Articles

Could God Have Made the Big Bang?
(On Theistic Counterfactuals)

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1. Introduction

That the universe began in a big bang is often believed by theists to confirm divine creation *ex nihilo*. But Quentin Smith claims that it means God must *not* exist.[1] For if he does, there is an earliest state E of the universe. God made E. E is ensured either to contain animate creatures or to lead to an animate state. For God would know that an animate universe is better than an inanimate one, and that even a minimally morally good being would be obliged to create one if he could. And God, being at least minimally morally good, and all-powerful, would be able and inclined to ensure the existence of one (p. 53). But science says that E is inanimate since the big bang singularity (E) involves the life-hostile conditions of infinite temperature, curvature and density; also that it is inherently unpredictable and lawless so that there is no guarantee it will emit particles that will evolve into an animate state. Thus E is not ensured to lead to an animate state (p. 53), and thus God could not have made E. So, God does not exist (p. 54). Smith: "There are countless logically possible initial states of the universe that lead by a natural and law-like evolution to animate states and if God had created the universe he would have selected one of these" (p. 58).

Could not God have made a big bang, then ensured life by altering its ejecta? Smith thinks not. For since the number of things big bangs might emit consistent with life are so small compared to all those they could emit, they naturally tend to lifelessness. So if God made one intending to make life, he would have made an initial condition inconsistent with this intention. That would be an irrationally self-defeating act requiring later correction, and God would not act irrationally (p. 55-56).

But could not this be true?

(1) If a big bang were the earliest state of the universe, it would emit life-producing particles.

(1) is true logically prior to creation, God knew (1) pre-creation, and (1) was his reason for making a big bang (p. 63); he knew it would yield life. Smith's answer: the truth-conditions needed to make (1) true do not obtain pre-creation. For the truth-conditions of counterfactuals (hereafter CFs) are relations between the total history of the actual world, or of the actual world prior to the CFs' antecedent, and the total histories of the most similar possible worlds. But pre-creation, there is no actual pre-antecedent or total world history for other worlds most to resemble. So pre-creation, nothing makes (1) true. Thus God cannot know (1) then, and so cannot have been sure a big bang would yield life. Thus if there was a big bang, God did not ensure life.

Smith's argument is of theological interest. But it also raises deep questions about the truth-conditions of CFs, the status of possible worlds and the possibility of there being causes for the events in indeterministic histories of events. I will argue, first, that God could have acted rationally to ensure life consistently with making a big bang, even if it was lawless, and even if he could not have known, pre-creation, whether it would yield life on its own. Second, Smith's reading of the truth-conditions of CFs entails absurdities. Read correctly, however, many contingent CFs *do* have truth-values pre-creation. I will then consider an argument against the determinateness of (1) deriving not from problems with a contingent CF being determinate pre-creation, but with the determinacy of CFs on sequels of events in indeterministic event-histories. We will see, however, that its being wholly indeterminate what the sequels would be of God-made, universe-starting, indeterministic event-sequences, is incoherent. If God was going to make only one universe, beginning it with an indeterministic event-sequence like a big bang, he would make succeeding events for it that contain life.[2]

2. How God Could Ensure Life and Make a Big Bang

Could God have rationally ensured life and made a lawless big bang if he could not have known whether it would yield life on its own? We approach this with a mundane analogy. Suppose *you* had to ensure something, e.g.,

that the lawn gets cut. You might cut it yourself, or make a machine to cut it for you. Or you might play a game with your sister: blindfolded, she wanders aimlessly, pushing a lawn-mower—no chance of her ever cutting the whole lawn.[3] But you give the odd direction ("go left," etc.). Between her wanderings and your instructions, the grass gets cut. Or you might ask your semi-unreliable brother to cut it for you, and be ready to do it if he does not. Finally, you might approach your semi-unreliable friends, asking each to cut it until one does. Why not do it yourself? Maybe you want to advance technology, play with your sister, reform your lazy brother, watch your friends invent amusing excuses; or maybe you just want to distribute responsibility for the lawn. (Smith never asks if God must have more aims than ensuring life which might make it all-in better that he do it indirectly.)

Analogously, here are some ways for God to ensure life: he could make life directly, or make something that is determined to make life. Smith would think these ruled out if God made a big bang, since it cannot contain life, and cannot, being random and lawless, be nomically determined to make life. But that leaves three ways. God could make something that, due to his supplemental actions, will be followed by life, while being ready to make life. He could make something that has a chance of making life, while being ready to make life directly if it fails (he "uses his brother" but stands by as a backup). He could keep making things with a chance of making life until one does (he "works down his list of semi-unreliable friends").[4]

The first way: it is chancy[5] what big bangs would yield, for they precede laws. But God, making a big bang, simultaneously biases its ejecta to produce conditions ensuring life. Would not this mean that he has not made a lawless big bang, but determinate physical laws *ab initio*? No. In the universe's earliest states, no regularities of the sort in physical laws (e.g., the inverse square law) immediately result from his intervention. But neither does any state appear that is inconsistent with life eventually emerging, with states and laws forming that would produce life. That is, no state appears that nomically militates against later life. Thus the universe conforms, *ab initio*, to God's aim: laws eventually evolve consistent with his aim that life exist. But the universe's initial few states, though partly God-governed, are not physical-law-governed.

Smith might re-object that it would have been irrational for God to make initial conditions unlikely to yield life, so that he must immediately fix them by biasing the result towards life. But he never produces conditions unlikely to yield life; he only allows things to occur congenial to later life—not by *making* laws, but by *restricting* which laws will come into effect to life-conducive ones. There is more than one set of these, and he does not care which appears. So he never allows conditions nomically or stochastically inimical to eventual life. (Your sister's wanderings are a bit constrained in the game from the outset by your occasional directions. Her wanderings

eventually form a pattern that cuts the lawn. But many patterns would do, and the resulting one is a combination of random events and your directions; had the events differed—had she first gone left, not right—your directions would have too. No particular pattern (law-set) is determined from the start, but one consistent with the lawn's getting cut is ensured.) Between its being totally random what a big bang emits (so that God is self-defeating in making one to ensure life), and God's so fixing what one emits that its initial states nomically ensure life (so that there *is* no big bang, but deterministic laws *ab initio*), there is a middle way: God makes a big bang whose early states fit no laws, but which states are consistent with his intention that life result, because restricted from emitting objects governed by laws inimical to life. How does this work? Some or all of the universe's states depend on God, but none of the slightly later ones nomically depend on the earlier (so *their* interrelation is indeterministic, even if their relation with God is not); but the later states have laws resulting in life much later. (The slightly later states partly depend on the earlier, because these partly induce God's choices—your sister goes left, you ask her to go right. But while God's choices respond to the earlier states, those do not fully fix his choices. Many would do, and he chooses among these randomly.) Thus, what with spontaneous big bang phenomena and his actions, there was, *ab initio*, randomness only between different ways of life resulting, not between ways of it resulting and not.

Continuing with our lawn example, suppose you start your sister somewhere on the lawn, which is 20 steps square. You might randomize for her starting position, let her randomize among, say, the four corners in deciding where she goes first, and then you might randomize in selecting one of the many formula-prescribed patterns that would cut the whole lawn. Perhaps you get this one, which you announce: go left for n minus 2 steps four times for each value of n, until n equals 0, with n first set at 22. She follows no laws when you direct her to her chosen corner, only your directions. But she then begins following a law—your formula. Never does any state obtain which nomically militates against the lawn being cut. But neither is there a law determining from the start that it shall be cut, only your intention. There is randomness in the initial stages of the process, and in selection of the lawn-cutting-guaranteeing law; and though the lawn is sure to get cut, it is not determined from the start just which law shall effect this result. Because you randomize among laws, you do not make any given law from the start, only restrict which of the many possible laws will come into effect to the lawn-cutting ones. You thereby cause there to be a law which results in the lawn being cut; but because you randomize in selecting it, you create a process with randomness in its initial stages. There is no law connecting the initial state (your sister's being somewhere on the lawn) to the eventual law, nor to the law's issue. Is not this an irrational way to get the lawn cut? No; even if you cut it yourself, you must start somewhere, in a place probably arbitrary—nothing wrong with tossing a coin for that, nor

with tossing between the many efficient cutting patterns. Besides, you may have other aims than just getting the lawn cut.

How does this way fit the notion that God could have ensured life and made a big bang, even if he did not know (and even were it indeterminate, pre-creation) whether the big bang would yield life left on its own? On the model of the big bang as an unpredictable succession of events, it could be that, had God not intervened (in shaping either the original explosion or its results), life was not ensured. But that *is* guaranteed by the big bang *plus* God's intervention. God here *uses* something not itself sure to make life, in a process sure to make it. (It is as if God makes some "clay" and simultaneously begins gradually shaping it into life, or begins selecting properties to add to it, choosing randomly from ones any of which would make it into life. The clay itself is life-neutral; depending on what is done to it, it can be part of life or not.)

The second way: God makes a big bang and leaves it alone. But had it not yielded states and laws that would lead to life (e.g., had it formed into particles and laws making it predictable that life would never appear, were the system left alone), he would have altered them to do so. (He had other ends making it ideal for him to make an initially random universe, not one itself ensuring life.) Thus the universe is ensured to contain life, since if it had not luckily become such that life would appear, he would have intervened. But the universe still began in a big bang, life still emerged without his intervention.[6] His making the big bang, while *potentially* defeating of his aim that life arise, was not *actually* so, since it yielded life without his having to intervene.[7]

In characterizing these ways, we have, per Smith, implied that they do involve or may involve God's intervening in random processes, precluding or reversing certain tendencies. But does it really make sense to speak of God *intervening in random* processes or their results, as if correcting an initially self-defeating randomizing act? On reflection, no. Smith says that if big bangs are random, they are unlikely to emit life and so naturally tend towards lifelessness. But this tendency is only *stochastic*. It is mathematically unlikely that life will follow a big bang, but no state (and so no animate one) is any less likely than any other. (In a fair lottery with 1,000 possible numbers, 999, though incidentally special, is no less likely to win than any other, e.g., 473, the odds for each being 1/1000.) So big bangs do not *causally* militate against life. Now if it is wholly undetermined by the big bang what it emits, its initial states are consistent with *anything* emitting. So if God "intervenes" to make life emit, he has not changed what would have happened; its initial state so underconstrains the future that no matter what happens, it is consistent with there having been a big bang. Indeed, for Smith, no pre-big-bang contingent CF about what would happen were there to be a big bang is true. Thus, again, nothing is such that, if there was a big bang, it bang is true.

would not normally have happened. So God does not interfere with one if he gives it a life-congenial sequel.[8] His action is simply (an optional) *part of* the big bang. Conversely, the initial state of the big bang is not inconsistent with his aim that there be life, since it is consistent with his acting to make life. (God could even have fixed each state in the universe's evolution, without thereby having made an *ab initio* deterministic universe. For the former involves counterfactual dependencies between states of the universe and God, the latter, between types of states of the universe itself. More below.) These metaphysical reflections apart, that a state is unlikely to produce life does not mean it is *inconsistent* with life, nor that it *militates against* life. And nor, then, does it mean its creator is being self-defeating in both making it and intending to produce life. (My shining my shoes is unlikely to get me to the office, but it is not inconsistent with it, nor does it prevent me from getting there.)

If, however, a big bang is a series of individually God-made events, surely it cannot be that God makes one *and* that it is indeterminate pre-creation whether life would result from it, considered on its own. For if he fixes each state, he fixes the living result. So in our two ways, God is not ensuring life while initially making something he could not have known would result in life; rather, he knows it will result, because he will make it. Yet when life follows a series of events beginning in a big bang, life does not "result" from it, that is, it is not a *nomic product* of the big bang. For since its initial states are lawless, they do not nomically determine the universe's later states. Thus life will not appear as the nomic result of a big bang. It is just something that occurs in its sequel. Since life does not *result* from the big bang, neither could God know that it will. He knows life will *appear*, since he will make it. But it will be the causal result of his intentions, not of the universe's initial physical state.[9] While God's action may be (an optional) part of the big bang, and while he may guarantee life by so acting, he could not know life will appear from knowledge of the big bang alone—could not know that, his action apart (i.e., if he does not make life in the sequel of the big bang), there will be life.

The third way: even if God must ensure life, that does not mean he must ensure it *in every universe*. For maybe he must also maximize diversity, make both living and non-living universes. And he might then make many big bangs, some perhaps yielding unstable universes collapsing back to nothing, making room for another try at life. Or maybe many universes can co-exist; and God might ensure life by being committed to making universes with big bangs until one happens to yield life. (A physical universe need not fill a possible world, so the God of our logical space of actualities can author many physical universes, maybe infinitely many.) No matter how bad the odds of a big bang yielding life, God can beat them by playing "the big bang game" infinitely many times, converging on a win even if he does not know, for any given big bang, whether life will follow.[10]

So Smith's disproof of God's existence seems unsound.[11] But, it remains to consider the implications of his argument for the nature of CFs and possible worlds.

3. Counterfactuals Determinate Pre-Creation

Smith claims (1) cannot be true pre-creation. In arguing for this, he considers several theories of what makes CFs true. The first: "the antecedent and consequent of the CF are both true in the possible world most similar to the actual world before the time specified in the antecedent."[12] But then, he argues, "there are no possible conditions in which (1) is true, since the time specified in its antecedent is the earliest time" (p. 63). There *is* no time before the antecedent's, so no world can resemble the actual world before then.

Yet surely the condition is satisfied by all worlds in which a big bang occurs at their earliest moments? For then they all have identical pre-big bang histories, namely, none. And maybe at all historyless worlds, ones where big bangs then occur eventually contain life, making (1) true pre-creation.[13]

Further, Smith's worry is that, pre-creation, there is no actual world history to resemble other possible worlds' histories. But even if there is then no prior history of the physical universe, there might be an extraphysical "history," or some logically pre-big bang "states," composed of God's mental life. Indeed, in our question we first imagine God's existing, and then, to try to reduce this to absurdity, we ask whether, if he made the big bang, he ensured life. The question implies that some states could logically precede physical history.[14] And these might ground CFs like, 'If God decided to make a big bang, one would occur and emit life'. What would make this true is that at worlds most similar to ours, ones where God counterparts decide to make a big bang, a big bang occurs and it emits life.

On the other theories Smith considers, a CF is true when its antecedent and consequent "are both true in a possible world whose *total history* is most similar to that of the actual world,"[15] or "some world in which the antecedent and consequent are both true is more similar in its over-all history to the actual world than any world in which the antecedent is true and the consequent false."[16] But Smith argues that since these theories "entail that a [CF] is true only if *there is an actual world* that serves as a relatum of the similarity relation," and since "(1) is supposed to be true logically prior to creation, its truth-conditions cannot include all the states (or all the states up to a time) of the actual world, which contradicts the truth-condition requirements of [CFs]" (pp. 63-64).

There are two ways to take this: maybe pre-creation it is not determinate which possible world shall be the actual one, and so which course of events is such that, by resembling the events at certain other possible worlds, certain CFs hold of it. (Recall the first part of the objection [p. 64]: that these theories "entail that a [CF] is true only if *there is an actual world* that serves as a relatum of the similarity relation . . .") Or maybe it *is* determinate

which world will be actual, but prior to its becoming such, there is no actual history of elapsed events, and so none for other worlds' events to so resemble as to make certain CFs true of the events in that history. (Recall the second part of the objection [p. 64]: that since "(1) is supposed to be true logically prior to creation, its truth-conditions *cannot include all the states* (or all the states *up to a time*) of the actual world..." —my emphasis.) I ignore the former for a moment to speak to the latter: surely it is not needed for a CF to be true at a world that its truth-condition—all the world's states—have already come to pass. For then no CF, no matter how temporally local its referent, could be true before the end of time. But surely statements like, 'Had I spilled my coffee I would have messed up my desk', are true as of *now*. If the truth-conditions of CFs are resemblances between the *total* histories of the actual and the closest possible worlds, surely these are histories of the actual, past, present and future, conceived as already (i.e., sempiternally) existing, if not all as present or past states in time of history. Thus surely even before actual-world-history gets started, CFs could hold true of its history's events.

Another dubious consequence of Smith's analysis of CFs: it entails an *over*-explanation of why the big bang is lawless if it is the universe's earliest state. For a law to hold in a universe is for certain CFs to be true of it. Applying Smith's analysis, for our universe to have laws, its world's past must most resemble that of another possible world where certain futures follow. Whatever *does* follow at the closest world to ours, *would* follow at ours under certain conditions, and that it follows there means our world has laws consistent with such futures, given the past. But pre-creation, our universe has no past; so no worlds then resemble its world; so its possible futures cannot then be constrained by the histories of similar universes. So our universe cannot have physical laws at inception. So, were Smith right, it would (implausibly) be a logical truth, not a contingent one of physics, that no laws hold of the universe at its earliest point. Also, the idea that God made the universe complete with deterministic laws—as Smith thinks he must to ensure life—would be incoherent. It could not have had laws from the outset. Thus Smith is inconsistent in saying both that for his reasons, (1) cannot be true pre-creation, and that "There are countless logically possible initial states of the universe that lead by a natural and law-like evolution to animate states and if God had created the universe he would have selected one" (p. 59). Rather, there could be no laws for initial states, and so no laws to permute them into animate states.

In any event, Smith's objection is ambiguous. When he speaks of CFs being true "logically prior to creation" (p. 64), does he mean prior to some world's being actual, or prior to a physical universe's being made in a world already actual? If the former, he is objecting (as I adumbrated above) that since, pre-creation, no world is yet actual, no world is the actual world required in the trans-world resemblance relation needed to ground the CF;

but if the latter, that since the actual world does not yet have a history—for pre-creation is pre-the-earliest-point-in-the-history-of-the-world—no other possible world can most resemble, in *its* history, that of the actual world. We replied to the latter. But if he means the former (as is suggested by his remark [p. 64] that these theories "entail that a [CF] is true only if *there is an actual world* that serves as a relatum of the similarity relation"), there are four responses to be made. Cognoscenti will notice that these presume several theories in the field: *possible worlds realism*: for something to be possible is for there to be a possible world where it is actual. *Counterpart theory*: each thing exists in only one possible world; what is possible or necessary of a thing in one world depends on resemblance relations between it and the things most like it—its counterparts—in other possible worlds; what is possible or necessary for a thing in our world is whatever is actual for things most resembling it in some or all possible worlds, respectively. *The indexical theory of actuality*: the difference between the actual world and other possible worlds is that the actual world is whichever one you are in. It is relative which is actual: each is actual for those in it. Finally, *modal logic system S-5*: in this system, if something is possible, it is necessarily possible. I cannot argue for these theories here, except that I note for them that their truth would preclude Smith's conclusions, and so avoid the absurdities of his reading of the truth-conditions of CFs. The responses:

(*i*) Smith may think the actual world does not exist until God makes the physical universe. That makes a possible world—the actual one—and contingent CFs cannot hold until it exists, so God cannot know them until he makes it.

But the making of a universe, and so of an earliest point in time in a world, cannot be the making of a possible world. For possible worlds are just logical possibilities; and these are sempiternal—they cannot be created or destroyed. Smith cannot object to this, for he allows that, pre-creation, logically necessary CFs are determinate: there are "states of affairs" corresponding to statements of logical necessity (pp. 64–65). (Right, for logical truths hold no matter what.) But if he grants the pre-creation existence of logical necessities, since each logical possibility is necessarily possible, he must grant that pre-creation there are states corresponding to statements of logical possibility, i.e., possible worlds composed (in part) of contingent events. Indeed, he seems in general to accept their pre-creation existence, for he objects not that they do not then exist, only that the actual world does not then exist to resemble those other logically possible worlds. But if possible worlds necessarily exist, so does the actual one, whichever it is. Thus the truth-conditions of (1) can contain "all the states (or all the states up to a time) of the actual world," even pre-creation; and since if worlds are sempiternal, so are trans-world resemblance relations, all required truth-conditions of contingent CFs are in place.

(ii) But maybe his objection is not that, pre-creation, the actual world does not exist among the possible ones, only that it does not then exist *as* the ac- tual world: God's making the universe converts a merely possible world in- to an actual one. But this is wrong, because for any possible world *W*, it is already trivially true that for anything in *W*, *W* is the actual world for it.

But if God cannot make possible worlds, nor convert a possible one into an actual one, what is it for him to make our universe, *U*, or a thing in it, e.g., life? Just for him to be a member of our world *W* i.e., a world-mate of *U* and us, and for states of *U* to counterfactually depend on God: at the worlds closest to *W* where God's counterparts "said," "Let there be a uni- verse," or "life," there was then a universe, etc. (and where they did not, there was not).

(iii) But Smith might object that God cannot know which contingent CFs hold of the actual world prior to making the universe there; for he might not yet know which world is actual, what it is (or will be) like. But whether a CF holds at some world, *W*, is indifferent to whether *W* is actual for the CF's contemplator, and to whether he knows which is the actual world. It just depends on the trans-world resemblances between *W* and the worlds closest to it. These are relations among logical possibles, and, as we saw, all such possibles and relations exist sempiternally. Thus God can entertain hypotheticals about what CFs are true even at worlds not actual relative to him, so that he could know all possible true CFs, for all worlds, including the actual world, even if he did not know which world was actual for him. But then even pre-creation, he can know of his actual world (if not so de- scribed), whether, were a God to make a big bang in it, life would emerge: inventorying possible worlds, he considers one where no physical universe exists. He wonders whether, if a God counterpart were to make a big bang there, life would result. He then considers worlds close to it, ones where there was nothing physical, and then a big bang made by a God counter- part, and sees if life followed. If it did, then it would have at the world he is considering. Thus even if he did not know which world is actual, he could know for any given one whether, were a God to make a big bang there, life would follow.[17] Summarizing: God can know all the true CFs for all possi- ble worlds (one of which is actual for him), since this is a world-relative matter, all worlds always exist, all trans-world resemblances always exist, and so all CFs always hold, available to be known *a priori*, since they are just functions of the sempiternally existing resemblances between sempi- ternally existing worlds.

(iv) But suppose Smith claimed none of this identifies *which* contingent CFs are *actually* true, true of the actual world. We reply: first, if it is a gen- eral truth that worlds beginning in God-created big bangs have animate se- quels, then God can know it, and so know that at his world, were he to

make a big bang, life would follow. Second, the actual-as-such-world is the one containing the God in question. For to imagine that God exists is to imagine that some world is the actual world, namely, the one containing him. We thought-experimentally *stipulate* the referent of 'the actual world' to be his world. And God knows which world is actual, and so which con- tingent CFs hold for it, since the world he inhabits is, trivially, actual for him. So, the contingent CFs true at our world pre-exist his making the uni- verse, and he could know them pre-creation.

4. A More Serious Problem for Divine Knowledge

Proposition (1) concerns sequels of antecedents that underdetermine them. This suggests an objection to (1)'s being determinate and knowable pre- creation that, surprisingly, Smith did not raise: if big bangs underdetermine their sequels—if it is chancy what will follow them, some, life, others, not— then surely the CF, 'were there to be a big bang, it would be followed by life', is indeterminate in truth-value: prior to a big bang, and even at its ear- ly states, there is no closest possible world to the one where it occurs; worlds where one is followed by life, and worlds where it is not, are equally close then. So how could God know, prior to the big bang, if life would follow it?

This is mysterious not for Smith's reason, that, pre-creation, there is no actual big bang to stand in trans-world resemblance relations. For even were there one, since indeterministic-lawed universes with similar histories up to time t can have different futures, knowledge of trans-world resem- blances pre-t and at t is silent on what would happen post-t. The real prob- lem is that possible qualitatively identical big bangs can have different possible futures, since their physical qualities underdetermine them. In this world there is a big bang, then life; in that world, one just like it (or differ- ent, but not in a way that correlates with future life), but no life. So knowl- edge of trans-world resemblances between big bangs at different worlds does not ground a prediction. Nor is there any basis for a fact of the matter, pre-t or at t, what would happen post-t. How, then, can God know such CFs? What could make true, contingent CFs concerning the indeterminis- tic sequels of big bangs?

William Lane Craig gives what I think is an unsatisfactory answer to this question.[18] Craig thinks Molinist considerations argue for the determinacy of (1) pre-creation. He argues for CFs concerning future contingents in general (statements about what would happen if some future, contingent event occurred) that they are determinate pre-creation, his argument seem- ing to amount to a much less detailed version of the arguments I gave in my points (i) to (iii) above. He then seems to think that this establishes the pre- creation determinateness of (1).[19] pre-creation, it can be a fact that if an event e were to occur in the actual world, W, a later event, e^* would occur in W. This, he thinks, would be a fact in virtue of there being a resemblance between W and a closest possible world, W'. The resemblance would have

two aspects, first, that an event like e occurs at W^1, and second, that a law, amounting to a CF, holds at both W and W^1, namely, one implying that if an e-like event occurs then an e^*-like event occurs. (Craig's argument, like mine, tries to show that laws concerning the consequences of future contingents can hold pre-creation; and with this much, I agree.) If e is a big bang, and e^* is life appearing, it is then a fact, pre-creation, that were God to make a big bang, life would appear. Thus God can ensure life by making the big bang, and his knowledge of CFs concerning future contingents (specifically, the consequences of making a big bang), gives him reason to make it. The problem with Craig's argument is that there is no law, and so no CF, taking a big bang as antecedent, and the appearance of life as consequent. For big bangs are indeterministic in two respects: nothing determines their initial states (unless God does); and those states do not determine their slightly later ones. All Craig has established is that in making a big bang, God fixes an initial state, and that if there *were* a (deterministic) law relating that state to a later one, God could know it before creating the initial state (and the law could hold at W before God makes that state). But since if the initial state is a big bang, it does not determine that the later state will contain life, God's making the first state does not ensure the later appearance of life, and so there is no CF to serve as God's reason for making the big bang. So we need additional arguments.

Well, suppose a possible world is a completely logically pre-laid-out succession of events. Then even at an indeterministic-lawed world, something *will* happen; even before it does, it is a fact that it will.[20] Thus perhaps it is determinate whether a given big bang is followed by life, just not whether big bangs in general are. For the former is a particular big bang, and so a member of a particular world, a succession of logical possibilities, in our case, life-involving ones. The latter is a class of events some members of which precede life, others not. So it is indeterminate just from membership in *this* class whether a *given* member precedes life. But God, in making a big bang, chooses *among* big bangs, among *this* and *that* one, among successions of possibilities, ones perhaps identified by their first members. Thus maybe he can ensure life by making one of the big bangs that precede life.[21] And this might allow God to ensure life with a big bang even if there is no determinate CF on what would happen in general were big bangs to occur; it is enough that there is a determinate "factual" about whether a given big bang is followed by life. The CF, 'if God made a big bang, it would be followed by life', would be made determinate and true by God's aims, ones he implements with his knowledge of factuals concerning particular big bangs: God would not make a big bang unless it had life in its sequel.

But if the members of the event-series comprising big bangs and their sequels are only contingently related, could not different such series have numerically or qualitatively identical first members? If so, such series lack the structure needed for one to pick out a series just by picking out a member of it (or to ensure animate sequels just by making a particular big bang an-

tecedent): any member could belong to any other such set (any big bang could have any future, not necessarily an animate one.)

True enough. So for God to be sure to make a big bang distinguished as one followed by life, a big-bang-that-preceded-life, he would also have to make (or at least constrain) its sequels. He could not just let sequels arise for it wholly randomly, for that only *might* involve life. If you like, for God to be sure to be choosing a big bang that has life in its future, is also for him to choose a future, or to so restrict futures that only an animate one occurs. But notice that in determining which universe-history occurs, he need not make a determinate universe. A universe is determinate only if there are systematic relations between types of events in its history. But the existence of a particular physical universe in the actual world could counterfactually depend on God, without each event in that universe counterfactually and nomically depending on other events in it. This reinforces a point of section 2 above: even if God determined a big bang's future, e.g. gave it a living sequel, that does not mean the big bang was a deterministic (law-governed) process, nor that it deterministically caused its living future.[22] So it was open to God to give his big bang a living sequel, consistently with its being lawless. Thus he could know whether there will be life in the future of a big bang, because *he could determine this*.

And surely there are determinate CFs concerning God's activities. For surely even pre-creation, God has dispositions, ones like those of his counterparts in other worlds. And this makes true such CFs as 'if God intended to make life, he would use one of section 2's ways'. Indeed, if God has his traits necessarily and essentially, then that he would be inclined to so make life is *logically true*. Thus, even for Smith, it would be a *determinate* pre-creation CF. For he allows that *necessary* CFs *are* determinate pre-creation (pp. 64–65). And just as this beats Smith's objection, it solves my problem, if God exists.

5. Review and Conclusion

As Smith set up the problem, we were to imagine God "setting off" a big bang. Since big bangs cannot contain life and do not nomically determine their sequels, Smith thought it problematic how God could have ensured life consistently with making a big bang. Problematic because on his reading of the truth-conditions of CFs, there could be no fact of the matter, prior to God's making the universe with a big bang, what would happen were he to so make it. But we saw that there was no problem in general with CFs being determinate and knowable pre-creation; if that were all there was to Smith's worry, God could have known a big bang would yield life were he to make it (were this one of the *true* determinate CFs), and so have ensured life by making one.

But Smith's argument—from the supposed pre-creation indeterminacy of CFs in general—misprosecuted his initial worry; the idea that CFs are indeterminate pre-creation was a red herring. The real problem, given

Smith's picture is this: if big bangs do not nomically determine their sequels, how can there be a fact of the matter what would happen were one to "set one off"?

But this is a misleading picture of what the relation would be between God and a big bang. For God to make one would not be for him to set off a bomb whose explosion he could neither predict nor control, but for him to make each event in a series whose initial stages do not nomically and counterfactually interdepend, and whose later stages do, and these later changes likewise depend on the intermediate ones. God would be like the cartoonist for an animated movie. On its initial frames he would draw crude forms unrelated to those in slightly later frames. But on the much later ones he would draw complex forms, each depending on the preceding frame, God working a pattern into the relation between the later frames not found in the earlier.[23]

Smith assumed that for God to have ensured life and to have made a big bang, the big bang would either have to contain life—which it cannot due to its physical extremes—or nomically determine life—which it cannot, being random and lawless. But it could, instead, be the lawless predecessor of lawful, animate states, in a universe each state of which was God-created. He could have made a random big bang, but given it a living sequel, with no threat to its randomness; for any sequel is consistent with an event that totally underdetermines it. And this same fact means that in making a big bang, God would not be defeating his aim to ensure life.[24]

Notes

1 Quentin Smith, "Atheism, Theism and Big Bang Cosmology," *Australasian Journal of Philosophy*, 69 (1991): 48-66. All page references are to this work unless otherwise noted.

2 And if he was going to make several universes, beginning each with big bangs, he would so make them that at least one eventually contains life.

3 A referee thinks "no chance" too strong. Surely there is *some* chance; for she *might succeed* in cutting the whole lawn. But this is due to ambiguity in the sense of 'chance'. There is chance *qua* logically possible outcome, and *qua* finite likelihood of outcome. It can be a possible outcome of her wanderings that the lawn gets cut, without there being a finite chance of that. There are infinitely many ways she could fail; so there is no finite chance of her ever randomly succeeding. E.g., she could start going in a circle after the first second, or half-second, or ... In any case, that is the notion I seek to illustrate with this example. (Contrast it with the next, where we assume some finite chance of success without your further interfering.) Even if there is no finite chance of her succeeding by random motions, your guidance is not *needed* for her to succeed, only for her to be *guaranteed* to do so, either certainly, or with some finite chance.

4 John Leslie reports, in his *Universes* (London and New York: Routledge, 1989), p. 181, that A. R. Peacocke "has been arguing ... that God might ... have cre-

ated up to infinitely many universes, confident that at least some ... would become life-containing just by chance," which sounds rather like the last option.

5 Chancy or worse—see note 3 above.

6 A referee wonders how God is here to be understood to have created the living universe. God seems merely its guarantor, taking no action. But Smith only requires that God ensure life, not directly create it. Besides, God *does* take an action: he starts a process that raises the probability of life beyond what it would have been had he done nothing; and his readiness to step in ensures life, even if the big bang only makes it slightly probable. But if life results without God's having to intervene in his big bang, is he responsible for life, especially if it was unforeseeable that his making the big bang *would yield it*? Did he *ensure* it? Yes, for he made the process which had a chance of making life, which otherwise would have had no chance of existing, so that life's existence counterfactually depends on him. And his being ready to step in if things go badly means he gives a guarantee; he is the ensurer.

7 A referee asks, "If God *would have* intervened *had* things begun to go poorly, then how could it even have been 'potentially' self-defeating to have created a world in which things might have gone ... poorly were God a definite non-intervener?" If it was always part of God's intention in making the universe with a big bang that, if it did not autonomously yield life, he would make it do so, then no act of his tended to defeat his aim to make life. For his initial act of creation was the action, as defined by its intention, of making-life-by-a-big-bang-or-directly-(if required). So both making the big bang and leaving it alone, and making it and fixing it, would have counted as executing his initial intention. Thus, if he had had to intervene, that would have been consistent with his initial intention, not a repair on its consequence, and so not a repair of a self-defeating action. I agree, given the assumption about God's intention. His making a big bang, which then happened not to yield life, would only be self-defeating if he intended to make life with a big bang, intending not to have to interfere later.

8 A referee thinks there is a respectable—if not compulsory—sense in which God works against the natural tendencies of a big bang if its chances of emitting life are, say, one in a billion, and he sticks life in its sequel. But since there is no law saying that if there is a big bang, there is no life, God does not change a law, nor violate one. Since, then, there is nothing for God to be interfering with, his making life in the sequel of a big bang is no interference with it. Is he not altering the odds of life being in its sequel? Not necessarily. Maybe the reason the odds are one in a billion that there will be life after a big bang is that God puts life after one of every billion big bangs. Besides, it is consistent with the odds of one's emitting life being one in a billion, that in a given run of big bangs, there be two in a billion; other runs could contain fewer than one to balance out the numbers.

9 A referee suspects paradox. "Could God *determine* ... what is to result from an *indeterministic* process, without destroying its essential randomness ...?" But what makes the process involving the big bang and later life indeterministic is

that there is no law taking the initial states of the big bang into life-involving states. That is consistent with God's making—causing, determining—both the initial state and the later, living one. Suppose I put down some cards in random order. There is determinism in the relation between me and each card, for I caused each to be put down; but not between one card and another, for no card caused another to be put down.

10 Were the odds *infinitely* bad, God might be in trouble. But Smith himself (in "A Natural Explanation of the Existence and Laws of our Universe," *Australasian Journal of Philosophy*, 68 [1990]: 22–43) interprets physics as saying there is a finite chance of a big bang's yielding a universe with laws like ours, laws congenial to life; big bangs do not *fully* underdetermine their ejecta's properties, but make certain properties probable in some degree, give them a small, finite chance of emerging. Note that if this is not true, either in the nature of big bangs, or by God's decree, then Peacocke's method (see note 4, above) is faulty. If the odds are infinitely small that any given universe will contain life, the same is true of any number of universes; so it would be unreasonable to be confidant that some will contain life "just by chance." "What if God plays the big bang game infinitely many times, with an infinitely small chance of life emerging each time; is he likely to win? Alas, this passes my math; I cannot say. But for God to be *sure* of creating life by making many universes, this must not be like tossing coins until one comes up heads. For heads may never come up, though that is ever less likely. (It is 50 percent likely for each toss, but far less likely for 10 tosses, less likely still for 100, and so on.) Instead it must be like being allowed to pick lottery numbers at random (picking each time only from those one has not yet picked) from finitely many numbers until one picks the winner. So God can leave it open which of the many universes he will make will contain life, but must decree that at least one of them will. (So to make the analogy with semi-unreliable friends accurate, your friends must have agreed that one of them will do what you ask, but they must not have told you which one will do it when you ask.)

11 A referee thinks that while I rightly claim Smith has not shown that God did not create the big bang, all Smith meant was that God could not create the universe via a big bang *simpliciter*, a point with which my arguments seem to agree. But Smith was trying to argue that the big bang did not ensure life, so God could not have ensured life by making it; and that God could not have ensured life by making the big bang then doing other things. For since big bangs make life unlikely, in making one, he would be defeating his aim of making life, making a mistake he would have to fix. But God would not be so irrational. So he must not exist, given a big bang. I have tried to show that God's life-making actions can be part of the big bang; or that it does not have properties making it self-defeating of God to make it while doing other things too to guarantee life.

12 Jonathan Bennett, "Counterfactuals and Possible Worlds," *Canadian Journal of Philosophy*, 4 (1974): 381–402; and Wayne Davies, "Indicative and Subjunctive Conditionals," *Philosophical Review*, 88 (1979): 544–64.

13 Perhaps not all big bangs yield life; but that is not Smith's objection, though we consider its implications, below.

14 Smith does not object to things holding logically pre-creation. He only doubts the pre-creation existence of conditions making determinate, contingent CFs about creation.

15 Robert Stalnaker, "A Theory of Conditionals," in *Studies in Logical Theory*, edited by Nicholas Rescher (Oxford: Blackwell, 1968), pp. 92–112; Richmond Thomason and Robert Stalnaker, "A Semantic Analysis of Conditional Logic," *Theoria*, 36 (1970): 23–42; and Frank Jackson, "On Assertion and Indicative Conditionals," *Philosophical Review*, 88 (1979): 565ff.

16 David Lewis, *Counterfactuals* (Cambridge: Harvard University Press, 1973).

17 A referee objects that this implies that there are, available to be discerned, true CFs at the resembling world, which there could not yet be for Smith, since it does not become the relevant resembler until creation of the actual world. But a CF is not made to hold of one world by that world's most resembling another world where the CF holds. (For what then would be the condition of its holding there?) Rather, a CF is made to hold of a given world by the CF's consequent holding at a world where the CF's antecedent holds and which is otherwise the world most like the given world. And since worlds are just sempiternal possible successions of possible events, so that one apprehends worlds by imagining such successions, the truth-conditions of CFs are sempiternally available for contemplation.

18 "Theism and Big Bang Cosmology," *Australasian Journal of Philosophy*, 69 (1991): 492–503, a reply to Smith. See especially pp. 493–96. Actually, I find Craig difficult to follow on this; he may not have posed the question to himself in quite this way, but may have just argued that CFs concerning future contingents could, in general, be determinate pre-creation. But he seems to find that a reply to something like our worry. Still, maybe I should only say that, if he *has* an answer to it, it is the argument I now sketch.

19 Proposition (1) appears as "(C)" in his article.

20 Does this, plus logic, make the required CF determinate? For any propositions *P* and *Q*, if *Q* is true, e.g., 'there is life', then if *P* is true, e.g., 'there is a big bang', then 'if *P* then *Q*' is true; thus, 'if there is a big bang, then there is life'. But this only makes a *material conditional* (MC) determinate and true, not a CF. For that, we need 'if *P* had been true, then *Q* would have been true', which does not follow from the MC. MCs with true consequents will be true whatever else holds at any world, but contingent CFs are true only if certain particular things hold at resembling worlds.

21 The argument of this section in effect develops a point made rather quickly by John Leslie in his *Universes*, pp. 181–82.

22 Is there not at least a deterministic relation between the universe and God? Yes, but see note 9 above. Also, God's causing events may not involve *nomic* causation.

23 A referee suggests that this point ("that creating a universe in which the various stages are not nomically/counterfactually following from one another is compatible with giving it a determinate...selected...life-containing form") is one "that J. J. C. Smart has long been arguing for. Smart concedes that in his B-theory-of-time world the future is *determinate*; he denies...that this commits him to *determinism*. See...his...*Our Place in the Universe*."

24 A version of this paper was presented at Dalhousie University. For helpful discussion, my thanks to David Braybrooke, Bob Bright, Steven Burns, Susan Dimock, Wayne Fenske, Randall Keen, Bob Martin (especially for "the second way"), Victoria McGeer and Sheldon Wein. I am especially grateful to two anonymous referees.

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En quel sens les objets physiques sont-ils réels?*

1. Introduction

La notion d'objet physique est au cœur de la problématique métaphysique du réalisme : réalistes et antiréalistes construisent habituellement leurs positions sur la base de différentes conceptions de cette notion. De façon générale, les réalistes prétendent que les objets physiques existent et possèdent des propriétés intrinsèques les définissant indépendamment de nos facultés de perception et de conceptualisation. Par rapport à cette caractérisation, qui nous accompagnera tout au long du texte, nous nous plaçons dans le clan des antiréalistes. Toutefois, notre but présent n'est pas tant de critiquer la conception réaliste de l'objet physique que de proposer les grandes lignes d'une forme d'antiréalisme cohérente. Pour nous situer dans le débat contemporain nous contrasterons nos idées avec le réalisme interne de Putnam et le phénoménalisme, deux positions qui se rapprochent de la nôtre par leur rejet de la notion réaliste d'objet physique. Cependant, le réalisme interne et le phénoménalisme, nous le verrons, prennent souvent la forme de thèses portant sur le langage, ce que nous voudrons éviter de faire. Il est à notre avis avantageux, pour répondre à la question qui sert de titre à ce texte, de ramener le débat en deçà des questions de langage, au niveau de la perception non épistémique, où l'on peut encore, selon les termes de Dretske, voir sans croire.

Nous décrirons d'abord brièvement le réalisme interne de Putnam et le phénoménalisme, afin de voir comment ils définissent la notion d'objet physique dans leur cadre antiréaliste respectif. Nous indiquerons ensuite