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Explaining Existence

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I

The problem of why something exists rather than nothing is doubtless as old as human philosophising. Of comparable antiquity is the observation that one cannot hope to explain why something exists rather than nothing by appealing to the existence of something else, on pain of vicious circularity.

In this paper, I distinguish between the question of why anything exists, and the question of why particulars exist. These two questions are equivalent only if the only things that exist are particulars. Certainly many have held that universals as well as particulars exist.[1] I take it here that there is a *prima facie* distinction between universals and particulars. It follows that the former question is *prima facie* more

1 See e.g. D.M. Armstrong, *Universals and Scientific Realism* (2 vols.) (Cambridge: Cambridge University Press 1978).

general than the latter. I will initially concentrate on the latter, taking a hint from some recent theorising about the physics of the Big Bang. I will argue that, properly understood, there is a sense in which the existence of particulars might be explicable. That, it seems to me, represents some progress on the problem. For instance, it is arguable that when people ask why anything exists they have in mind the question of why particular things, or one big particular thing such as the spatiotemporal universe, exist. Insofar as that is the problem, I suggest that we can make inroads into it. I then go on to ask how these considerations might be applied to the more general question of why something exists rather than nothing. I will suggest that there are several ways the world might be, in which even this question might have an answer of sorts.

II

Current intense levels of theorising about the Big Bang continue to push explanation closer to $t=0$. Recently the physicist Edward Tryon has proposed a theory of the Big Bang according to which it begins as a 'quantum fluctuation' out of nothing. Tryon has described his theory as a theory of creation *'ex nihilo.'*[2] Now *'ex nihilo'* is a loaded phrase for philosophers, conjuring up debates about whether something could come out of nothing unless God created it. I do not think that it is necessary to confuse philosophical readers with the technical details of Tryon's proposal. It should be said, though, that inspection of those details reveals that the initial quantum fluctuation takes place in otherwise empty space and time.[3] Now it has been argued that empty space and time, or spacetime, are particular existing things.[4] If that is true,

2 Edward Tryon, 'Is the Universe a Vacuum Fluctuation?' (hereafter UVF) *Nature* **246** (1973) 396-7; also 'What Made the World?' (hereafter WMW) *New Scientist* **1400** (1984) 14-16.

3 Tryon: '... some pre-existing true vacuum,' WMW, 15; or '... the vacuum of some larger space in which ours is embedded,' UVF, 397. It is fair to say that much of the physicist's interest in such a theory is in the accounts of how a big universe could come out of a little quantum fluctuation and of how conservation principles can be held true, which do not concern us here.

4 See e.g. Graham Nerlich, *The Shape of Space* (Cambridge: Cambridge University Press 1975).

then Tryon's theory is not a theory of particular things beginning out of literally *nothing*, as the phrase *'ex nihilo'* suggests.

Mind you, the situation is complicated by what I take to be an implied relationism about space and time in Tryon.[5] Briefly, relationism is the doctrine that space and time are mere constructs out of spatiotemporal relations between particular material bodies and events. One consequence of this doctrine is that unless some of the latter exist, space and time cannot. Thus, if relationism were true, Tryon's theory would be of a beginnning literally *ex nihilo*. But I do not believe that relationism is true, as has been argued elsewhere.[6]

III

Even so, Tryon's theory provides us with the opportunity for speculation. So let us ask what kind of theory there could be which gave an account of how particular things and events exist or occur, in terms other than by postulating the existence of other particular things or events. To avoid the complicating factor of relationism, let us speculate about what a probabilistic theory of Tryon's kind, but which lacks commitment to pre-existing space and time, could do in explanation of particularity. So let us try to postulate a theory wherein all particulars begin to exist a finite time ago, and wherein there is some initial state which has some likelihood in virtue of some probabilistic laws such as those of the quantum theory. It goes without saying that the present exercise is speculation; I am not suggesting that it is true.

I do not know how to describe this possibility in the kind of detail physicists go in for. But obviously it would be desirable, if possible, to supply more detail about the kinds of laws which would give a 'physics of nonexistence.' We will proceed in two stages. First, we will con-

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5 In addition to the use of *'ex nihilo,'* we have, for example, '... some pre-existing true vacuum, *or state of nothingness*,' WMW 15, emphasis mine.

6 See Nerlich, Ch. 2; also his 'Hands, Knees and Absolute Space,' *The Journal of Philosophy* **70** (1973), 337-51; also Chris Mortensen and Graham Nerlich, 'Spacetime and Handedness,' *Ratio* **25** (1983) 1-13; and 'Physical Topology,' *The Journal of Philosophical Logic* **5** (1978) 209-23. Note, too, that it is not apparent how to make Tryon's own words consistent here: how in a state of genuine nothingness could anything pre-exist?

sider the possibility of eliminating a pre-existing space but not time, so that the resulting theory might be regarded as explaining the existence of both space and also events in it. Then we will go on to look at the problem of extending the account to eliminate pre-existing time as well.

In General Relativity, there are what is known as the 'vacuum field' solutions to the field equations. Informally, these say that in a universe with no matter and energy, spacetime still has a definite metrical structure, in some cases that of Euclidean flatness. As has been pointed out by Grünbaum and others,[7] the existence of the vacuum field solutions suggests that relationism is false, in that in the absence of matter, spacetime would continue to be an existing thing. We should avoid any theory like that here, because of the previous complication that space, or time, or spacetime, are arguably particulars. But avoiding it does not look to be in principle impossible. We can suppose that there is some quantity which is a function of time and which measures the distribution of energy or matter (call it mass $M=M[t]$), and if M takes the value zero the theory says that the metrical structure of space (but not time) is *undefined*. This seems a reasonable way of saying that under the condition $M=0$, space would not exist.

So, let us imagine that our laws include the consequence that if $M=0$, then events E_1, E_2,... have probabilities p_1, p_2,... respectively. My claim is that if the universe 'begins' with event E_1,then this law will explain the occurrence of E_1 as well as anything is explained in the quantum theory or in Tryon's theory. Before getting to that, however, there are a number of complications to explore. One is this. Arguably, the events E_1, E_2,... would be spatial events, in the sense that if any of them occurs at a time then space exists at that time. So we might imagine that the condition $M=0$ obtains for an interval of time and then a 'quantum fluctuation' occurs, and space and matter are born. That seems to me to be an intelligible possibility. But the form of the above law does not require that the possible events E_1, E_2 have to occur *after* the condition $M=0$. So is it a possibility that we have a law '$M=0\rightarrow E_1, E_2$,... have probabilities p_1, p_2,...' where the E_1, E_2 could *simultaneously* with $M=0$? It is, if the 'events' E_1, E_2, ... did not

7 A. Grünbaum, 'The Philosophical Retention of Absolute Space in Einstein's General Theory of Relativity,' in J.J.C. Smart, ed., *Problems of Space and Time* (New York: Macmillan 1964) 313-17.

need the existence of space; or equivalently, did not need $M \neq 0$. That would be possible, for example, if then E_i were conditions on the *derivative* of M, say '$M=0 \rightarrow dM/dt=x_1,x_2,\ldots$ with probabilities p_1, $p_2,\ldots$'.[8] Now this form of law allows for various possibilities. If at some time *t*, we have $M(t) = 0$ while the quantum fluctuation $dM/dt=x, \neq 0$ occurs, then for an interval of time after *t*, $M \neq 0$. Thus, the history of the universe for times when space and matter were present, would be the set of times $\{t':t<t' \leq now\}$, which has no first instant. This is of course, topologically possible with a continuous *t* variable. Again, one of the finite possibilities when $M=0$ at some time *t* might be $dM/dt=0$ also. (Perhaps even this *has* to be one of the probabilities.) Then, if $dM/dt=0$ comes off, we would have the situation described earlier, of $M=0$ for a stretch of time after *t* until one of the other possibilities $dM/dt \neq 0$ occurs and space begins.[9]

Since there does not seem to be any contradiction in the supposition that laws might be as above, I conclude that at least a pre-existing space is dispensible from an account somewhat like Tryon's. It seems to me that a theory like the present one would give as good an explanation of the existence of space and particulars (other than times) as any in probabilistic physics. The radioactive decay of a single atom is not explained in current theories via prior sufficient causal determination. But it is explained nonetheless, to the extent that we demonstrate how it is governed by laws showing that events of that kind are to be expected, with a precise degree of expectation. A somewhat random universe need not be a chaotic one. If our universe is such that this is the best kind of explanation we can ultimately hope for, then the origin of space and matter need not be worse off in this respect than anything else. In Tryon's words, 'our universe is simply one of those things which happen from time to time.'[10]

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8 A mathematically more sophisticated theory would deal with the events E_i and their probabilities using integrals over finite intervals of time, and would also need to give conditions on higher derivatives of M, which would in turn be a tensor quantity; but we will not bother about these complications here.

9 Independently, we can consider whether the whole of time stretches infinitely, or only finitely, into the past. One wav, but not the only way, in which the latter could happen, is if $M=0$ at a first instant. Time would then be structured isomorphically with a finite closed interval of the real numbers, $0 \leq t \leq$ now (ignoring future times).

10 Tryon, UVF, 397

Can we get rid of pre-existing time as well? I think that we can. First, let us strengthen the condition $M=0$ to mean that in the absence of mass, neither space *nor* time exists. This does not, of course, amount to relationism, no matter how a relationist's heart might be gladdened if such were the case: the constant conjunction of space, time and matter does not entail that they are identical. Now it seems to me that it could still be a law that $M=0 \rightarrow dM/dt = x_1, x_2, \ldots$ etc. Here, though, we might have to understand the 'obtaining' of the 'initial' condition $M=0$ & $dM/dt=x_1$ (say) somewhat differently, on the grounds there would be no instant 'at' which $M=0$. Imagine that time is finite into the past but lacks a first instant. This would be so if the set of instants corresponds to some finite half-open interval of the real numbers, $0<t\leq$ now. Then we can understand the proposition '$M=0$ & $dM/dt=x_1$' as meaning that the *limit* of M as we go backwards in time (toward $t=0$) is zero, and the limit of dM/dt is x_1; or to put it differently, as *t approaches* zero, M approaches zero and dM/dt approaches x_1. Things would behave in the early part of the universe *as if* dM/dt really were x_1 at an earlier time.

We might in addition want to regard the condition $M=0$ & $dM/dt=x_1$ as a 'mathematical fiction,' in the sense that $M=0$ is not an event which occurs at a time. I am not persuaded that we must do this, however. An argument that we must, would appeal to the necessity of the principle that *whatever obtains, obtains at a time*; and it is not clear how one would argue for its necessity (its mere truth being insufficient to prevent speculation). Furthermore, against such an argument we might invoke a counter-principle which has been widely held in the history of philosophy, that no particulars exist necessarily. For then, since the previous argument would establish that temporal instants exist necessarily if any proposition is necessarily true, then temporal instants fail to be particulars.

In any case, we seem to have been able to dispense with pre-existing temporal particulars. So I suggest that a theory something like Tryon's is conceivable, in which the existence of all particulars is on equal footing in respect of explanation, and in which the probabilistic explanations are of the sort ordinarily available in probabilistic physics. Furthermore, conceivably this is just the right way to deal with the Big Bang. What bothers theorists about the actual instant $t=0$ is, I suggest, that current theories predict a spatial (perhaps even spatiotemporal) singularity there. Tryon trades this in for pre-existing space and time, and matter/energy singularity. The present suggestion does seem to allow for at least a spatial singularity, perhaps even a spatiotemporal singularity; but only in the sense that the usual laws of physics hold on a finite half-open time with no first member. Perhaps then there is less reason to find singularity at the origin of things perplexing.

Robert Nozick[11] also considers the possibility that the existence of something rather than nothing be explained by some kind of probabilistic partitioning of possible states (one state being that nothing exists and so being satisfyingly egalitarian in his sense). He is concerned that any a priori partitioning of possible states for this purpose would be arbitrary and so need explanation, i.e. be inegalitarian. I think that Nozick is not always sufficiently careful about the difference between explaining why something exists, and explaining why a proposition, such as a universally quantified law, is true (though he does address himself to the question of truthmakers for laws). On our present model, our laws would be responsible for the particular probabilistic partitioning that there is. This seems to be standard scientific practice in more limited domains. So, too, on the present model it is the truth of laws which would explain existence, or at least the existence of particulars. Another of Nozick's ideas, that there might be certain 'natural' states, including its being a natural state that nothing exists, can be given a law-based probabilistic gloss: natural = high probability. The present account also avoids a point of Michael Burke's.[12] Burke argues that were time finite into the past with no first element, one should not conclude merely from the fact that every event had an explanation in terms of prior events, that it had been adequately explained why there is something rather than nothing. Whether this is true or not might be disputed; and if it is not, then the present model explains existence in a stronger sense than I have claimed. I am inclined to agree with Burke; but even if he is right, it is being claimed here that the extra explanation is provided by (probabilistic) laws.

11 Robert, Nozick, *Philosophical Explanations* (Oxford: Oxford University Press 1981)

12 Michael Burke, 'Hume and Edwards on Why Is There Something Rather Than Nothing,' *Australasian Journal of Philosophy* **62** (1984) 355-62

IV

We have been considering the possibility of a lawlike explanation of the existence of particular things and events. It will doubtless have occurred to the reader that, whatever the ontic status of a pre-existing space and time in Tryon's account, he is still left with the truth of the laws of probability physics as unexplained. Now someone might confusedly think that hence such laws would 'exist,' so that the existence of some things would remain unexplained. But on the face of it, at least, laws are not the right kind of thing to exist. They are, rather, the kind of thing which is true or false. The latter does not rule out the former, though the claim that laws exist would need an argument. But even if laws do exist, it might be argued that they would not be particulars; so that particularity, at least, remains explained.

A more promising line of argument is this. It might be asked how a law could be true if nothing exists to 'ground' it. We might invoke a slogan: *no difference without a difference in what exists.* If L_1 and L_2 are different sets of laws, and L_1's being true is a different state of affairs from L_2's being true, then some things must exist and have a certain nature in order to constitute the difference.

Here we see the reason for the earlier distinction between explaining particularity and explaining existence in general. For there is a current theory, due to Armstrong, Tooley and Dretske,[13] according to which laws are true in virtue of relations between underlying existing universals. I do not propose to discuss the details of the theory. The difference between Armstrong and Tooley is interesting for our purposes, though. Armstrong's universals are Aristotelian, Tooley's are Platonic. For Tooley, the reason why a law or counterfactual can be true even when nothing exists instantiating the terms of the law, is that the truthmakers for the law are relations between Platonic universals, the mark of which is that they continue to exist uninstantiated. An Aristotelian like Armstrong holds that universals only exist in their instances, and do not exist uninstantiated. My preferences in this matter lie with Tooley, but here I only want to contrast the way the two

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13 Armstrong; see also his *What Is a Law of Nature?* (Cambridge: Cambridge University Press 1984); Michael Tooley, 'The Nature of Laws,' *Canadian Journal of Philosophy* 7 (1977) 667-98; Fred Dretske, 'Laws of Nature,' *Philosophy of Science* **44** (1977) 248-68.

views apply to our present discussion. If Tooley is right, then the existence of particulars might well be explicable along the lines of this paper; though the existence of something rather than nothing is not, since for the explaining laws to be true, universals must exist. If Armstrong is right, the matter is less clear. It is arguable that Armstrong's theory cannot allow that there be laws which hold when no particulars exist, in which case it does not look like the kind of explanation of particularity we have been considering would be available. But perhaps laws can be true while no particulars or universals exist. Then we would have the stronger result that the existence of anything at all would be explicable in such a universe. Of course I am not saying this is how things are, only how they might be.

So there is a difference between asking why particulars exist and asking why anything at all exists. The former might be answerable along the lines discussed; but even an answer to the latter is not wholly unthinkable if laws could be true consistent with nothing existing. But now we can observe that presumably the explaining laws would be contingent. For both Tooley and Armstrong, for example, the truthmakers for laws are *contingent* relations between universals. So something remains unexplained: why contingent laws are thus and not so. Conceivably, of course, it is incorrect to think that the laws of nature are contingent. The kind of reasoning which led to the Theory of Relativity can be made to look surprisingly a prioristic. If entailment is necessary for explanation, then since necessity distributes over entailment, this course abolishes contingency altogether.

Perhaps it is not essential to be so heroic in the quest for Total Explanation. Nozick considers extensively the hypothesis that ultimate contingencies might be self-subsuming and so in a sense explain themselves. His conclusion seems to be that inegalitarianism cannot be avoided even here. One contingency-retaining possibility not considered by Nozick is as follows. Suppose that the laws of nature are necessary but probabilistic, with a finite probability going to the condition that nothing exists, $M=0$. Then, I suggest, if anything exists it would exist contingently. But on the other hand existence would be explained as well as any probabilistic explanation explains, and by necessary laws. The idea that a probabilistic theory such as the Quantum Theory might be necessary is a kind of dual to the above suggestion that the Theory of Relativity might be necessary. Since presumably necessities would not need explanation, the probabilistic idea has the advantage that it allows both for contingency and also for the explanation of every fact.

I do not regard the necessity of either of these theories a particularly tempting option, it must be confessed. But even here we should not be too hasty in our rejection. If there is any lesson in this paper, it is that explanations might be pushed further back than we hitherto thought.[14]

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