. Thus, we should amend (7) to read

- 7*. We should be surprised that we do observe basic features of the universe which individually or collectively are excessively improbable and are necessary conditions of our own existence.

Against (7*), both the WAP and the Anthropic Philosophy are impotent. But which features are these specifically? Read Barrow and Tipler's book. Once this central fallacy is removed, their volume becomes for the design argument in the twentieth century what Paley's *Natural Theology* was in the nineteenth, viz., a compendium of the data of contemporary science which point to a design in nature inexplicable in natural terms and therefore pointing to the Divine Designer.³

² Similarly, the falsity of (6) does not follow from the truth of (5), for (5) may be schematized as $\sim S: \sim (\exists x) ([Mx \cdot \sim Ax] \cdot O_x)$, where M is 'is me', O_x is 'is observed by me' and A is 'is alive'. From this it does not follow that $\sim S: (\exists x) ([Mx \cdot Ax] \cdot O_x)$, which is the negation of (6).

³ Once the central fallacy is thus removed, Barrow and Tipler's argument in the lengthy quotation in the text seems to amount to little more than the old objection that *any* state of affairs is highly improbable and therefore the obtaining of the actual state of affairs requires no special explanation. But this objection is surely misconceived. What unprejudiced and right-minded

Now Barrow and Tipler will no doubt contend that I have missed the whole point of WAP. For (7*) is true only if the basic features of our observable universe are co-extensive with the basic features of the Universe as a whole. And it may well be the case that the Universe at large does not in fact display the apparent features of design which our segment does. Barrow and Tipler endorse the Many-Worlds Interpretation of quantum physics, but one could also appeal to inflationary models or oscillating models of the Universe in order to generate multiple worlds. If such a wider Universe exists, then it might be argued that all possible universes are actualized and that WAP reveals why surprise at our being in a universe with basic features essential to life is not appropriate.

Objections can be raised against each of the theories proposed for generating many worlds; but even if we conceded that a multiple universe scenario is unobjectionable, would such a move succeed in rescuing us from teleology and a cosmic Designer? This is not at all obvious. The fundamental assumption behind the Anthropic philosopher's reasoning in this regard seems to be something along the lines of

8. If the Universe contains an exhaustively random and infinite number of universes, then anything that can occur with non-vanishing probability will occur somewhere.

But why should we think that the number of universes is actually infinite? This is by no means inevitable, not to mention the paradoxical nature of the existence of an actually infinite number of things. And why should we think that the multiple universes are exhaustively random? Again, this is not a necessary condition of many-worlds hypotheses. In order to elude the teleological argument, we are being asked to assume much more than the mere existence of multiple universes.

In any case, the move on the part of Anthropic philosophers to posit many worlds, even if viable, represents a significant concession because it implies that the popular use of the WAP to refute teleology in a Universe whose properties are coextensive with the basic features of our universe is fallacious. In order to stave off the conclusion of a Designer, the Anthropic philosopher must take the metaphysically speculative step of embracing a special kind of

person could possibly regard a chimpanzee's haphazardly typing out the complete plays and sonnets of Shakespeare as equally probable with any chaotic series of letters? The objection fails to reckon with the difference between randomness, order, and complexity. On the first level of randomness, there is a non-denumerably infinite number of chaotic sequences, *e.g.*, 'adfwj', each of which is equally improbable and which collectively could serve to exhaust all sequences typed by the ape. But the meta-level of ordered letters, *e.g.*, 'crystalcrystalcrystal', need never be produced by his random efforts, were he to type for eternity. Even more improbable is the meta-meta-level of complexity, in which information is supplied, *e.g.*, 'To be or not to be, that is the question.' Hence, it is fallacious to assert that since *some* set of conditions must obtain in the universe, the actual set is in no way improbable or in need of explanation.

multiple universe scenario. That will hardly commend itself to some as any less objectionable than theism.

We appear then to be confronted with two alternatives: posit either a cosmic Designer or an exhaustively random, infinite number of other worlds. Faced with these options, is not theism just as rational a choice as multiple worlds?

Barrow and Tipler demur, maintaining that 'careful thinkers' would not today 'jump so readily' to a Designer, for (i) the modern viewpoint stresses time's role in nature; but since an unfinished watch does not work, arguments based on omnipresent harmony have been abandoned for arguments based on co-present coincidences; and (ii) scientific models aim to be realistic, but are in fact only approximations of reality; so we hesitate to draw far-reaching conclusions about the nature of ultimate reality from models that are at some level inaccurate (p.30). But Barrow and Tipler seem unduly diffident here. A careful thinker will not readily jump to any conclusions, but why may he not infer a Divine Designer after a careful consideration of the evidence? Point (i) is misleading, since the operations of nature always work; at an earlier time nature is not like an *unfinished* watch, rather it is just a *less complex* watch. In any case, the most powerful design argument will appeal to both present adaptedness and co-present coincidences. Point (ii) loses much of its force in light of two considerations: (a) this is a condition that affects virtually all our knowledge, which is to say that it affects none of it in particular, so that our only recourse is simply to draw conclusions based on what we determine most accurately to reflect reality; fortunately, the evidence at issue here is rather concrete and so possesses a high degree of objectivity; (b) Barrow and Tipler do not feel compelled to exercise such restraint when proposing metaphysically speculative but naturalistic accounts of the universe's basic features, *e.g.*, their defense of the 'many worlds' interpretation of quantum physics or scenarios for the origin of the universe *ex nihilo*, which leads one to suspect that a double standard is being employed here.

Hence, the Anthropic Principle notwithstanding, I see no reason why a careful thinker may not, on the basis of the teleological argument, rationally infer the existence of a supernatural intelligence which designed the universe.

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