

The Preposterous Peter Lynds' Finite Universe without Beginning or End: A Critique

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1. Introduction

In this article we discuss the philosophical and physical aspects of the alleged ideas of a universe that is finite, however has neither a beginning nor an end as proposed by Peter Lynds, who has been recently established and endorsed as a "ground-breaking" figure of revolutionary concepts about physics paradoxes. Although his claims about our universe are not overly new, it is of great importance to examine his hypotheses and deductions framed in his article "*On a Finite Universe with no Beginning or End*", which can be traced via his home page. We demonstrate using logical premises and scientific findings, that such allegations about the universe are fallacious and do not stand against acute reason and cosmological observations.

Hypothetical models swarmed with primary mistakes in modern science about our ultimate universe, are essentially related to confusing both the physical and "objective" times with each other as done by Peter Lynds. For this renders cosmologists and physicists advancing premises that are scarcely devoid of errors and logically inconsistent statements. Thus they reach blundered conclusions about the cosmos without providing any evidence of justification beforehand. Another factor of their flaw to establishing an epistemological or scientific theory of the substantial universe is the tendency to acting under the enticement of the illusion, which is the imagination to judge what you have not ever seen according to what you see. Before proceeding thoroughly in pointing out the major shortcomings of Lynds' paper, lets establish in the outset to some logical basis, since Lynds' paper "is sitting somewhere between physics and philosophy" as he stated.

2. The correlation principle

In their book¹ "*Endless Universe: Beyond the Big Bang*", Paul Steinhardt and Neil Turok declared that "there is still one niggling problem: the universe had to have started out in such a precise -and unlikely- state that it seemed as if it must have been created rather than just having happened". Let's check whether this unlikelihood of creation is de facto justified or else, in the light of scientific logic. Nobody disagrees -I suppose- that science is about discovering and perceiving entities as they are in reality, and is about what can or cannot be verified, not about what we desire to be true. Then the question to follow is: how can we prove or disprove the universe *sans* creation? This seems at first glance rather a paradox in the scientific prospect, since it is still materially perplexing to some cosmologists despite the fact the big bang theory provides in regard to creation in time . If scientists are reluctant to accept creation of the universe from *ex nihilo*, how can one establish the criteria to judge the veracity of a metaphysical question as such and give an answer to it? The answer is to stick to the act of reason, since epistemological facts are gained when the mental conceptions become concomitantly identical with external reality, and once this certitude occurs then science (knowledge) is fulfilled and yields a fruitful outcome. The proper method to achieve such certitude I believe, is to revert to the *correlation principle*, which is basically the work of the intellect via syllogism. i.e., we posit a premise regarding the natural or metaphysical subject matter, and then scrutinise the effects and consequences concurrent with this proposition. If- after examination- these effects are existent, then the hypothesis is correct and the likelihood raises to a scientific truthful sureness, otherwise one resorts to another supposition and do the inspection again, analyse and so forth. Thus using some constraints and straitening procedure to sift off the factual and drop out the unfeasible propositions provides scientific certitude. Since all what the reason requires for a credible comprehension is the rational certainty (intellectual conception) in the first place, and the concordance of this certainty with external reality secondly. Once this condition- the concordance- is abided, there is no reason to exclude this certitude from the scientific domain. In other

words, the difference between the intellectual certainty and the certainty resultant from sensible experiments of natural phenomena, becomes ipso facto indiscernible.

3. Negation of Lynds' model

Having established for the yardstick of adjudicating a natural phenomenon via the act of reason, let's inquire about a beginningless universe; a universe in this sense that existed haphazardly or created itself, and check the logical content of such assumption. Lynds, quoting Kant stated: "the notions of the universe having no beginning and stretching back infinitely in time, versus its beginning at some finite time in the past, were equally contradictory". He digressed: "if the universe had no beginning, there would be an infinite period of time before any event". This idea was absurd to Kant, Lynds added. Consequently, Lynds wonders if the universe did have a start; what caused this action? And did time pass before that? These were and still perplexing and fundamental questions to cosmology: what caused the big bang and where did matter (visible and dark) come from? Hence Lynds espoused a conjectured model to give an answer to such paradoxical issues. The model he stresses, is agreeable with general relativity and standard hot big bang theory. The corollary of his model is a universe without beginning or end however, finite and provides a solution to the "mystery" of its origin as well as to Kant's paradox.

First of all, there is antinomy in saying the universe is per se finite without beginning or end. Because, if the universe is finite which is emphatically so, though it has a shape with no boundaries, then it must have had initiated at a particular time long ago. The finiteness of the cosmos logically implies its creation, and what is created is never infinite in time and space, and is not self-sustainable either. The universe is bound to be finite since it is impossible that an empty space exists externally to our world as shown by Al Kindy and Al Ghazaly before. Any existing object around us is finite, and this includes time itself which is finite too, since we cannot deny that we feel it at present and that it ran and passed until today. If time had no beginning it would have not reached to this very instant, but rather would have remained in the past. The One Who created time with a start attribution is the Exalted Creator; the *raison d'être*.

Now in reliance upon the correlation principle, one educes that the evolvement of the universe from one particular state to another encompassing all existents, is compelling to rationally believe that it emerged after it had been in a state of nihility. For, if the cosmos were eternal with no beginning it would have attained and maintained such unique state. However, this is absolutely in contrast to what observational cosmology indicates, and we need not turn a blind eye to the strong correlation between the evolution of the universe and its creation. Thus the universe is created from nothingness at a particular instant of time, and the issue of a without-beginning cosmos is untenable. As the universe stemmed from a creation process, there are according to the ruling of the *excluded middle* two possibilities; the universe either be created or a creator of its own, and since it is evident that we observe an evolving universe, hence the latter is not self-sustainable and thus incapable of creating itself. Further, the finitude of the cosmos implies its insufficiency which ensues from the fact that it is created by someone external to it. Thus the consequence is that this whole universe was not emerged by mere coincidence, but rather by a Supreme and Almighty Creator, Who will bring this world to an end, and Who by no means is playing dice! This fact can be made clear using mathematics, following the renowned Roger Penrose who calculated the probability P to have a cosmos created accidentally and found that ($P \sim 1/10^{10^{23}}$), which is considered mathematically zero².

In case one assumes the world was created via a self-reaction mechanism between existence and nonentity until existence lastly prevailed, we could directly observe that this thesis is a total falsehood. The reason is due to the fact that the single thing cannot simultaneously be a cause and effect of itself; i.e., it is contradictory to propose the universe in a state of nihility to have had caused itself. In other words, to achieve superiority of a thing over another, an external cause is a necessary, since things tend to remain as they are till acted upon by an operator or force to alter their states. Further, to suggest that the universe is beginningless is tantamount to saying it is ancient and sempiternal, through becoming and progression it existed and still evolving up to the very moment. The answer to this incoherence is that the cosmos altogether is but a concatenation of causes and effects. To presume also the preexistence of the universe establishes for the concatenation of objective causes endlessly to infinity,

and this is logically fallacious. Instead, the concatenation must revert to a self-existing entity; the Causer of causes, that is the One God. Newton, working on his mathematical formulation of gravity, declared he knew nothing about the cause of it:

"Hitherto, we have explained the phenomena of the heavens and of our sea by the power of gravity, but have not yet assigned the cause of this power. This is certain that it must proceed from a cause that penetrates of its force.....Hitherto, I have not been able to discover the cause of those properties of gravity from the phenomena, and I frame no hypothesis"³.

The One Who provides sustenance to existents made causality a magnificent principle for man's intellect to ponder about the universe and its Creator. One must not, however, reach a conclusion that the world is always deterministically founded on the system of causality as embraced by some classical physicists and materialists. This causality can be violated whenever willed by the Reason of Causes, and it is no surprise that this is rationally likely, as man is urged to contemplate beyond what he always observes of the apparent coupling of the cause and effect, and to think deeply beyond the efficacy of causes and to search for the ultimate source behind creation. The splendour and preciseness of the world, as well as its perfection and excellence are compelling also to persuade man-of-no-preconceptions that it is the act of the Absolute Creator. The big bang sounds a paradox only to those who are unwilling to accept the creation of the universe from nullity. The cataclysmic explosion marked the creation and beginning of the universe which had been since set up in expansion. Gravity, which is one of the four forces of nature, is dominating at large scales and is attractive, pulling objects to one another. What is really bewildering is how different parts of the universe started simultaneous expansion? And what caused this synchronisation and gave the command?, as Andrei Linde inquired⁴. Atoms, particles and all sort of our world's constituents would have been otherwise spread out and propagated chaotically in space. However, the contrary happened and a very highly ordered and synchronised cosmos emerged with precise laws governing its behaviour. It is stunning that the gravitational force is contracting and not expanding, nonetheless it dominates the expanding universe. H. Lispon, an antagonist of the big bang theory, reluctantly admitted the truth of creation as he said⁵:

"If living matter is not, then caused by the interplay of atoms, natural forces, and radiation, how has it come into being?.....I think, however, that we must admit that the only acceptable explanation is creation. I know that this is anathema to physicists, as indeed is to me, but we must not reject that we do not like if the experimental evidence supports it".

Even Fred Hoyle the well known astronomer, who also opposed the big bang theory on the basis of his materialistic tenet, confessed⁶:

"The Big Bang theory holds that the universe began with a single explosion. Yet as can be seen below, an explosion merely throws matter apart, while the big bang has mysteriously produced the opposite effect- with matter clumping together in the form of galaxies".

There is also the staggering equilibrium between the attraction forces and the speed of expansion, which was delicately fine-tuned to avoid the premature collapse of the cosmos during birth, and the utter splattering of its material forever in case the rate of expansion was a bit faster. If the rate of expansion had altered by a factor of 10^{-18} of a second, there would have been no existing universe. Paul Davies acknowledges this extraordinary fact⁷:

"Careful measurements puts the rate of expansion very close to a critical value at which the universe will just escape its own gravity and expand forever. A little slower and the cosmos would collapse, a little faster and the cosmic material would have long ago completely dispersed. It is interesting to ask precisely how delicately the rate of expansion has been "fine tuned" to fall on this narrow dividing line between two catastrophes.....The explosive vigour of the universe is thus matched with almost unbelievable accuracy to its gravitating power. The big bang was not evidently, any old bang, but an explosion of exquisitely arranged magnitude".

All of the above leads us to the realisation that this perfected and elegant universe is mastered by the All-Knowing Creator, Who caused the big bang and provided the matter of the cosmos and willed its creation.

4. Time prior to the existing universe

One of the questions raised in Lynds' paper was: what happened before the beginning of the universe? if it did have one, as he expressed. The argument in the previous section has proven the beginning of the universe. To answer the second part of the question one needs to get back to illustrating the notion of time, which on its own abstract concept is meaningless unless we speak of intervals of time i.e., measurements by clocks. One of the definitions of time is that dimension in which the system of cause and effect regarding natural phenomena occurs. Despite the abstract concept of time alone without physical measurement, one cannot deny its existence, since we feel it and witness its effects⁸. However, to make quantitative measurements of time intervals, we use clocks which need a reference point that can be defined by means of the motion of the heavenly objects. Time but the quantity by which the motion of an object is determined, and there is time assigned to every contingent being. As time is the dimension of the existence of a thing, and since such thing is materially existing hence it is moving. The movement requires extending space to occur, thus time identifies this extension of motion. Each materially being in nature is existing in a "circumstance of time". Accordingly one could grant that since the universe is occupying a space, hence it has time that started once the universe had been originated. Now based on the *Kalam Cosmological Argument*, which advances the premise that the temporal series of past events cannot be actually infinite, one concludes that if the universe did not exist at a finite time ago, then the current while could never arrive⁹. But we know for sure it has arrived, and the universe is thus finite in the past and existed at a willful moment of time.

In view of this, is it meaningful to wonder what happened before time? This question seems to arise solely from the incompetence of thinking of a period where no space-time existed before creation. It was the prominent Al Ghazali who brilliantly answered this intriguing question when he demonstrated the non-existence of such duration whichever finite or infinite prior to the emergence of the universe. Time had no existence before creation, yet it is only our imagination which insists on envisioning finite or infinite periods of time preceding the occurrence of the cosmos. Our reason fails in apprehending the beginning without "before" associated with it. This mind-boggling "before" man's illusion persistently thinks of is time. In addition, we keep imagining that beyond the universe there exists the void. The actual void has been long ago negated by philosophers such as Al Kindi and Al Ghazali as well. In his treatise on *Prime Philosophy*, Al Kindi showed the impossibility of an absolute void. Since the void is a place within which nothing is placed, the place and something to place are mutually related and non of which precedes the other. Hence if there exists a place, then there is something to be placed, and if there is something placed there ought to be a place. Therefore, Al Kindi concluded there exists no place without something placed in it. Thus the void cannot exist, since it is preposterous to have a place without something placed in which. Al Ghazali in this respect, posited the void as an empty space of infinite dimension. He proved that such emptiness beyond our universe cannot be sustainable, such that the distance is finite if there is a finite object since the distance is a function of the object. Thus there is no actual infinite spatial dimension beyond a finite object. As time is dependent on the motion performed by an object of finite dimensions beyond which there cannot be any spatial dimension, it is impossible for any temporal dimension finite or infinite to exist beyond it either. Hence durations sans creation are inconceivable, and it is beyond reason to ask what happened before the beginning of the universe.

5. Indeterminate universe between expansion and deceleration

In his conjectured model, Lynds also hypothesized a universe in which no initial or final conditions determine the course of events. This approach terminates causal interpretations of why the conditions at the big bang were so unique and of why the entropy of the universe was low at the beginning. There is nothing in reality that cannot be assigned some initial conditions, even the universe itself which arose from a point of infinite density. P. Davies explains that prior to the creation the universe did not exist, and even we liked that or not we must conclude that the universe's energy was somehow simply "put in" at the creation as an initial condition¹⁰. Initial or final conditions are mathematical terms by which the behaviour of an evolving mechanical system can be predicted via equations of motion. If one presumes no initial conditions of a particular system, it would be nearly impossible to investigate thoroughly its dynamics by means of mathematics. Lynds' exclusion of initial or final conditions is merely to justifying his perspectives of a cyclic universe; big bang to big crunch and vice versa. However, he tacitly implies the big bang as initial condition to the big crunch, and the latter as initial condition to the big bang infinitely despite the invalidity of such assumptions. In principle, it bears no

inconsistency at all to suppose the end of the universe to occur in a big crunch, because it is logically a permissible issue although not evidenced yet by observational verification. Rather it is irrational to suggest the creation of the universe via eternal cycles of big bang-big crunch mechanism from infinity. Yet, the problem is not only how to preserve the second law of thermodynamics from contravening, but it is deeply related to logical premises that must not lead to contradiction. An oscillating universe repeating itself infinitely at exactly the same time cannot stand against reason. An exhaustion of energy each cycle is inextricable, and at some point something to be created from nullity becomes a must¹¹.

This model is also groundless as this allows the universe per se to create and annihilate itself, be a cause and effect of its own. This, as we demonstrated previously, is fallacious. In addition, the infinite cycle of the big bang-big crunch is faced with another rational impasse. For if this process has been taking place infinitely, we could ask why did we not observe the big crunch last year or 1000 year ago or so? The solution to this tangled riddle is to grant that it is impossible to traverse the infinite. Since one can always add or subtract an event before arriving at infinity, which cannot after all be actually reached. This is entirely based on the premise that a process composed of successive addition cannot be actually infinite⁹. As the temporal series of past events is a process composed of successive addition, hence the temporal series of past events can't be actually infinite. W.L. Craig points out to the fact that the future is potentially infinite, as it does not exist; but the past is actual in contrast to the future, since it is verified that we have traces of the past in the present, but no traces of the future. The difference between the potential infinite and actual infinite is that the first increases towards infinity as a limit, but never reaches infinity so that it is *indefinite* than infinite. Whereas the actual infinite is a set in which a number of elements is really infinite, and not thriving towards infinity.

From the physics perspective, cosmic observations offer absolutely no support to a cyclic universe. Although there is no conclusive results to espouse a contracting universe, there are as well no grounds why a universe shrinking to a single point should explode and emerge again. The decisive discovery back in 1998 that the cosmic expansion was actually accelerating and not slowing under the influence of gravity sounded beyond belief. The direct observation of such cosmic acceleration of distant supernovae rendered the entire community overhauling the cosmic evolution and inspect the mass-energy content of our universe. About 75% of this content had to be formed by some exotic, gravitational repulsive matter that scientists know nothing about, and is called dark energy. The latter can be assigned an "equation of state" which in addition to mass, includes all forms of energy contributing to gravity. According to general relativity the strength of gravitational attraction is governed by a specific energy density ρ , and pressure p combined such that $\rho + 3p$, which is the equation of state¹². If p is negative then $(\rho + 3p) < 0$ thus turning gravity from an attractive to a repulsive force. Physicists alternatively introduce the quantity $w = p / \rho$ where w ought to be less than $-1/3$ to cause cosmic acceleration. The case when $w = -1$ i.e., the pressure p is equal and opposite to the energy density ρ , corresponds to Einstein's cosmological constant for which the energy density does not change in space and time. However, understanding truly the nature and essence of dark energy requires studying w as function of time, i.e., to find out about $w(t)$.

A quantum vacuum model of gravity cannot advocate a universe without beginning or end either, and solves no mystery of the origin of the universe at all. Quantum physics misleadingly entails that elementary particles and even space-time can be spontaneously created and annihilated within a vacuum. The risky and equivocal philosophical implication of such claims is that, there is a probability for a causeless creation from nothingness to occur in a vacuum, and this can be extended to our universe. This scenario, however, cannot be patronised since the quantum vacuum is not actually the nothingness or the void which is impossible to exist as discussed earlier. The vacuum in the quantum field theory is a space full of different types of matter and energy that are already existing. Some physicists call it the zero-point energy, others dub it the electromagnetic sea or the quantum fluctuations,...etc. There is no creation from nihility in this vacuum; what is really occurring in it is that conversion of energy into particles or adversely continually takes place. Further, introducing the notion of imaginary time to deny the non-existence of time prior to creation is a hopeless case. Hawking for instance, assimilated the expansion and contraction of the universe in chronological order as circles defining a cone, the sharp single point of which represents the start of the universe¹³. But he adamantly argued that this point is not "infinitely" abrupt, so that it is rounded in imaginary space-time. He concluded hence that a round and smooth corner is part of a circle and has no beginning, similarly to a circle which has no beginning. This implied that the universe did not come out of a very sharp point and had no beginning. The argument against Hawking's hypothesis can be furnished on two points. The first is that the imaginary time is meaningless and there is no basis to assume real time to

run after Planck time (10^{-44} s) of the big bang, and consider the temporal interval prior to that as imaginary just to evade timelessness. The second is the temporal quantum uncertainty (10^{-36} of a second) resulting from this tiny roundedness at the start of the universe is so small to bring about a substantive error in determining the timing of the universe at the beginning.

Regarding the notion of events temporally reversing, Lynds advanced the possibility that the order of events during the contraction phase should reverse in such a way that this order would still be in the direction in which the entropy was increasing. In this context, the violation of the second law of thermodynamics is escapable without any singularity encountered, and no law of physics would be breached as the big crunch is reversed. Issues like time reversal processes in physics are unquestionably important and have profound implications. Nonetheless, one has to be heedful to the epistemological and ontological theses associated with time reversibility. For we know that physical laws are discovered by humans and cast mathematically via relations or equations relating different parameters and variables. These laws cannot be completely applied to tackle the absolute ontology. The latter is assigned to philosophy or religion, which is transcendental over physics or mathematics with regard to the overwhelming view about the whole existence. For example, one can move either term of an equation from one side to the other by changing sign. This does not mean that one can transpose something from existence to nullity or vice versa. But rather it is the manipulation and verification of the factual and proven results. Similarly, the parameter representing time " t " often appears in formulae describing a physical phenomena, and can be assigned (+) or (-) within a mathematical framework or symmetry rules. Converting the (+) of " t " to (-) or vice versa in a physical law does not imply a real reverse from the present to the past or adversely in the real sense of time. This is idiomatic and only hypothetically possible in order to refer to a temporal direction characteristic to this system, and has nothing to do with the actuality of reversing the universal arrow of time, which we feel from cradle to grave. The one-directional passage of time is expressed in the second law of thermodynamics, which states that the disorder in isolated systems increases with time. The latter is also called the law of entropy which is described by Eddington as the supreme metaphysical law of the entire universe¹⁴. It is undoubtedly the blatant evidence for the intervention of the Transcendental Cause Who is firmly holding the universe. Associated with the arrow of time, this law defies man's capabilities to evade the inescapable destiny that he is heading always to the future. Once dead he will never return to this life, rather he is destined to a different life of which the laws of physics will peter out. The arrow of time is wholly cosmological and related to the consciousness of man. Shattered pieces of a glassy plate spread out on floor will never assemble themselves and jump back to the edge of the table on its own. Actual time irreversibility is not allowed by the law of entropy unless achieved by external intervention. If the falling of a glass off the table were filmed, one could observe the scattered pieces gathering up and leaping to the same former place on the table, when the tape is played back. Definitely this is not a factual reversibility of a process in time, i.e., it isn't going back from the future to the past in the real sense. It is merely repeating the sequence of an event that has happened but captured by a camera through some elapsed temporal interval. We can envision the latter operation to occur in a characteristic time that can be assumed horizontally extending, while the thermodynamic direction of time is perpendicular to the characteristic time axes. When played back the tape shows time-recorded frames of an event; the information were stored and could be displayed whenever we wished in reference to the perpendicular arrow of time. Our consciousness is aware that no real flipping of the direction of time occurs during the play back, it rather discerns that the witnessed event took place at a particular date, and we only sense memories of it related to the past. In other words, the relationship of time with the universe is ubiquitous, but the connection of the natural objects with time itself is partial. Different parts of nature and things within which run with respect to time according to the "function of the cosmological equation". These parts or things do not have an equable and coalesced connection with time, i.e., they are imaginary enclosed, not inferentially like the inclusion of points by a geometrical shape.

In summary, to gain relatively significant and epistemological results about time and its progression, it can be said that the temporal existence is of two levels. The first of which is internal, related to the consciousness and feelings of man. The second is a natural time that has relevance to physical phenomena spatially taking place. The physical temporal variation relation can thus be defined according to the domain of occurrence, for which there exist certain coordinates assigned to it. Hence there is the temporal domain of the microscopic world which atoms and particles are interacting within which. Also there is the large-scale (cosmological) domain, which possesses a more generalised definition of coordinates. Between both latter domains, a molecular domain of events exists, where a time scale characteristic of molecules can be defined.

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