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Volume Two

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Darwinism and Design

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"All right. You say that you don't know whether Darwinism (understood to include Allism) is true or false. So, for all you know, it's true. But Darwinism is inconsistent with theism. How, therefore, can you be a theist? Shouldn't you be, if not an atheist, then an agnostic?" This second chapter is my reply to this challenge. That is to say, in this chapter I will defend the thesis that Darwinism and theism are consistent theses.

In the previous chapter, I presented a theory that I called *Weak Darwinism*, a version of the Darwinian theory that did not include "Allism" – Allism being the thesis that random (that is, blind) mutation and natural selection (or environmental filtration) alone are responsible for the vast taxonomic diversity and apparent exquisite design that one finds in the biological world. I recommended that Allism be jettisoned not because I claimed to know that it was false but rather on the ground that neither I nor anyone else knows whether it is true. (On that ground taken together with the apparent absence of any scientific work for it to do.) I closed the first chapter with a promise to consider the following challenge:

All right. You say that you don't know whether Darwinism (understood to include Allism) is true or false. So, for all you know, it's true. But Darwinism is inconsistent with theism. How, therefore, can you be a theist? Shouldn't you be, if not an atheist, then an agnostic?

This second chapter is my reply to this challenge. That is to say, in this chapter I will defend the thesis that Darwinism and theism are consistent theses. If my defense of their consistency is successful, it will not be necessary for me to go on to defend the consistency of *Weak Darwinism* and theism – since *Weak Darwinism* is simply Darwinism with one part of the theory left out, and is therefore consistent with any theory Darwinism is consistent with. I do not of course deny that Darwinism is inconsistent with a literal interpretation of the story of creation in the book of Genesis. (It is obvious that *Weak Darwinism* is no less inconsistent with a literal interpretation of Genesis than is Darwinism proper.) In this lecture, I am concerned only with the consistency of Darwinism and theism. I will consider the consistency of Darwinism and Scripture (and, more generally, the consistency of science and Scripture) in the third chapter (56).

I begin with a very simple argument. This simple argument is not precisely an argument for the conclusion that Darwinism and theism are consistent. It is rather an argument for the conclusion that *Darwinists* should believe that Darwinism and theism are consistent. It is an argument of the kind that logicians call an argument *ad hominem* – the *homines* in question being Darwinists – because it has the *truth* of Darwinism as a premiss. (Someone who did not accept the truth of Darwinism, therefore, could consistently say that the argument was valid but not accept its conclusion.) And here is the simple argument:

You Darwinists believe that the actual world is a Darwinian world – that is, a world in which Darwin's theory is *true*. But actuality implies possibility: anything that is actual is possible. And God, if he exists, is by definition omnipotent. And an omnipotent being can create any possible object – even if that object is a whole universe or cosmos. Well, this Darwinian Earth of ours (as you believe it to be) is a possible object – since it exists. Therefore, an omnipotent being could create it – and could create the whole physical universe of which it is a part. And if an omnipotent being *could* create a Darwinian world, then why should someone who thinks that the actual world is a Darwinian world regard that feature of the actual world as demonstrating that – as having even any tendency to show that – there is no God?

When I presented this simple *ad hominem* argument to my Darwinist friend Alex, he replied that blind mutation and environmental filtration essentially involve chance and are not therefore a process that any being, even an omnipotent being, could control. Therefore (Alex argued), although Darwinism is perhaps consistent with the existence of a supernatural creator, it is not consistent with such a creator's being able to *ensure* that the history of life on our planet have any particular outcome – such as the existence of rational beings like ourselves. The upshot of his argument is that a creator of a Darwinian world cannot be the creator of everything that world contains; he cannot be the creator of those of its inhabitants who are the products of the contingent process of mutation and natural selection.

Alex is not the first person to have suggested that important role assigned to chance or randomness in the Darwinian account of the development of life is incompatible with theism. Here is a famous quotation from the biologist Jacques Monod (a Nobel laureate) to the same effect. Speaking of the events that have been identified as the sources of mutations, Monod says:

We call these events accidental; we say that they are random occurrences. And since they constitute the *only* possible source of modifications in the genetic text, itself the *sole* repository of the organism's hereditary structure, it necessarily follows that chance alone is at the source of every innovation, of all creation in the biosphere. Pure chance, absolutely free but blind, at the very root of the stupendous edifice of evolution: this central concept of modern biology ... is today the *sole* conceivable hypothesis, the only one that squares with observed and tested fact. (Monod 1971, pp. 112–13)

Monod goes on to make it clear that he understands chance in Aristotle's sense, as arising from the coincidence of independent lines of causation. (Thus, it is due to chance

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that Shakespeare and Cervantes died on the same day – April 23, 1616 – as it would not be if they had killed each other in a duel. In this sense, chance can exist even in a fully deterministic world.) Monod identifies the source of this chance with imperfections in the fundamental mechanisms of molecular invariance in living organisms. He mentions only the causes of mutations, but he might have mentioned other sorts of events that have been significant in biological history and can with equal plausibility be ascribed to chance: the flood that happened to destroy a certain herd of ruminants, the raising by geological forces of a land bridge that enabled representatives of certain species to move into a new environment, the intersection of the trajectories of the Earth and a certain comet, and so on.

I don't quite see how it is that the hypothesis that all such events are due to chance is the only conceivable hypothesis. (Is the hypothesis that the motions of the air and water molecules in the sky over Dunkirk in the late May and early June of 1940 were due entirely to chance the only *conceivable* hypothesis?) But let's suppose that this hypothesis is at any rate *true*. Does it follow that the general features of the biosphere are products of chance? It does not. To suppose that it did would be to commit what logicians call the fallacy of composition. It would be as if one reasoned that because a cow is entirely composed of quarks and electrons, and quarks and electrons are non-living and invisible, a cow must therefore be non-living and invisible.

There is a marvelous device for calculating the areas surrounded by irregular closed curves. It is an electronic realization of what is sometimes called the dartboard technique. To simplify somewhat: you draw the curve on a screen; then the device selects points on the screen at random, and looks at each point to see whether it falls inside or outside the curve; as the number of points chosen increases, the ratio of the chosen points that fall inside the curve to the total number of points chosen tends to the ratio of the area enclosed by the curve to the area of the screen. For a large class of curves, including all that you could draw by hand, and probably all that would be of practical interest to scientists or engineers, the convergence of ratios is quite rapid. Because of this, such devices are useful and have been built. Now the properties of each point that is chosen – its coordinates – are products of chance in just Monod's sense. But the whole assemblage of points chosen in the course of solving a given area problem has an important property that is not due to chance: its capacity to represent the area of a curve that had been drawn before any of the points was chosen. Indeed, since the device was built by human beings for a purpose, there can be no objection to saying that the whole assemblage of points has the *purpose* of representing the area of that curve – despite the fact that the coordinates of each individual point have no purpose whatever. It is also true that the fact that each point has coordinates that are due to chance is not due to chance and has a purpose: its purpose is the elimination of bias, to insure that the probability of a given point's falling inside the curve depends on the proportion of the screen enclosed by the curve and on nothing else.

Suppose that every mutation that has ever occurred is, as Monod says, due to chance. Suppose, in fact, that every individual event of any kind that is a part of the causal history of the biosphere is due to chance. It does not follow that every aspect of the biosphere is due to chance. And if none of these individual events has a purpose, it does not follow that the biosphere has no purpose. To make either inference is to commit the fallacy of composition.

Now this reasoning shows at most that the thesis that some features of the biosphere are not due to chance (and likewise the stronger thesis that they have a purpose) is logically consistent with Darwinism. It could still be that the conditional probability of the thesis that there are features of the biosphere that are not due to chance is very low, even negligible, on the hypothesis of Darwinism. But the reasoning does show that if someone wants to construct an *argument* for the conclusion that Darwinism is in any sense incompatible with the thesis that some features of the biosphere are not products of chance, he will have to employ some premiss in addition to "Darwinism implies each individual event in the vast totality of events that together constitute the history of terrestrial life was due to chance." (And, as I have implied, I do not find that premiss itself indisputable.)

How might an advocate of the thesis that Darwinism is incompatible with design respond to these points? One way might be to argue that the features of the biosphere are in a very important respect unlike the features of an assemblage of points produced by our area-measuring device. Each time we draw a curve on the screen of the area-measurer and turn the thing on, it is for all practical purposes determined, fore-ordained, that the assemblage of points it produces will have the property of representing the area enclosed by the curve. But someone might protest – Alex and Monod in effect *have* protested – that the properties of the biosphere are not like that. There used to be a popular thesis called Biochemical Predestination, according to which they *were* like that. According to Biochemical Predestination, you just take a lifeless planet that satisfies certain conditions (conditions the Earth satisfied before there was any life on it, and which are undemanding enough that it would be reasonable to suppose that a pretty fair number of planets in a given galaxy satisfied them) and in due course you will "automatically" have life, eukaryotic life, multicellular life, sexually dimorphic life, highly differentiated life, and, finally, intelligent life – the whole *Star Trek* scenario. Biochemical Predestination does not seem to be very popular among the practitioners of the life sciences these days, although belief in it seems to be common among physicists and astronomers and nearly universal among university undergraduates, who believe that Vulcans and Klingons await us among the stars with the same unreflective assurance that attended the belief of their 20-times-great grandparents that elves and trolls awaited them in the woods. But if Biochemical Predestination is not true, if the main features of the biosphere did not fall into place automatically, but are rather due to remote chances that just happened to come off, then how can it be that these features are due to the purposes of a divine being – or any intelligent being? In short, the failure of Biochemical Predestination shows that, since the "evolutionary process" (whatever exactly that may be) has no determinate "output," it is not the kind of thing that could be anyone's instrument. (Curiously enough, Biochemical Predestination was said by those who believed in it to show that the evolutionary process was not anyone's instrument.) It can no more be used for that purpose than a flamingo can be used as a croquet mallet.

This is an interesting and important argument. It deserves a more careful formulation. I offer the following.

It seems plausible to suppose that if any features of the biosphere are products of intelligent design, then some very *particular* features of the biosphere are products of intelligent design: this one if no other: the existence of rational beings like ourselves, creatures made "in God's image and in his likeness." If natural selection cannot be used (even by an omnipotent and omniscient being) as an instrument to produce living things with "special"

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characteristics like rationality (or binocular vision or opposable thumbs or pentadactyl limbs; but let us use rationality as our primary example), then it is unreasonable to suppose that any intelligence has been using it as its (sole) instrument in imparting features to the biosphere.

Advocates of the argument we are considering hold that natural selection is indeed unusable for this purpose, owing to the radical contingency of its output. The concept of radical contingency may be explained as follows. Consider the Earth as it was at some very early stage after the emergence of life – when, say, there was only a single type of organism, some bacterium-like prokaryote. Let us say that we are considering the earth as it was at “ t_0 .” Consider all the physically possible sets of subsequent trajectories of the particles whose precise arrangement at t_0 constituted this “initial state.” (We suppose a given set of diachronic boundary conditions, that is, a given, predetermined “schedule” of extraterrestrial “inputs” into terrestrial conditions: sunlight, meteors, and so on.) A complete set of these particle-trajectories may be called a history. Consider a space each of whose points is a history. Postulate a numerical measure, a measure of proportion, defined on this space. The idea behind this measure is that it should allow a sufficiently knowledgeable being – a being of the epistemological order of Laplace’s Intelligence – to make judgments like this: in 70 percent of the space of histories, the Earth has feature F at $t_0 + 1$ billion years. If we suppose that each history is exactly as probable as any other,¹ and if the space of histories satisfies a few unexciting formal conditions, our measure is a probability measure, and the above judgment may be read as, “Given the way things were at t_0 , the probability that the earth would have feature F at $t_0 + 1$ billion years was 70 percent.”

The thesis that rationality is radically contingent is this: the set of histories that contain rational beings comprises only a small proportion of the total space; that is, the probability of rational beings was small, given the way the earth was at t_0 . The thesis that opposable thumbs or pentadactyl limbs are radically contingent is, of course, to be explained in the same way. The rather more vague general thesis of “radical contingency *simpliciter*” is that the existence of all, or at least most, of the specific features of living organisms are radically contingent. (“Gouldian contingency” may be defined as the thesis that the existence of every phylum that exists today is radically contingent.)

Now a moment’s thought will show that there is an annoying technical difficulty that must be faced by anyone who thinks that the existence of rationality, or anything else, is radically contingent. If the physical world is strictly deterministic, there is only one history, and, therefore, in a strictly deterministic world, nothing is radically contingent. (If the world is strictly deterministic, God, or the Laplacian Intelligence, could have produced *every* feature of the present biosphere simply by seeing to it that the world was as it in fact was at any time in the past – after all, the world of the remote past did in fact did manage to “turn into” the present world and, if strict determinism is true, it couldn’t have turned into a world having any features but those of the present world. There are various ways this technical problem might be solved. To discuss them, however, would take us away from our discussion of radical contingency and Darwinism. Let us, therefore, simply assume that there is enough indeterminacy in the world (rooted in quantum indeterminacy, perhaps) that the proponent of the radical contingency of the special characteristics of the biological world need not attend to this problem.

Let the argument continue. If rationality is radically contingent, then the processes of the natural world cannot be anyone’s instrument for producing rationality. Of course, this does not show that *natural selection* could not be anyone’s instrument for producing

rationality – not unless the thesis that rationality is a product of natural selection entails or somehow requires that the genesis of rationality be a matter of radical contingency. I am not sure how one would argue for this conclusion. We have seen that it does not follow logically from the premiss that each individual event that is a part of the history of life on the Earth is due to chance. It may be, however, that it does follow from that thesis in conjunction with some set of true statements about the conditions under which natural selection has actually operated. If a set of statements having this feature could actually be produced, and if they were known to be true, it would be pedantic to insist that it had not been demonstrated that Darwin's account of the taxonomic diversification and apparent teleology in nature was *per se* incompatible with design, but only the conjunction of Darwin's account of these things with certain other statements – statements that were known to be true. Let us, in order to give the proponents of the incompatibility of Darwinism and design as strong a case as possible, assume that Darwinism commits its adherents to the thesis that certain features of the world, features that it is reasonable to suppose have been conferred on the world by God if *any* features have been conferred on the world by God (the existence of rational beings, for example), are radically contingent.

If we do suppose this, some of us may find the world a bit suspicious. If the existence of rational beings is of a very low order of probability, given that all the features of the biosphere are due to natural selection, and there in fact are rational beings, doesn't that provide some reason to doubt whether all the features of the biosphere are due to natural selection?

"Of course not. Given the general thesis of radical contingency, whatever reasonably specific features chance happens to endow the biosphere with will be radically contingent. That the world of living things exhibits many features that are radically contingent is therefore not itself a matter of radical contingency. There is no more reason for you to be astonished by the existence of rational beings than there is for you to be astonished by your own existence – which is, in almost anyone's view, radically contingent."

Such exchanges as this are very tricky. Those who think that the existence of rational beings is evidence for the falsity of natural selection, will reply by arguing that the existence of rational living organisms (unlike the existence of any particular rational living organism, such as you or me) is highly probable on the hypothesis that the world has been created by God, and, therefore, that the fact that there are such beings favors this hypothesis over any hypothesis on which their probability is low. There are, of course, ways of replying to this reply, and there are ways of replying to the replies to the reply – and so on, for all practical purposes, *ad infinitum*. I do not propose to enter into the ins and outs of a debate on this topic (it would be similar to debates about whether the "fine-tuning for life" that the cosmos apparently exhibits require an explanation). I will only observe that the contention that the existence of rational beings counts against any theory according to which their existence is extremely improbable has sufficient plausibility that it deserves to be discussed seriously and at length.

Whether or not this is correct, however, haven't I conceded that Darwinism is incompatible with design if Darwinism commits its adherents to the thesis that certain features of the world that a designer would want are radically contingent? And doesn't Darwinism carry this commitment – if not certainly, then at least for all anyone knows? If you define Darwinism as I have and if you assume that Darwinism, so defined, entails the radical contingency of some features of the world such that God (or any designer) would create a

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world only if he, or it, could ensure that it had those features ... *then* have you not got a thesis that is incompatible with design? These are very good questions, and they deserve answers. But *how* they are to be answered depends, I think, on how we understand the following clause in our statement of Darwinism in the first lecture:

Mutations are mainly due to copying errors that occur during reproduction. They have only biochemical causes. If the laws of chemistry will permit a certain mutation to occur when a certain cell divides – if that mutation is a chemical possibility – *whether* the mutation will occur and *how probable* its occurrence is have nothing to do with whether its occurrence would be a “good thing” for the descendants of that cell (or the descendants of the organism of which that cell is a part).

And how they are to be answered depends in particular on how we understand the phrase “only biochemical causes.” Does this phrase mean “no *natural* causes, no causes operating within the physical world, other than biochemical causes”? Or does it mean, “no causes, natural *or* supernatural, other than biochemical causes”? It is evident that Darwinism is inconsistent with *supernatural* design, with God’s having guided the development of life toward ends he has chosen, only on the latter interpretation of “only biochemical causes.” But, on that interpretation, it would seem that “Mutations have only biochemical causes” is a metaphysical thesis. And, one may ask, is it the business of a scientific theory to advance metaphysical theses? Let us grant that a theory that appeals to supernatural causes is *ipso facto* not a scientific theory. Let us grant that it is an essential part of the methodology of the natural sciences always to search for purely natural causes – and always to assume that our failure so far to find an explanation in terms of natural causes of any event reflects only the limits of our present theoretical knowledge and experimental technique. Some would dispute these assumptions; but let us grant them for the sake of the argument: let us grant them to see what follows (or, more importantly, does not follow) from them. What does not follow is that it is proper for a scientific theory to include, to have as a part of its propositional content, the thesis that the phenomena of which it treats never have supernatural causes. That may be true, but if it is true, establishing it would require some sort of argument. I do not know how the argument would go. Newton’s laws of motion, and his law of universal gravitation tell us (at least to a good approximation in many circumstances) how massive bodies move when the only forces that are acting on them are gravitational. But they no more contain within themselves the statement “Supernatural agencies never affect the motions of massive bodies” than they contain within themselves the statement “Electromagnetic forces never affect the motions of massive bodies.” The obvious position to take on this question, it seems to me, is that the laws of nature have no more to say about the operation of supernatural agencies in the physical world than the laws of gravitational mechanics have to say about the operations of electromagnetic forces. This obvious thesis may be wrong, but I will accept it till someone shows me why I should not.

Do the best meteorological theories (those that are embodied in computer programs for predicting the weather) have as a part of their content that no supernatural agency ever affects the weather? Is someone who believes that God had a special hand in the way the weather was at Dunkirk in the position of rejecting the best meteorological theories? I don’t see why I should think so. And I don’t see how the belief that God had a hand in the way life has developed on the Earth can be said – just in virtue of having that very general belief, and not some much more specific belief (as it may be: a belief that each

species is a special creation) – could possibly be inconsistent with any scientific account of the way life has developed on the Earth.

It might be argued, in opposition to what I have just said, that the Darwinian account of the history of terrestrial life is a special case: according to that account, every event that plays any significant part in this history is, as Monod emphasized, due to *chance*; and if an event is chosen, if it is deliberately brought about by a rational agent in order to serve that agent's ends, then that event is *not* due to chance.

There is certainly a sense of "chance" in which this is true. But the word is a tricky one with many senses. Consider the closely related word "random." In one sense of the word, a sequence of things – numbers, say – each of which is individually and deliberately chosen by a rational being is not "random." Nevertheless, if the members of some odd sect claimed to have in their possession a book of mystically significant numbers, numbers chosen by God, you could not refute their belief by applying statistical tests to show that the book (despite its fancy calligraphy and illuminated capitals) was in fact a table of random numbers, for there is no inconsistency in saying both that a sequence of numbers satisfies all the statistical tests necessary for it to be pronounced "random" and that it was chosen by God for some purpose. Like its near relation "random," the word "chance" has more than one sense, and some of its senses are compatible with "deliberately chosen." If Darwinism is to be a scientific theory, a theory that treats only of the natural world, and if it is to incorporate the concept of chance, that concept must be understood in a way that can be spelled out entirely by reference to the natural world.

Is there such a sense? Of course there is. It is a commonplace of Darwinism. It can be found in any textbook discussion of Darwinian theory, and it can be found in my own statement of Darwinism in chapter 54 and indeed in the passage from that chapter that I quoted above. Let us consider mutations, the most important class of events to which Darwinists apply the word "chance." It is of the essence of Darwinism to insist that mutations do not occur in response to changes in the environmental perils or opportunities that confront individuals or species. There is – Darwinists insist – simply no correlation whatever between the "usefulness" to a particular species of a possible mutation and the likelihood that it will occur. Recall the example I used to illustrate this idea, the story of the toad species that is slowly dying out owing to some gradual environmental change. Three possible mutations in the genome of that species are equally likely from the point of view of molecular biology. One of the mutations, if it became established, would enable the species to cope with its changing environment, one would have no significant effect at all, and one would be lethal. If Darwinism is correct, then these facts about the "usefulness" of the three mutations have no effect whatever on the probability of the mutation's turning up in some toad of the coming generation: the probability of each is (as regards factors that operate within the physical world) a matter of biochemistry and is independent of the species' needs with respect to coping with or exploiting the features of its environment. This thesis entails that in a perfectly good sense of the word, mutations are due to chance: the Aristotelian sense that I mentioned earlier in connection with Monod. That is to say: Changes in an organism's DNA (as opposed to the transmission of such changes to the organism's descendants) and the features of the organism's environment that are relevant to its success in having descendants are causally independent of each other.

It is, however, consistent with the thesis that all mutations (and, more generally, events that have played a role in the history of life) are due to chance in this Aristotelian sense that God has been guiding the development of life – by deliberately causing certain mutations

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(and various other events, such as climate changes). If God has been doing this, it does not follow that the history of terrestrial life would reveal anything inconsistent with the Darwinian thesis that all mutations are due to chance. Suppose that God has in fact been guiding the development of life in this way. Suppose also that there is a record of all the uncounted billions of mutations that have ever occurred. Is there any reason to suppose that a statistical analysis of all these mutations and the circumstances under which they occurred (perhaps Laplace's Intelligence could be pressed into service to perform the analysis) would have to uncover some significant correlation between the potential usefulness to species of various mutations and the likelihood of their occurrence?

If there is such a reason, I do not see it. If the radical contingency of history of life on the Earth is indeed a consequence of Darwinism, then a theist who accepts Darwinism (and who accepts the thesis that radical contingency is a consequence of Darwinism) might speculate that God has directed it down the path it has in fact taken by a judicious choice of mutations (and climatic changes and of events of many other types). And the atheistic Darwinist will have to admit that nothing in the history of life, no possible paleontological discovery, could be inconsistent with, or even cast doubt on, this thesis. After all, the atheistic Darwinist thinks that the actual course of biological history *was* produced by a sequence of events that was due to chance in the Aristotelian sense. Therefore, he must admit that if God chose the actual course of biological history, God chose – produced, created – a course of events that was due to chance in the Aristotelian sense. And this is something that an omnipotent and omniscient being would find no more difficulty in doing than He would in creating a table of random numbers.

It does seem as if there are a lot of people who, even if they are willing to admit that God *could* have done this, think it's at least very unlikely that God – if He existed – *would* have done anything of the sort. Presumably they think that if the biological world were the creation of an infinite being, a being whose power and knowledge were absolutely without limit, the world, and the biological world in particular, would look very different. (I'm not talking about the existence of suffering, which is an entirely different problem, and quite unrelated to Darwinism.) I can point to at least one clear example of someone who thinks this, the zoologist Richard Dawkins (perhaps the world's most famous atheist), who has said, "A universe with a creative superintendent would be a very different kind of universe from one without" (Dawkins 2006, p. 78). But how, then, would it look? When I actually talk to people who think this and ask them this question, I do not generally get answers – or I get ones that I (frankly) regard as simplistic. One example of this is Dawkins' own answer: that one would expect a "universe with a creative superintendent" to have a shorter and simpler history than that of the actual world – and a history in which chance played either no role or at least a much less prominent role than its actual role. I don't see it. I don't myself have any *a priori* expectations about what features a world created by a being whose intellectual faculties were literally infinitely greater than mine would have, and I would strongly advise others not to have any such expectations. I can only compare Dawkins' apriorism on this matter to the apriorism of the seventeenth-century cleric who argued that the vast distances between the planets that astronomy had supposedly discovered must be illusory since God would not waste space in the way the new astronomy implied that he had.

I think an answer to my question is in order, and one that is the product of a little thought and at least some familiarity with theology. Anyone who thinks that the history of terrestrial life is inconsistent with its being the vehicle by which God's purposes have unfolded in time

really should have something to say about how the history of life *would* look if it *were* the vehicle of God's unfolding purposes.

Note

- 1 If the number of histories is finite, each should have probability $1/N$ where N is the number of histories; if the number of histories is infinite, each should have probability 0 (or, if infinitesimal probabilities are allowed, each should have the same infinitesimal probability).

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