

How Process Theology Can Affirm Creation *Ex Nihilo*

Rem B. Edwards

REM B. EDWARDS is Lindsay Young Professor of Philosophy, Emeritus at The University of Tennessee, Knoxville. He is the author/editor of fifteen books, including *Religious Values and Valuations* and of more than fifty articles. He studied with Charles Hartsborne at Emory University. E-mail redwards@utkux.utcc.utk.edu.

Mainstream process thinkers have clearly repudiated the traditional Christian view that God created our universe out of nothing, *ex nihilo*, at some point in the finite past. They affirm instead that God created our universe out of the chaotic remains of some prior universe or cosmic epoch, which in turn was also created out the chaotic remains of some prior universe, and so on to infinity, because every finite actuality was partly created by and out of some prior actuality. As David Griffin put it, "Creation of our particular world was not initiated by a creation *ex nihilo*, in the sense of a total absence of finite forms of actuality, but was a creation out of chaos, out of a less ordered realm of finitude" (*Physics* 139). When integrated into process theology, the claim that every reality is created partly by and out of antecedent realities (and partly by God) implies that our universe or cosmic epoch is just the latest member of an infinite sequence of antecedent universes that God created necessarily because God is necessarily creative, social, loving, and embodied in *some* universe—*ad infinitum*.

I wish to show that and how we can retain valuable process insights, such as that God is necessarily creative, social, loving, and embodied in some actual universe, and still affirm creation *ex nihilo* for our universe. Without relating his metaphysics to recent developments in scientific cosmology, Robert Neville, both a friend and a severe critic of process theology, has previously championed creation *ex nihilo* (*God; Theology* 28-48; *Creativity* 33-35, 44-46). However, most philosophical-minded process theologians have not been able to conceive of a way to get around the principle that all realities are partly created out of prior actualities and still preserve God's necessary creativity, sociality, love, and embodiment. I hope to show that and how it can be done quite successfully by employing concepts that are quite readily available in contemporary Big Bang astrophysics and cosmology, and that reasons given by process thinkers for repudiating creation *ex nihilo* can be bypassed. In developing these points, I also hope to show how process thought can relate its insights to contemporary scientific Big Bang cosmology, and that traditional process thought contains elements out of which a process understanding of creation *ex nihilo* can be constructed.

I. A New Framework for Understanding Creation Ex Nihilo

In answering the question “Is God Creator *Ex Nihilo*?” on the *Process and Faith* website, John B. Cobb, Jr. replies that “Whitehead knew nothing of the ‘Big Bang’ and thought instead of cosmic epochs evolving out of earlier cosmic epochs with no singularities involved. Process theology followed him.” Process thinkers have indeed followed Whitehead in affirming that our universe, our cosmic epoch, was created out of the ashes of some temporally antecedent universe, and that both universes belong within an infinitely prolonged series of created universes that collectively fulfill the necessity of divine creativity, sociality, love, and embodiment. Charles Hartshorne affirmed, admittedly with some hesitation:

That actuality is finite in space I readily believe. It is certainly finite in some respects; for to say otherwise would be to say that everything thinkable was also actual, and this is absurd. But the serious question concerns the past of the creative process. Is there an actually infinite regress of past stages—if nowhere else, then at least in the divine becoming? If not, how can a first stage be either avoided or made intelligible, if every experience must have antecedent objects [. . .] ? So Kant’s first antinomy, his most potent argument, stares us in the face. All I can see to do is to reject his disproof of the possibility of an actual infinity. [. . .] This question I cannot at present answer to my own complete satisfaction. (*Creative* 125)

In his “Response to Alston,” Hartshorne fleshes out his cosmology of finite space and infinite time by linking it to Whitehead’s doctrine of cosmic epochs, telling us that “I incline to Whitehead’s view of cosmic epochs, each with its own laws” (100). Presumably this all means that a series of spatially finite cosmic epochs extends infinitely into the past, and that our universe was created out of the remains of the preceding epoch. The same interpretation must also be placed upon Lewis Ford’s “Alternative to *Creatio Ex Nihilo*,” which affirms: “For if the world is not created from nothing, it can possibly have an infinite past. If every creative act creates itself out of past acts, *ad infinitum*, the world must have an infinite past” and upon Cobb and Griffin’s “Process theology rejects the notion of *creatio ex nihilo*, if that means creation out of *absolute* nothingness. Process theology affirms instead a doctrine of creation out of chaos” (65). Griffin positions this chaos within a temporally ordered set of oscillating universes when he explains that “There was no beginning. The chaos from which our world began can be considered the final state of a previous world. Creation is the gradual bringing of order out of chaos” (*Evil* 23).

How does all of this relate to what is going on in contemporary scientific cosmology? Today, for the most part, cosmology is being done by astrophysicists rather than by philosophers or theologians. Most of these scientific cosmologists do not believe in God and seem to know little or nothing about process philosophy. They wish to leave the impression that their atheistic

cosmological speculations are somehow “scientific,” although this is far from being the case, as will be explained later. Still, for convenience, let us call cosmological speculation being done by astrophysicists and other professional scientists “scientific cosmology.”

Contemporary scientific cosmology is very diverse. The variety that best correlates with the views of mainstream process theologians is Oscillationism, even though process thinkers have not explicitly affirmed it by using the word “oscillationism.” Contemporary scientific Oscillationists¹ usually affirm that our universe is but the most recent in a temporally infinite series of cosmic epochs, that it was created entirely, not by God, but by an influx of energy from an antecedently existing universe, that this prior universe originated from its own Big Bang, enlarged to the maximum allowed by the tension between the expansive kinetic energy of its Bang and the constrictive force of its gravity, then began to contract after gravity ultimately prevailed, and finally ended in a Big Crunch, from the ashes of which our own Big Bang rebounded.

Most scientific Oscillationists also affirm that the series or set of Bang-to-Crunch epochs extends infinitely into the past. They do so primarily because they think that this is a way of avoiding God. As Alan M. MacRobert recognized in *Sky and Telescope* in 1983, “the idea of an oscillating universe, in which the Big Bang resulted from the recollapse of a previous phase of the universe, gained currency merely because it avoided the issue of [divine] creation, not because there was the slightest evidence in favor of it” (211).

The naiveté of the view that an infinitely prolonged natural or spatiotemporal order of things needs no God would be readily apparent to philosophers, from Aquinas to Whitehead and beyond, who understand that an infinitely prolonged universe or set of successive universes would likely lack the complete self-sufficiency essential for naturalistic atheism and would be contingent upon God in many respects. For instance, God could and most likely would be required by each cosmic epoch to squeeze out any residual entropy or chaos inherited from an antecedent epoch, to select desirable laws (especially life-supporting ones) for each new universe, and to choose its initial conditions (like the quantity of stuff, energy, or mass in the universe, the strength of the basic physical forces, and the asymmetry of matter over antimatter—or *vice versa*). Process thought would add that God is essential to provide each spatiotemporal occasion in every epoch with an “initial aim” that includes novel possibilities to be creatively actualized by the choice or initiative of every creature, and that God preserves and cherishes forever in his faultless memory the values created by existing individuals in each cosmic epoch and gives them “objective immortality.”

Pure Oscillationism, which affirms a single infinitely prolonged strand of successive universes, has some stiff competition in contemporary scientific cosmology. The main competition comes from the “many worlds” view, or

what I call “Big Fizz Cosmology,” according to which both time *and space* are infinitely extended and creative. Space in today’s astrophysics is not just nothingness or an empty Newtonian or Kantian form that separates physical objects and processes. As Whitehead recognized, a lot is going on in so called “empty space” (*Science* 153-54; *Process* 92, 177, 199). Actual occasions constantly occur there, but they do not consolidate into persisting societies.

Today’s cosmologists are convinced that space itself is a kind of physical something, a field with its own physical properties, its own actualized mass/energy and density. It has a fine-grained foamy texture, best described by the laws of quantum physics; and it can be bent, stretched, shrunk, warped, vibrated, and knotted. The seemingly emptiest spatial regions are seething or bubbling with “virtual particles” awaiting birth or actualization. Scientific-minded cosmologists think that quantum indefiniteness allows these virtual or real potential particles to be converted briefly into actual particles, so long as they promptly cease to exist so as not to violate—for more than an instant—the principle of the conservation or constancy of energy (Misner 1202-03; Rozentel 88-95, 107-10; Linde 612-20; Gribbin, *Beginning* 244-55).

Matter and antimatter particles are constantly being created in empty space; usually they annihilate one another almost immediately, but not always. The cosmology proposed by highly influential Inflation Theory says that effervescent virtual particles occasionally escape from “empty space” into more enduring actuality, as allowed by the random fluctuations recognized by quantum theory, and then they inflate into an entire universe (Guth 167-87, 245-52; Ferris 349-66). This happens more than once; most inflation theorists think that it happens an infinite number of times to actualize every possible world.² Process thinkers should agree here with Hartshorne (and Leibniz) that the notion of actualizing every possibility is absurd since there are impossible possibilities within and among every conceivable world. Quantum Cosmologists seem to think that every possibility is actualized, even if it takes an entirely new universe to accommodate each one. Process thinkers dissent, however, on the grounds that for moral and aesthetic reasons, God would not create the innumerable horrible, trivial, or boring worlds that are logically possible.

Our spacetime system, the only one we can observe directly (at least in part), the one whose origins we can trace back to a chaotic Big Bang, originated around 15 billion years ago. All events that compose our spacetime system are causally connected with other events within that system, which is in principle traceable back to the Big Bang. The cause of the Bang itself lies outside our spacetime system; but it may or may not have been God.

Most Quantum Cosmologists, those who apply quantum theory to cosmological questions, hold that our universe is but one of infinitely many universes spawned, not by God, but by and from the near-nothingness of quantum-foamy empty space. According to this “many worlds” Big Fizz infla-

tionary scenario, the relevant infinitely fertile “empty space” is not a part of, does not belong to, our cosmic epoch. Big Fizz Cosmology postulates a transcendent quantum-fizzy Motherspacetime or Superspacetime within which infinitely many child-worlds or universes co-exist in infinitely extended space throughout infinite time. After child worlds are thus spawned, they may or may not then begin to oscillate.³

Let us consider the “many worlds” notion of infinite Superspace that supposedly accommodates an endless number of independently co-existing and spontaneously conceived child universes. According to cosmological theories widely accepted today, since infinite Superspace has always existed, it co-exists with infinite Supertime. When a spatiotemporally finite universe like ours expands, it pushes into pre-existing Superspacetime, not into absolute nothingness. Believe it or not, many scientific-minded cosmologists take all of this stuff very seriously!

Developments in contemporary cosmology outlined thus far may strike you as utterly wild speculation, having little or nothing to do with empirical natural science, even if it originates with professional astrophysicists. Indeed, it is just that! All postulated antecedent and contemporary universes, and the infinite Supertime and quantum-foamy Superspace within which they are located, transcend our cosmic epoch and are totally inaccessible to human experience. They exist before and beyond our spacetime system in a time prior to the beginning of our time and in a space beyond and outside of our space, so we can never observe them. They are supernatural realities, if real at all, that transcend our system of nature or spacetime. If they exist, they are supernatural other worlds. Even science, if this is science, cannot get along without the supernatural. As philosophy postulates or explanatory hypotheses, their reality (or lack thereof) can be considered and debated; but that would take us far beyond the scope of this article. To get the intricate details of that, you must await the publication of my *What Caused the Big Bang?* It should be obvious to anyone, however, that any explanatory appeal to realities that transcend our spatiotemporal natural order of things always leaves empirical natural science far behind. Hereafter, “scientific” cosmology will appear in quotes.

So, what does this have to do with creation *ex nihilo*? The concept of transcendent Superspacetime developed by Big Fizz Cosmologists is purely theoretical and has nothing to do with verifiable natural science, but it may nevertheless be extremely useful to theologians! I began by saying that process theologians have been unable to conceive how to make sense out of creation *ex nihilo* and still affirm infinite Divine creativity, love, sociality, and embodiment. This is largely because they assumed that finite space is the only possible complement to infinite time. Hartshorne, for instance, says that “the divine actuality so far as I can grasp the relevant concepts, must involve a numerically infinite number of past creatures, but the creation need not, and

I think must not, be spatially infinite" ("Martin" 74); and he repeatedly asserts the finitude of space while affirming the infinity of time. (*Creative* 30, 125, 126) By default, if in no other way, other process theologians seem to agree.

What would happen if, *contra* Hartshorne, the conceptual framework of process theology were expanded to include not only Hartshorne's infinite Supertime, but also the infinite Superspace postulated by so many contemporary "scientific" cosmologists? Here, our objective is simply to extend our way of *conceiving* of the arena of infinite Divine creativity, love, sociability, and embodiment; and this has nothing to do with *verifying* propositions about other transcendent worlds, which we mortals could never do. Neither infinite Supertime (previously assumed or affirmed by process theology) nor infinite Superspace (hitherto denied by process theology) are verifiable by us. Only God could do the job.

Within infinite Divine Superspacetime, God could be infinitely loving, social, embodied, and creative without being tied to a single temporal strand of spatially finite antecedent-and-successive universes. Within infinite Superspace and throughout infinite Supertime, God could create many co-existing universes out of nothing, or nothing more than "empty" Superspace itself; and God could be infinitely creative, social, loving, and embodied in relation to them. No co-existing universes would *have* to be created out of antecedent universes, although some might be. As God wills, some or all co-existing universes could be completely independent causally of all the others, so the crucial barrier between mainstream process theology and traditional Christian theology would no longer exist.

Divine creation of universes *ex nihilo*, thus understood, always *presupposes* other actualities, i.e., God's embodiment *somewhere* in Superspacetime, but actual universes or Divine bodies *need not be created out of* other actualities, such as temporally antecedent universes. Process theologians can consistently affirm that throughout everlasting Supertime, God may create, as willed, many independently existing universes out of nothing, or the near-nothingness of "empty" Superspace; and that if, once initiated, some universes form an oscillating series, this is not true of our universe, which God could have created *ex nihilo*.

In infinite Superspacetime, all child universes could be so far removed from every other—infinately far apart if necessary—that they could never contact or causally influence one another or be derived causally from preceding universes. Or, if God wills, some might have tangential contacts with others, being connected perhaps by wormholes or creative acts of God. Some of these co-existing child universes might even be Heaven, Purgatory, or Hell; and God might be able to figure out how to get us from one to the other! "Beam us over, God!" After we die, God could just re-constitute us in transformed and much improved resurrected bodies (as John Hick suggests) in the spacetime of another world that co-exists with our universe in infinite

Superspacetime. Again, the point is just to conceive of such things, to make them intelligible, not to verify or confirm any beliefs we may have about them.

The concept of infinite Superspacetime is neither the Newtonian notion of absolute space and time, nor Einsteinian relativity spacetime. It derives not from classical or relativity physics but from quantum physics applied imaginatively to cosmology. My suggestion that God might recreate an improved edition of us in another co-existing spacetime system is not as un-Whiteheadian as it may seem. If order, as we know it, is usually a complex emergent achievement from pre-existing order, this could not be true of creation *ex nihilo*; and even if true, in light of what quantum physicists have discovered about non-local causality we can no longer assume that all causal influence requires spatiotemporal contiguity or proximity. Even the telepathy in which Whitehead believed (*Process* 253, 308) did not presuppose that. According to quantum physics, what Einstein called "spooky action at a distance" is a reality; and within Superspacetime, that action could transcend local universes. Whether it actually does or not, we do not know.

If God is actualized in both infinite Supertime and infinite Superspace, the everlastingness of divine sociality, love, and creativity would not be subverted if a finite universe like ours was created out of nothing about fifteen billion years ago. Why should God's everlasting creativity be tied to a single temporal strand of spatially finite universes, of which ours is the most recent member? God could be everlastingly creative in Superspace as well as in Supertime, where particular universes need not emerge from antecedent universes. To reconcile process theology with the creation of our universe *ex nihilo*, we need a concept of Divine Superspacetime as God's sensorium and arena for infinite creativity, as further explained in the following discussion. If my analysis is successful, process theology should adopt the view that God's potential embodiment is coextensive with infinite Superspacetime; and God's actual embodiment is coextensive with all the worlds God has chosen to actualize within Superspacetime. God's present body is not confined to our finite Big Bang spacetime epoch, which may or may not have antecedents, depending on the plausibility of Oscillationism.

Taking the general concept of Motherspacetime or Superspacetime from contemporary "many worlds" cosmology does not and should not commit process theology to much of the baggage that has been attached to it. Process thinkers will want to reject the Principle of Plenitude, so popular with today's "scientific" cosmologists, according to which all possible worlds are actual worlds. Instead, in infinite Superspacetime, God creates all the worlds that God chooses, but not all possible worlds. For many good reasons, God is not driven by the ideal of Plenitude, which requires the creation of *all* possible worlds. God may have created an infinite number of worlds in Superspacetime, but God understands that infinity cannot be used up and that an infinite

number will always remain to be created. God also realizes that many possible worlds are too horrible, or too trivial and boring, to be created at all. As Whitehead noted, "It is not true that God is in all respects infinite. If He were, He would be evil as well as good" (*Religion* 153). Divine Superspacetime need not be conceived as resembling the quantum-foamy spacetime of our universe, in which actual particle-occasions are constantly emerging spontaneously but briefly from virtuality. Instead, Superspacetime is God's arena for deliberate but selective creativity; and it has all the properties that God wants to give to it, even though we may not know what they are.

Mainstream process theologians were unable to conceive of creation *ex nihilo* because they were wedded, implicitly if not explicitly, to the model of a single strand of spatially finite oscillating universes extending infinitely into the past, each member of which arises causally from both God and from its immediate predecessor. Hartshorne affirmed "an infinity of earlier universes, each produced out of its predecessor, more or less catastrophically or gradually"; but God created them all, including our universe, out of their predecessors (*Man's* 94; see also 234, 239). This cosmological model precludes the possibility that a universe could arise causally only from God at some point in the finite past—the essence of creation *ex nihilo*. It assumes that God's infinite creativity was only temporally ordered; but it may also be spatially ordered as Divine Superspacetime, where God might be everlastingly creative of multiple universes that have no causal relations with *our* system of spacetime; and our system of spacetime could arise directly from God's Superspacetime and creative will alone, without being preceded by antecedent universes. Other universes or cosmic epochs could be "beyond" ours spatially, to use Whitehead's word for it, without being "before" ours temporally, as mainstream process theology has assumed.

II. Elements of Superspacetime in Process Thought

Elements out of which a theory of Divine Superspacetime can be constructed already exist in process theology. In discussing the possible existence of many independent worlds in an essay in *Essays in Science and Philosophy*, Whitehead proposed that and how we might conceive of independently existing universes that have no causal, temporal, or even spatial relations with one another:

We can imagine that, in the realm of existence, there may be an alternative space-time process other than that of nature; but nature and the alternative process do not conjoin to make one process. In fact we are aware of such alternative processes in dreams, where we apprehend a process of events which in respect to nature are nowhere and at no time. (144)

Despite any philosophical problems one might find with Whitehead's dream world proposal, this shows that the idea of multiple worlds is not entirely alien to process thought. However, the most effective and trouble-free way to conceive of independent worlds and to relate process theology to contempo-

rary Big Bang cosmology is to think of other worlds as co-existing, not in dreams, but within Divine Superspacetime, within which some worlds (like ours) could be created deliberately out of nothing, i.e., out of the real potentiality and virtuality of genuinely "empty space."

Whitehead was unaware of Big Bang cosmology, as Cobb indicates. Hartshorne, by contrast, was well aware of it; but he neither made a serious and detailed attempt to relate his cosmological commitments to it nor verbally affirmed Oscillationism. However, he clearly has a concept of Divine Supertime, i.e., of God's time before (and after) our time, the time of our 15 billion year old universe. He wrote:

Certainly someone ought to correlate metaphysics and physics. For instance, even if the supreme reality is a kind of becoming, then it seems there must be a sort of divine time (even Barth says something like this), and the correlation of this with worldly time, as construed by relativity physics, is a neglected and apparently extremely formidable task. Perhaps this is rather a problem in cosmology than in pure metaphysics, cosmology being the application of metaphysical principles to what science reveals as the structure of our "cosmic epoch." Yet unless either physicists or metaphysicians have erred, there must be an at least *possible* way of harmonizing what the physicists say is true of our cosmic epoch and what metaphysicians say is true of all possible epochs. (*Creative* 53-54)

As we have seen, today's "scientific" cosmologists do not restrict themselves only to our epoch, but this just makes them metaphysicians in disguise! I suggest that today's metaphysical (and only pseudo-scientific) cosmologists have done process theologians a great service in providing us with a concept of Superspace to complement the Supertime that Hartshorne and mainstream process theologians postulate to accommodate antecedent cosmic epochs. Superspacetime is the proverbial transcendent space beyond our space and time before our time. Although the concept of Superspacetime originated with an infinitely many worlds atheism, it can be united with the process concept of God to form the notion of a Divine Superspacetime, within which both infinite divine creativity and universes created out of nothing are possible and conceivable. If time and space are inseparable, as process thought and contemporary physics both suggest, then divine Supertime, affirmed by Hartshorne, also implies divine Superspace. Divine Superspace can be more inclusive than the finite space of our own and preceding oscillating epochs; it can embrace other co-existing universes.

In all likelihood, Hartshorne had only the spacetime of our cosmic epoch, (or similar antecedent oscillating epochs) in mind in insisting upon the finitude of space. If so, his insistence on the spatial finitude of our cosmos in no way conflicts with affirming infinite Superspacetime as the ultimate arena for divine creativity. As far as I have been able to determine, Hartshorne does not give a good argument for his insistence that space must be finite. He just affirms spatial finitude without argument, as if it were intuitively certain or

obvious, which it clearly is not to contemporary “scientific” cosmologists; but his writings were never informed by the concept of Superspacetime that they have developed. A good argument for the finitude of our space can be given as follows: at or immediately after the onset of the Big Bang, the space of our universe began as finite (slightly larger than a singularity); it has since expanded at a finite rate (the Hubble constant or cosmic expansion rate, plus perhaps a brief exponential but still finite inflation rate); and the expansion has endured for only a finite amount of time (about 15 billion years). From these premises we can conclude that our space is finite. A parallel argument shows that our time is finite and has a “first moment”; but this is perfectly compatible with the idea that our finite spacetime exists within and is expanding into the “empty” quantum-foamy virtuality of infinite Superspacetime, which has no “first moment.”

One might conjecture, as suggested to me by Lewis Ford, that Hartshorne would argue for the finitude of space by appealing to the premise that there can be no actualized infinities at all, that such things are unintelligible, from which we could conclude that there can be no actualized infinity of space, that space is finite. Yes, but when reflecting on the far distant past, Hartshorne bites the bullet and reluctantly admits that process thinkers must affirm an actual infinity if they hold that each creaturely event is created out of some other creaturely event—*ad infinitum*; otherwise one must affirm creation *ex nihilo*! (*Creative* 63, 65, 125, 126). In these passages, Hartshorne clearly affirms an actual, not just a potential, infinity of past events for our world and for God. Anyone who wants to avoid creation *ex nihilo* is logically committed to an actualized infinity and thus must repudiate the above argument that space is finite.

As quoted earlier, Cobb says that process theologians accept Whitehead’s notion of distinct “cosmic epochs.” Whitehead invented this terminology, though he was not very specific about its scope. Under the influence of early quantum theory in the 1920s, Whitehead thought that our own cosmic epoch is dominated by electromagnetic energy that exists only in discrete quanta, and he defined a “cosmic epoch” as “the widest society of actual entities whose immediate relevance to ourselves is traceable” (*Process* 91). Our present cosmic epoch can be traced “to an aboriginal disorder, chaotic according to our ideals” (*Process* 95), Whitehead believed; but there are other cosmic epochs “far beyond our immediate cosmic epoch” that are ordered very differently from our own (*Process* 97). He knew nothing about Big Bang Cosmology, which was still in its infancy when these words appeared in *Process and Reality* in 1929; and he did not explain whether his “beyond” is to be construed spatially, temporally, or both. Mainstream process theology has interpreted Whitehead’s wording temporally; but “widest” and “beyond” are actually spatial words, not temporal words; and he did not say “oldest” or “before.” Perhaps Whitehead spoke better than he knew! Or perhaps he knew

about Superspace as well as Supertime! Isn't it just his "extensive continuum" construed not simply as the realm of "real potentiality" for our own cosmic epoch, but "in its full generality beyond the present epoch"? (*Process* 66, 97, 288-89). Notice especially his emphasis on potentiality. The in-depth explication of Whitehead's concept of "extensive continuum" by Jorge Luis Nobo (205-18) is almost perfectly compatible with the understanding presupposed here. Whitehead distinguishes this more general extensive continuum from that of our own epoch, which is dominated by societies of electromagnetic occasions (*Process* 98). He describes it in *Process and Reality* as

a vast nexus extending far beyond our immediate cosmic epoch. It contains in itself other epochs with more particular characteristics incompatible with each other. [. . .] We cannot discriminate its other epochs of vigorous order [. . .] in our own epoch. This ultimate, vast society constitutes the whole environment within which our epoch is set [. . .]. (97)

Whitehead clearly uses the spatial word "beyond" rather than the temporal word "before" to refer to alternate cosmic epochs. He certainly does not say that our epoch's "whole environment" is merely temporal, as pure Oscillationism would have it. Co-existing universes in infinite Superspace are no more "traceable" by us than antecedent universes in infinite Supertime.

III. *Process Objections to Creation Ex Nihilo*

As documented at the beginning of this discussion, mainstream process theologians have clearly repudiated the traditional Christian belief in creation *ex nihilo*, and they have given a number of reasons for rejecting this belief. With one such reason I wholeheartedly agree, namely, that the (Protestant) *Bible* teaches only that our universe was ordered out of chaos, but not unequivocally that it was created out of nothing. (Edwards, *Reason* 172; Ford, *Lure* 21) Let us begin with the reasons that Cobb gives in his *Process and Faith* website discussion of "Is God Creator *Ex Nihilo*?"

First, Cobb explains, the traditional theology of creation out of nothing reserves the word "creation"[. . .] for a single act, the one in which the world is brought into being out of nothing." To this he opposes the process view that "God is creatively at work at all times and places." However, there is no real opposition between these positions. Whether Cobb intends to make a historical point or a logical point here is unclear, but much of the hostility of mainstream process theologians toward creation out of nothing may issue from confusing historical associations with logical connections. It is true historically that traditional Christian theology tended to reserve the word "creation" for God's origination of our universe from nothing, but it did not deny that God is creatively at work at all times and places. It just used other words for God's ongoing creativity, words like "sustaining" the universe and exercising general and special "providence" over and within it.

Of course, traditional concepts of God's sustaining and providential activities were usually qualified by the deterministic or predestinationistic assumption that everything that happens is implicit in creation itself from the very outset, or from the immutable vantage point of God's changeless eternity. Perhaps something like this is what Cobb has in mind. In their *Process Theology: An Introductory Exposition*, Cobb and Griffin raise this more subtle metaphysical objection. They tell us that the doctrine of creation out of absolute nothingness "is part and parcel of the doctrine of God as absolute controller"(64).

However, viewed logically rather than historically, creation out of nothing, ongoing creation, and the creation of co-creative creatures are in no way incompatible with one another. Creation out of nothing is logically contradicted by the mainstream process assumption of creation out of something, but not by the notion of God's ongoing creative activity within our world; and God's creating co-creative creatures is logically contradicted by the traditional notion of creating totally programmed non-creative creatures, but not by the notion of God's creating the universe out of nothing. No *logical* obstacles exist to combining creation *ex nihilo* with ongoing divine creativity and divine creation of co-creative creatures.

Cobb clearly wants to make a logical point when he says that "the implication of the doctrine of creation is that God is quite external to the world and the world quite external to God." Closely related is Cobb's charge that creation *ex nihilo* encouraged "exclusive emphasis on divine transcendence" ("God"). However, historically, classical theologians consistently affirmed God's immanence as omnipresence and made some solemn efforts to take this seriously; so it is not entirely true that classical theology made God and the world to be totally external to one another. The real difficulty is that what the classical theologians gave with one hand, they usually took away with the other. They did indeed characterize the contrast between God and the world so severely (pure being/pure becoming, pure cause/pure effect, spatially extended/incorporeal, etc.) that the two were "quite external" to and mutually exclusive of one another (Edwards, *Reason* 175).

Does creation out of nothing inevitably involve such catastrophic contrasts? I can't see that it does. The opposition here is between our universe or epoch as caused by both God plus a series of antecedent worlds extending infinitely into the past, and as caused solely by God at the beginning of its finite past. Both have God as a causal factor; the latter has only God. Necessary and everlasting Divine creativity, sociality, love, and embodiment presuppose the everlasting actualization of other universes *somewhere* in Superspacetime, but God's creative actualization need not be confined to a single line of temporally ordered and spatially finite cosmic epochs in Supertime, of which ours is the latest member. If the laws of quantum physics apply throughout Superspacetime and its products and are not limited just to our

spacetime and its antecedents, then every actualized universe is grounded in indeterminateness, spontaneity, and creativity, just as process metaphysics affirms. However, there is no *logical* necessity that "empty" Superspace be quantum-fizzy. A purely Newtonian Superspace is at least *logically conceivable*.

Cobb himself recognizes that "the event in which our universe arose certainly seems to be markedly different from all the subsequent events" ("God"); and process metaphysics has its own ways of differentiating between God, the world, and occasions within the world without implying that God, the world, and finite occasions are "quite external" to one another.

Some process thinkers like the late Bowman Clarke are also in danger of making God and the world quite external to one another (See Edwards, "God"). They hold that God is merely a final cause who acts only by luring or persuading existing events, and that God is in no sense an efficient cause who acts by creating, infusing, or reordering energy. As final cause, God acts on actualities within the world only by providing them with their "initial aims," the relevant sets of possibilities, weighted slightly toward the good, from which they must create themselves. A neat solution to the problem of theodicy results: since God is not the efficient cause of anything, God could not be the efficient cause of evil; and God could not intervene in nature and human history to prevent the most horrendous evils because God lacks the causal power to do so. A good case can be made, however, for the claim that Whitehead's God is both an efficient and a final cause of events, that providing initial aims to actual occasions and choosing beneficent laws for created universes involves efficient as well as final causation (Edwards, "God" 52-55).

Because he defines the terms differently, David Griffin would not phrase his very similar position on theodicy in terms of "efficient" versus "final" causation. Griffin identifies efficient causation with transitions between occasions and final causation with the internal concrescence of occasions (*Evil* 101). This implies, unfortunately, that there can be no teleological, purposive, persuasive relations of final causation between actual occasions or entities—a conclusion that Griffin clearly would not want to accept. My preference is to define "final cause" in a more ordinary or Aristotelian sense that permits final or teleological causation both between and within actual entities. Griffin himself recognizes the legitimacy of this broader and more conventional meaning (*Evil* 100, see bottom paragraph).

Despite our terminological differences, Griffin's power-deficient God is not far removed from Bowman Clarke's. Griffin holds that God simply lacks the power to prevent evil, to create a universe out of nothing, or to bring about any effects where "persuasion" is not involved. (*Evil* 24-25, 99-100) But must process thinkers presume that persuasive final causation applies absolutely everywhere? Might there not be some "markedly different" situations, e.g., originating universe—creating the mass/energy out of which partly self-creative actual occasions emerge—in which God acts only as an efficient

cause without being a final cause in the sense of giving initial aims to occasions that issue from pre-existing societies? Insisting that God, who has His own aims for newly created universes, must be able to persuade everything by imparting initial aims to successive occasions could not apply before the first moment of creation *ex nihilo*. Before that, nothing exists to be persuaded; the first moment of creation out of nothing succeeds nothing. Beginning with the very first moment, however, something may exist to be persuaded. Of course, the absolutely original grandly unified and undifferentiated mass/energy presumed to exist at the very beginning of our Big Bang might not be susceptible to persuasion; but as soon as it is sufficiently unwound, expanded, and diversified to generate actual occasions, it would. We cannot simply equate physical energy with persuasive creativity; the basic physical conditions that make partly self-creative entities possible must come first. Dictating that persuasion must be exercised even on the non-existence that preceded our Big Bang is an irrational demand, like insisting that circles must be squared. Non-existence cannot be a co-creator with God; but from or very near the outset, a new universe created *ex nihilo* could be.

In his website discussion, Cobb relates the process view of infinitely prolonged ongoing creation to Big Bang cosmology by indicating that the latter calls for an initial "singularity" from which our universe emerged, and by expressing the doubt that this does not mean strictly "out of nothing" ("God"). About this, at least four points need to be made.

First, singularities are defined as being infinitely small, dense, compressed, hot, and curved; and they have no magnitude or locus in our spacetime since that is what emerged from the initial singularity. Some versions of Big Bang cosmology really do affirm that our universe emerged from a singularity. Clearly, however, something infinitely small *is* absolutely nothing empirically and physically. Not even God could perceive something infinitely small, and nothing can be physical that is absolutely devoid of all spatial properties, i.e., that has no size at all, because spatial extension is the very definition of the physical. As all modern philosophers agree, "All bodies are extended."

Initial singularities have many problems that make them cosmologically unattractive. In brief, being absolutely nothing empirically and physically is surely one of the most serious difficulties; another is that non-physical things cannot be physical causes, so an initial singularity does not provide a physical explanation for the origin of our universe. Closely related is the problem that no one knows what would make a singularity explode because no known laws of physics apply to them. Again, cosmic epochs separated by singularities could not belong to a single, continuous, spatiotemporal, causal sequence because space, time, physical causation, and all natural laws break down completely and do not exist in or apply to singularities. Yet again, we could not reason back to singularities separating cosmic epochs or to even earlier epochs by

extrapolating from the natural laws that we know because these laws presuppose spacetime for their application and terminate absolutely at singularities.

Second, Oscillation Cosmology is not bound inextricably to the idea that successive universes arise from and are separated by singularities. Many contemporary Oscillationists agree with Stephen Hawking that quantum effects would prevent a prior universe undergoing gravitational collapse from shrinking to a singularity (50, 113, 132-36). According to Big Bounce Oscillationists, a universe or cosmic epoch being terminated by a Big Crunch would rebound from a small finite state of intense compaction into a subsequent cosmic epoch initiated by a Big Bang without first proceeding all the way to total collapse into an infinitely condensed singularity. (Markov 333-55; Barrow and Dabroski 851, 858; Gribbin, *Beginning* 166) As Cobb indicates, Whitehead thought "of cosmic epochs evolving out of earlier cosmic epochs with no singularities involved" ("God"). Process Oscillationists would presumably find Big Bounce Oscillationism very congenial, for it requires no singularities between crunch/bounces. It has its own problems, which I cannot discuss here, but by appealing to it Process Oscillationism could affirm a Big Bang that rebounds from an antecedent universe without having to embrace troublesome singularities.

Third, our universe may not be derived from a singularity or a crunched-up antecedent cosmic epoch at all. If and when singularities form at the end of a Big Crunch, why don't they just stay there forever? No one knows what would cause a singularity to explode. No physical laws that we know could account for it, for all of them break down in singularities. The quantum fluctuations to which Inflationary Cosmology appeals would not do the job because they presuppose the laws of quantum physics, which, along with all other natural laws, would also break down in singularities. Inflationary Cosmology does not derive its many worlds from singularities or from crunched-up antecedent universes. Inflation requires just the right kind of quantum-foamy "empty space" in Superspacetime; and singularities and crunches just aren't the right stuff!

For the reasons just given, with or without singularities, Process Cosmology need not and should not give an oscillationistic account of the origin of our universe. The most plausible view is that our world or cosmic epoch was not created out of a preceding universe. Instead it was created out of nothing (without antecedents) within divine Superspacetime. If our low mass universe is open, as it now appears to be, especially in light of the very recent revolutionary discovery that the rate of Hubble expansion is increasing, not decreasing as previously assumed,⁴ then our universe does not belong within any kind of an oscillating series because all members of such a series must be closed to sustain infinite oscillations.

Fourth, Cobb doubts that the nothingness to which contemporary cosmologist appeal is really nothing. Although singularities are empirically nothing

and have many other problems, what about the “empty space” of Superspacetime? Well, it is not a full-fledged antecedent universe, so we are at least that close to creation out of nothing. Superspacetime may but need not have the actualized quantum-foamy physical mass/density that contemporary cosmologists assign to “empty space” within our existing spacetime system; on no empirical or scientific grounds can we infer that Superspacetime is like our universe’s quantum-fizzy spacetime “vacuum.” It could be closer to a realm of real potentialities than to an actualized energy field. Aside from the co-existing universes that God has created, Superspacetime could consist mainly of potential rather than actual occasions; and nothing is to potentiality as something is to actuality. As the everlasting arena for creativity, Divine Superspacetime is God’s infinitely extensive potency for creativity and social sensitivity. Its “spontaneity” is God’s well-considered selectivity. The actualized regions of Divine Superspacetime would contain not all possible worlds, but only those universes deemed desirable by an infinitely loving Creator. Just how many co-existing worlds there are only God knows; but at least one universe must exist in perpetuity to satisfy God’s loving, social, creative nature and the plausible requirement that all minds are embodied. Any number of successive and/or co-existing universes could come and go, given an infinite amount of time to play with them. Unlike us, God doesn’t have to rush to do anything. Presumably, as many universes would co-exist as God freely chooses to be involved with; but only God knows how many. The view proposed here does not locate God entirely outside of our cosmos. It allows for all the divine immanence that metaphysics and religion find desirable; but it recognizes, as do most process theologians, that the everlasting and omnipresent features of divinity, God’s primordial nature, does transcend our cosmic epoch. It also does not violate Whitehead’s ontological principle, according to which explanatory reasons are always located in actual entities, but not necessarily in actual occasions (*Process* 19). God is not located in Superspacetime; rather, it is located in God, the ultimate actual entity, without whom there would be no space, no time, no actuality, no potentiality.

Finally, Hartshorne argues very explicitly that the finitude of past time is inconceivable. After conceding that if we conceive of the past as infinite, what we could know of it is “negligibly small,” he then argues:

Conceive of it as finite, and then it seems fairly clear that we never grasp what is meant by a first stage of creation, a process preceded by no process. All our thinking seems to break down at that point. We would have either an effect of an inconceivable cause, or something which simply transcended the causal idea, and hence our concept for explaining concrete things. (*Wisdom* 96)

In response, we must distinguish the finitude of our our spacetime, which is conceivable, from the infinitude of Superspacetime. Creation of our universe *ex nihilo* does not presume an absolute “process preceded by no process.”

It presupposes the everlasting processing of Divine creativity, which need not be located solely in oscillationist Supertime but could be expressed in many worlds that either co-exist within and/or are created successively within Divine Superspacetime. If so, God's occasions or experiences of created worlds would always be preceded by other divine occasions or experiences, even if the series of occasions that constitute our world originated *ex nihilo* around fifteen billion years ago. The God of process theology can be both the final (purposive), efficient (creating *ex nihilo*), and formal (the Divine vision of eternal objects) cause of a universe created out of nothing. If efficient causation acts from the past to the present, God's creative act of bringing our world into being out of nothing could be in God's past without being in our world's past. Creation *ex nihilo* is possible and conceivable without violating the "no process preceded by no process" principle from God's perspective, though it might seem so from a non-process-theism human perspective. If the "all creation" refers to Superspacetime, God could still be "not *before* all creation but *with* all creation" (Whitehead, *Process* 343) while definitely and necessarily existing "before" the creation of our spacetime system fifteen billion or so years ago.

Is it God as transcendent cause, or the world as an *ex nihilo* effect, that Hartshorne regards as inconceivable?

If God is everlastingly creative in Superspacetime, God's creation of our universe out of nothing would not be an inconceivable effect of "an inconceivable cause" because God, the cause, really is conceivable, at least in the abstract. Hartshorne has argued extensively and persuasively that we can and do have an abstract concept of God (the cause) without knowing God's full concreteness. The crucial issue is whether a universe caused by God alone is any less conceivable than a universe produced by God out of an antecedent universe. If God is conceivable at all, then a universe caused by God alone would not result from an "inconceivable cause." Perhaps it is inconceivable that a necessarily creative, loving, social, and embodied Supreme Becoming should exist without having created anything to love, but other universes in Superspacetime having no causal relations with our own epoch could fill the bill.

Hartshorne's main point could be that a universe created out of nothing would be an inconceivable effect. I contend, and I believe Hartshorne would agree, that the notion of causation as such is broader than that of physical, i.e., spatiotemporal, causation. It is the notion of conditions that are either necessary and/or sufficient for producing an effect. Even if, contrary to the absolute incorporeality and timelessness of the classical God, all efficient causal conditions must be in some sense spatiotemporal, then the relevant spatiotemporality for creation *ex nihilo* could just be transcendent Divine Superspacetime; it need not be the spacetime of an antecedent universe from which our universe was causally derived. Our Big Bang could have been

created out of nothing within God's Superspacetime without violating any defensible presupposition of process theology.

Thus, subtle and not so subtle replies can be given to the central objections that mainstream process theologians have raised against the traditional doctrine of creation *ex nihilo*. The preceding account of how process theology can accommodate creation *ex nihilo* may need a bit more tweaking and development here and there; but its affirmation would permit process theology to avoid alienating those more conventional Christians who are convinced that in the beginning, God created our universe out of nothing.

Notes

1. See Barrow, Gribbin, Rees, and Markov. Here and in the discussion to follow, I will try to give a few examples of contemporary scientific cosmologists who hold or discuss the positions that I identify. My claims about what Oscillationists and other contemporary scientific cosmologists affirm are much more extensively documented in my as yet unpublished book titled *What Caused the Big Bang?*
2. See Guth 15, 247-48; Rozental 91, 97, 124; Drees 51, 63-64, 97; Linde 607, 618, 620-21; Gribbin, *Beginning* 245.
3. See Rozental 8, 122-24; Drees 46-52; Linde 620, 625, 626-27; Gribbin, *Beginning* 244-55.
4. See Ann K. Finkbeiner, "Cosmic Yardsticks: Supernovae and the Fate of the Universe," James Glanz, "Breakthrough of the Year: Astronomy: Cosmic Motion Revealed," and James Glanz, "American Physical Society: Celebrating a Century of Physics, en Masse."

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