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Leslie, UNIVERSES

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BOOK REVIEWS

Universes, by **John Leslie**. London and New York: Routledge, 1989. Pp. vii, 228. Cloth.

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The cosmos appears to have been designed as an abode for life. This has been amply demonstrated by the marriage of cosmology and elementary-particle physics that is one of the most striking features of the current scientific scene. The universe evolved out of an initial singularity (or a “quantum fuzz” or a region of “imaginary time”) some fifteen thousand million years ago in accord with certain laws of nature. These laws contain apparently arbitrary numbers that are not determined by physical theory as it is currently understood, but rather “have to be filled in by hand.” One sort of example among many others would be the relative strengths of the various fundamental physical forces. (For example, electromagnetism is roughly 10^{39} times stronger than gravity. This ratio seems to be a brute fact. As far as theory goes, the exponent might have been 35 or 47 or any other number.) In addition to the apparently arbitrary numbers that are contained in the laws of nature that govern the cosmos, the cosmos itself displays quantifiable and seemingly contingent features, such as its total relativistic mass, its very low initial entropy, and the number of “families” of elementary particles it contains. Many of these numbers have the following interesting feature: if they had been only very slightly different, there would have been no life. (Among the many untoward effects that a slight variation in the numbers could have produced are the following: a cosmos that lasted only a few seconds; a cosmos that contained no atoms; a cosmos that contained no stars; a cosmos in which all matter was violently radioactive.) It is very probable that future developments in theoretical physics will shorten the list of independent numerical parameters in the laws of nature, and will thereby reduce the number of features of the laws of nature that could apparently have been otherwise. And it is possible that some of the features of the cosmos that are at present seen as “boundary conditions” (“input” for the laws of nature), such as the number of particle-families, will turn out to be consequences of the laws. Nevertheless, the degree of apparent contingency exhibited by the cosmos and its laws is impressive. Even if future developments in physics greatly reduce this apparent contingency, it looks as if there will be plenty left. It looks as if, whatever the future of physics and cosmology may hold, only a tiny region within the “space” defined by all possible variations in the numerical parameters that figure in the laws and cosmic boundary conditions contains life-permitting cosmoi.

Why does the cosmos look as if it had been designed as an abode for life? The most obvious explanation is that the universe looks as if it had been designed because it really was designed. But Darwin has shown how apparent design can be only apparent. (This conceptual point is independent of the question whether the theory of evolution by natural selection can account for the actual course of terrestrial evolution.) The theory of natural selection cannot be applied directly to the problem of the apparent design of the cosmos, since universes do not reproduce themselves with random heritable variations. (Or do they? Since I wrote the preceding sentence, one of my colleagues at Syracuse University, the physicist Lee Smolin, has speculated that universes may do just that.) But some of the features of Darwinian explanations of apparent design in nature are so abstract and powerful that they can be lifted out of the context of biology and applied to the physical world as a whole.

A purposive, rational being can survey a set of possibilities and, after due deliberation, cause one or more of them to become actual. Chance, on the other hand, may generate a large number of diverse actualities, and some "selection factor" may then weed out all but a few of these actualities. Under certain circumstances, the "surviving" actualities may be very much like the actualities that a purposive, rational being would have chosen to actualize after surveying a set of possibilities. Thus may chance and a selection factor conspire to mimic purposive design. In the theory of natural selection, actualities are weeded out by being destroyed or, at any rate, prevented from reproducing. If, however, we are interested in explaining how apparent design may be only apparent, we are not forced to postulate a selection factor that weeds the garden of chance-generated actualities by allowing the continued existence only of actualities that exhibit apparent design; all that we really need is a selection factor that allows us to *observe* only chance-generated actualities that exhibit apparent design. All that we need is an "observational selection effect."

Suppose that an enormous number of actual cosmoi of wildly varying properties were generated by chance, so many and so various that it was statistically unsurprising that a few of them had the delicately balanced set of features that permit a cosmos to contain life. *Our* cosmos, of course, would be one of the rare life-permitting ones. And suppose that we are unable to observe any of the others, the silent majority. (There could be many reasons for our inability to observe them. Perhaps the spacetime curvature of our cosmos "hides" them, or perhaps the others are simply too far away, or perhaps cosmoi exist "one at a time," like beads on a temporal string.) If all this were the case, it would look to us as if our cosmos were the only cosmos and as if it had been carefully "tuned" to permit the existence of life. But this

would be an illusion, generated by the interplay of chance (which blindly produces the enormous variety of actual cosmoi) and an observational selection effect (which allows us to see only our own cosmos, a cosmos that must, of course, be suitable for life).

In this superb book, John Leslie argues that the fine-tuning of the cosmos presents us with a choice between the two “hypotheses” we have stated above: the “Design Hypothesis” and the “World Ensemble Hypothesis.” He does not, however, understand the Design Hypothesis in quite the way that one might imagine, since he takes seriously the idea that the mere “ethical requiredness” of the existence of life might, unmediated by the actions of any conscious, purposive being, be responsible for the existence of a unique fine-tuned cosmos; and he is willing to count that possibility as a case of “design.” In addition to the thesis that (1) the fine-tuning of the cosmos presents us with a choice between the Design Hypothesis (so understood) and the World Ensemble Hypothesis, the central theses of the book are the following: (2) Science cannot provide us with any decisive reason for accepting one of the hypotheses and rejecting the other; (3) Each of the two hypotheses has an equal initial right to be taken seriously; (4) The attempts of various philosophers to show that there is nothing puzzling about the fine-tuning of the cosmos and its laws (nothing that requires any sort of explanation) are ludicrously bad; (5) Neither hypothesis can be seen on philosophical grounds to enjoy a decisive advantage over the other.

The book has many virtues. To begin with, it is vigorously and clearly written and beautifully organized. Among its more substantive virtues is its very solid instruction in the relevant physics and cosmology. (The scientific accuracy of the book has been vouched for by an impressive array of experts.) It should be stressed, however, that anyone who is willing to take it as given that current physics and cosmology represent the cosmos and its laws as fine-tuned to support life can skip the solid—perhaps for some tastes too, too solid—instruction and have no difficulty in following the philosophical arguments that are based on this assumption. These philosophical arguments strike me as being of a very high order. I can especially recommend Leslie’s critique of those philosophers who have argued that any given combination of values of physical parameters is as probable as any other, and that therefore there *could not* be anything about the actual set of parameters displayed by the laws of nature that required an explanation. (Compare: There could be nothing that required an explanation in someone’s being dealt four consecutive royal flushes, one in each suit, since the probability of such a sequence of hands is equal to the probability of being dealt *any* four particular hands successively.) In evaluating these arguments, Leslie makes very effective use of the principle that if a certain state of affairs *strongly suggests* a certain “tidy” explanation (as someone’s being dealt four royal flushes in a row does, and someone’s being

dealt four mediocre poker hands in a row does not), then it is not reasonable to contend that that state of affairs requires no explanation.

Leslie also makes the very important point (which I am pretty sure has not been made by anyone else) that to argue that the cosmos exhibits apparent design, we need not employ the premise that only a minuscule subset of the whole set of possible cosmoi are life-permitting. It suffices to argue that only a minuscule subset of the possible cosmoi “in the local area” are life-permitting. This is an important point because it might for all we know be that there are laws of nature and cosmos-designs radically and unimaginably different from “our” laws and the design of our cosmos. Indeed, it might be that practically all possible cosmoi are radically different from ours, and it might be that practically all of the radically different cosmoi are life-permitting. How can we know that this is not so? If we cannot, we are not in a position to employ the premise that only a minuscule subset of the set of all possible cosmoi are life-permitting. But if only a minuscule subset of the possible cosmoi that are “in the local area”—that differ from our cosmos only in being governed by laws of nature with the same general structure as our laws but with different numerical parameters “plugged into” them, and in having different boundary conditions for the laws to operate on—are life-permitting, *this* is a fact that demands an explanation, whether or not there are radically different possible cosmo. Here is an analogy. Suppose that there is a target that has an arrow sticking into it. Does this fact require an explanation? Well, not if the world is either chock full of targets or chock full of people shooting arrows at random. But if the world is large, and if there is only one target and only one arrow, then an explanation is required for the fact that the sole arrow is sticking into the sole target. Suppose now that the world is chock full of targets, with the exception of one area a mile across that contains but a single target, right at its center. And suppose that there is an arrow protruding from that target and no arrows to be found anywhere else in the mile-wide area. In this case, too, an explanation is required. And if we inhabit an area a mile across, containing, right at its center, a single target sporting the only arrow to be found in our little area (the rest of the world being hidden from us), we need not, in attempting to answer the question whether this state of affairs requires an explanation, consider the fact that, *for all we know*, the world outside our parochial one-target area is chock full of targets. We reason soundly when, without considering speculations about what lies outside the area we can observe, we conclude that there must be some explanation for the fact that there is an arrow in *this* target.

The only reservations I have about Leslie’s book concern his neo-platonism, his (to me) very odd idea that the ethical requiredness of a state of affairs can bring about the realization of that state of affairs without the

mediation of the action of conscious, purposive beings. In this book, and in many previous publications (see especially his *Value and Existence*, Blackwell, 1979) Leslie has tried to make this idea intelligible, but he has not got through to me. For my part, despite his best efforts, the thesis that ethical requiredness can, it itself, be *effective*, remains as puzzling as the thesis that the beauty and sublimity of gothic architecture (considered simply as a *possible* system of architectural design) could bring about the existence of cathedrals and colleges and guild-halls, without the mediation of the action of conscious, purposive beings. Ethical requiredness, to my mind, is an objective feature of certain states of affairs (although, as a Christian, I accept the teaching of my religion that ethical requiredness is not a feature of the state of affairs *There being created rational beings* and, *a fortiori*, not a feature of the state of affairs *There being conscious organic life*); it is nonetheless an abstraction, and abstractions are, so to speak, purely passive. It is sometimes tempting to talk otherwise. Gödel, for example, has said that the axioms of set-theory “force themselves upon the mind as true.” But if this statement is to have any chance of saying something ontologically coherent, it must mean that the mind, in contemplating the axioms of set-theory, thereby actualizes a powerful and unopposed disposition, which is a part of its own concrete character, to assent to them. All of the causality involved in this operation belongs to the disposition, which is a disposition of the concrete individual mind, or of the concrete individual being whose mind it is. It may be that the axioms of set-theory objectively possess a feature called, say, “intuitive obviousness.” If so, this feature of the axioms cannot affect even the flow of electrons inside a mathematician’s skull. It may be that Christian theology is wrong and the state of affairs *There being conscious organic life* objectively possesses the feature “being ethically required.” If so, this feature of that state of affairs is incapable of *affecting* even the course of thoughts in the mind of an ethically sensitive Demiurge, much less of bypassing the Demiurge and bringing about the existence of life on its own. (Leslie, by the way, is the neo-platonic analogue of a deist: he does not think that the ethical requiredness of certain states of affairs ever has any “local” effects, not even such local effects as an awareness of the ethical requiredness of these states of affairs in the minds of rational beings. His theory limits the effects of ethical requiredness to imposing laws and boundary conditions on the cosmos as a whole: ethical requiredness does just what the God of the deists does.) I don’t mean to suggest that Leslie is unaware of these points or fails to discuss them at length. (See Chapter 8 of the book under review, as well as *Value and Existence*.) I am saying only that I remain unconvinced.

However this may be, *Universes* is an important book and should be a part of the working library of anyone seriously interested in the Argument from Design.