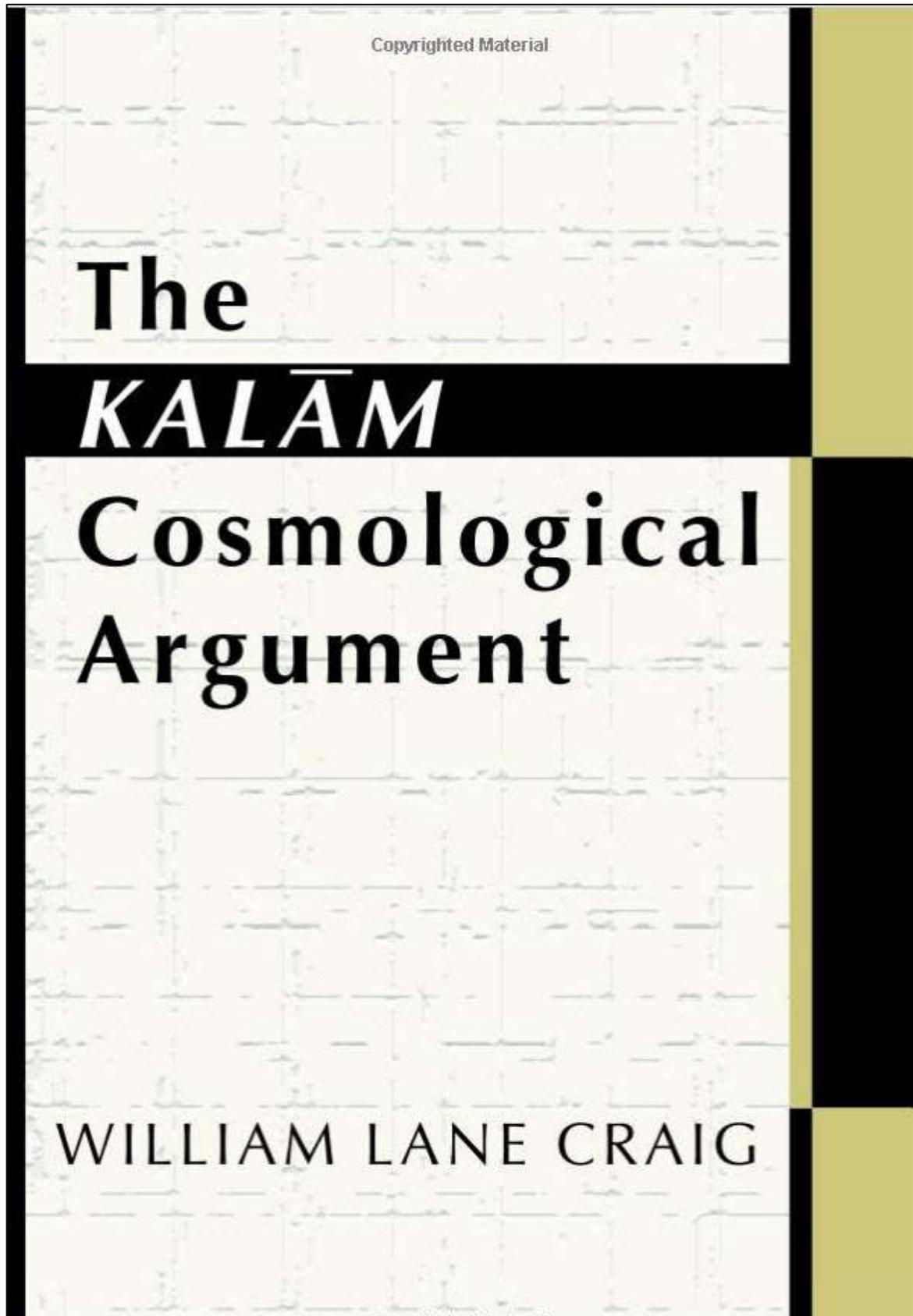


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The Kalam Cosmological Argument

By: William Lane Craig



PART I: Historical Statements of the Kalam Cosmological Argument

- Peters remarks, When the polemic finally abated Islam found that the experience of al-Ash'ari had been repeated: falsafah as such was further weakened, but in its place stood the scholastic kalam, faithful in principle to the revelation of the Qur'an, but unmistakably the product, in shape and procedure, or the Hellenic: tradition in philosophy, orthodox and at the same time Aristotelian. [Peters, *Arabs*, p. 187.] [William Lane Craig, *The Kalam Cosmological Argument*, THE Macmillan Press LTD, 1979, p.7]
- We have already commented on the origin of this popular Kalam argument for God's existence. Ghazali's terse summary may be outlined as follows: 1. There are temporal phenomena in the world. 2. These are caused by other temporal phenomena. 3. The series of temporal phenomena cannot regress infinitely. 4. Therefore, the series must stop at the eternal. [William Lane Craig, *The Kalam Cosmological Argument*, THE Macmillan Press LTD, 1979, p.45]
- The conclusion must therefore be: the series must stop at the eternal. The series of temporal phenomena must have a beginning. Therefore, according to the principle of determination (premiss one in the Iqtisad), an agent must exist who creates the world. Ghazali states, "... the people of the truth ... hold that the world began in time; and they know by rational necessity that nothing which originates in time originates by itself, and that, therefore, it needs a creator. Therefore, their belief in the Creator is understandable. [Goodman, 'Creation', p.75.] [William Lane Craig, *The Kalam Cosmological Argument*, THE Macmillan Press LTD, 1979, p.47]
- Now placing this argument within the logical context of Ghazali's thought, we can see why Ghazali concludes that the world must have a cause: the universe had a beginning; while it was nonexistent, it could either be or not be; since it came to be, there must be some determinant which causes it to exist. And this is God. Thus, Ghazali says, "So either the series will go on to infinity, or it will stop at an eternal being from which the first temporal being should have originated" [Al-Ghazali, *Tahafot*, p.33] [William Lane Craig, *The Kalam Cosmological Argument*, THE Macmillan Press LTD, 1979, p.48]
- Ghazali assumes that the universe could not simply spring into existence without a determinant, or cause. We may schematise his argument as follows:

1. Everything that begins to exist requires a cause for its origin. 2. The world began to exist (a) There are temporal phenomena in the world. (b) There are preceded by other temporal phenomena. (c) The series of temporal phenomena cannot regress infinitely. (i) An actually existing infinite series involves various absurdities. (d) Therefore, the series of temporal phenomena must have had a beginning. 3. Therefore, the world has a cause for its origin: its Creator. [William Lane Craig, *The Kalam Cosmological Argument*, THE Macmillan Press LTD, 1979, p.48-49]

- In sum, Ghazali's cosmological argument is squarely based on two principles, as pointed out by Beaurecueil: 'There remain ... to the scepticism of Ghazalai two great limits, which appear now with a majestic clarity: one, the impossibility of the infinite number, and the other, the necessity of a principle of determination amongst the possible.[Carra de Vaux, Gazali, pp. 80-81] These are the two pillars of all Ghazali's reasoning in his proof for the existence of God: the impossibility of the infinite number permits him to establish that the world has a beginning; on the other hand, if it has begun, it is necessary that one being should give preference to its existence over its non-existence: this being is God, its creator. [Beaurecueil, Ghazali et S Thomas', p 211.] [William Lane Craig, *The Kalam Cosmological Argument*, THE Macmillan Press LTD, 1979, p.49]

Ch2: Proposed Formulation of the Argument

- In my opinion the cosmological argument which is most likely to be a sound and persuasive proof for the existence of God is *The Kalam Cosmological Argument* based on the impossibility of an infinite temporal regress of events. [William Lane Craig, *The Kalam Cosmological Argument*, THE Macmillan Press LTD, 1979, p.63]
- We may present the basic argument in a variety of ways. Syllogistically, it can be displayed in this manner: 1. Everything that begins to exist has a cause of its existence. 2. The universe began to exist. 3. Therefore the universe has a cause of its existence. [William Lane Craig, *The Kalam Cosmological Argument*, THE Macmillan Press LTD, 1979, p.63]
- The point of the argument is to demonstrate the existence of a first cause which transcends and creates the entire realm of finite reality. Having reached that conclusion, one may then inquire into the nature of this first

cause and assess its significance for theism. [William Lane Craig, *The Kalam Cosmological Argument*, THE Macmillan Press LTD, 1979, p.64]

Second Premiss: The Universe Began to Exist

PHILOSOPHICAL ARGUMENT

- Turning first to the philosophical reasoning, I shall present two arguments in support of the premiss: (1) the argument from the impossibility of the existence of an actual infinite and (2) the argument from the impossibility of the formation of an actual infinite by successive addition. [William Lane Craig, *The Kalam Cosmological Argument*, THE Macmillan Press LTD, 1979, p.65]
- This conception of the infinite prevailed all the way up to the nineteenth century. The medieval scholastics adhered to Aristotle's analysis of the impossibility of an actual infinite, and the post-renaissance thinkers, even Newton and Leibniz with their infinitesimal calculus, believed that only a potential infinite could exist.[4] One of the foremost mathematicians of the nineteenth century, Georg Friedrich Gauss, in an oft-printed statement, decried any use of the actual infinite in mathematics: I protest ... against the use of infinite magnitude as if it were something finished; this use is not admissible in mathematics. The infinite is only a facon de parler: one has in mind limits approached by certain ratios as closely as desirable while other ratios may increase indefinitely. [5] [William Lane Craig, *The Kalam Cosmological Argument*, THE Macmillan Press LTD, 1979, p.66]
- First Philosophical Argument: Our first argument in support of the premiss that the universe began to exist is based upon the impossibility of the existence of an actual infinite. We may present the argument in this way. 1. An actual infinite cannot exist. 2. An infinite temporal regress of events is an actual infinite. 3. Therefore an infinite temporal regress of events cannot exist. [William Lane Craig, *The Kalam Cosmological Argument*, THE Macmillan Press LTD, 1979, p.69]
- As a creation of the human mind, state Rotman and Kneebone, the Zermelo-Fraenkel universe of sets exists only in a realm of abstract thought ... the 'universe' of sets to which the ... theory refers is in no way intended as an abstract model of an existing Universe, but serves merely as the postulated universe of discourse for a certain kind of abstract inquiry." [B. Rotman and

G. T Kneebone, *The Theory of Sets and Transfinite Numbers* (London: Oldbourne, 1966), p. 61.] [William Lane Craig, *The Kalam Cosmological Argument*, THE Macmillan Press LTD, 1979, p.70]

- In point of fact, no non-denumerable infinity could exist in reality, since things in reality can be numbered. The examples of non-denumerable infinities like mathematical points and functions have no real existence. (More of this later.) Needless to say, then, the infinities possessing even greater power than these also could not exist in reality. [William Lane Craig, *The Kalam Cosmological Argument*, THE Macmillan Press LTD, 1979, p.87]
- These examples serve to illustrate that the real existence of an actual infinite would be absurd. Again, I must underline the fact that what I have said in no way attempts to undermine the theoretical system bequeathed by Cantor to modern mathematics. Indeed, some of the most eager enthusiasts of the system of transfinite mathematics are only too ready to agree that these theories have no relation to the real world. Thus, Hilbert, who exuberantly extolled Cantor's greatness, nevertheless held that the Cantorian paradise from which he refused to be driven exists only in the ideal world invented by the mathematician; he concludes, " ... the infinite is nowhere to be found in reality. It neither exists in nature nor provides a legitimate basis for rational thought—a remarkable harmony between being and thought .. The role that remains for the infinite to play is solely that of an idea—if one means by an idea, in Kant's terminology, a concept of reason which transcends all experience and which completes the concrete as a totality—that of an idea which we may unhesitatingly trust within the framework erected by our theory." [Hilbert, 'Infinite', p. 151.] [William Lane Craig, *The Kalam Cosmological Argument*, THE Macmillan Press LTD, 1979, p.87]
- All this strikes at the heart of the Platonist-realist thesis that numbers and sets are component parts of independently existing reality. The logical antinomies in naive set theory are fatal to this thesis because if numbers and sets do exist extra-mentally, then such sets as are encountered in the antinomies seem inevitable. There is no reason for denying that the set of all ordinals or the power set of all cardinals should exist. On this basis, Stephen Barker scores the logicist theory of types as without foundation: ... Russell's avowed

philosophy was that of realism, and realism offers no philosophical rationale for rejecting impredicative definitions [definitions which, in defining a thing, refer to some totality to which the thing being defined belongs]. If a set has independent reality, then why may not members of the set be defined by reference to the set itself? [31] [William Lane Craig, *The Kalam Cosmological Argument*, THE Macmillan Press LTD, 1979, p.91-92]

- In summary, we have argued in support of the first premiss of our syllogism: (1) that the existence of an actual infinite would entail various absurdities; (2) that the Cantorian analysis of the actual infinite may represent a consistent mathematical system, but that this carries with it no ontological import for the existence of an actual infinite in the real world; and (3) that even the mathematical existence of the actual infinite has not gone unchallenged and therefore cannot be taken for granted, which would then apply doubly so to the real existence of the actual infinite. Therefore, we conclude that an actual infinite cannot exist. [William Lane Craig, *The Kalam Cosmological Argument*, THE Macmillan Press LTD, 1979, p.95]
- The second premiss states that an infinite temporal regress of events is an actual infinite. By 'event' we mean 'that which happens'. Thus, the second premiss is concerned with change, and it asserts that if the series or sequence of changes in time is infinite, then these events considered collectively constitute an actual infinite. The point seems obvious enough, for if there has been a sequence composed of an infinite number of events stretching back into the past, then the set of all events would be an actually infinite set. [34] [William Lane Craig, *The Kalam Cosmological Argument*, THE Macmillan Press LTD, 1979, p.95]
- It is interesting that at least one prominent Thomist agrees that Aquinas and Aristotle fail to carry their case; thus Fernand Van Steenberghen states, " For him [Aristotle] an infinity in act is impossible; now a universe eternal in the past implies an infinite series in act, since the past is required, is realized; that this realization has been successive does not suppress the fact that the infinite series is accomplished and constitutes quite definitely an infinite series in act. [37] [William Lane Craig, *The Kalam Cosmological Argument*, THE Macmillan Press LTD, 1979, p.96]
- The importance of this difference between future and past events becomes

evident when we turn to questions concerning the actual infinite. For clearly, past events are actual in a way in which future events are not. In the real sense, the set of all events from any point into the future is not an actual infinite at all, but a potential infinite. It is an indefinite collection of events, always finite and always increasing. But the series of past events is an actual infinite, for at any point in the past the series of prior events remains infinite and actual. [William Lane Craig, *The Kalam Cosmological Argument*, THE Macmillan Press LTD, 1979, p.97]

- Since an actual infinite cannot exist and an infinite temporal regress of events is an actual infinite, we may conclude that an infinite temporal regress of events cannot exist. This conclusion alone will be sufficient to convince most people that the universe had a beginning, since the universe is not separate from the temporal series of events. But for the sake of completeness, we may add another argument to eliminate the possibility suggested by al-'Allaf that the temporal sequence of events had a beginning, but that the universe did not, that is to say,
- the temporal series of events was preceded by an eternal, quiescent universe, absolutely still. The first event occurred when motion arose in the universe; this was then followed by other events, and the temporal series of events was generated. There are thus two possibilities: since an infinite temporal regress of events cannot exist, then either (1) the universe began to exist or (2) the finite temporal regress of events was preceded by an eternal, absolutely quiescent universe. Accordingly, we may argue as follows: 1. Either the universe began to exist or the finite temporal regress of events was preceded by an eternal, absolutely quiescent universe. 2. The finite temporal regress of events was not preceded by an eternal, absolutely quiescent universe. 3. Therefore the universe began to exist. [William Lane Craig, *The Kalam Cosmological Argument*, THE Macmillan Press LTD, 1979, p.99]
- The first premiss is true in the light of the foregoing argument, which eliminated the possibility of an infinite temporal regress of events. This means that the sequence of events is finite and had a beginning. [43] Either this was an absolute beginning of the universe itself or only a relative beginning of events within an utterly immobile universe. Hence the second premise, which eliminates one of these disjuncts, is clearly the key premiss.

[William Lane Craig, *The Kalam Cosmological Argument*, THE Macmillan Press LTD, 1979, p.99-100]

- Therefore, we conclude the universe began to exist. And this is the second premiss of our original syllogism which we set out to prove. To recapitulate: since an actual infinite cannot exist and an infinite temporal regress of events is an actual infinite, we can be sure that an infinite temporal regress of events cannot exist, that is to say, the temporal regress of events is finite. If the temporal regress of events is finite, then either the universe began to exist or the finite temporal regress of events was preceded by an eternal, absolutely quiescent universe. But the finite temporal regress of events could not have been preceded by an eternal, absolutely quiescent universe. Therefore, since the temporal regress of events is finite, the universe began to exist. [William Lane Craig, *The Kalam Cosmological Argument*, THE Macmillan Press LTD, 1979, p.102]

Second Philosophical Argument

- We may now turn to our second philosophical argument in support of the premiss that the universe began to exist, the argument from the impossibility of the formation of an actual infinite by successive addition. The argument may be exhibited in this way: 1. The temporal series of events is a collection formed by successive addition. 2. A collection formed by successive addition cannot be an actual infinite. 3. Therefore the temporal series of events cannot be an actual infinite. [William Lane Craig, *The Kalam Cosmological Argument*, THE Macmillan Press LTD, 1979, p.102-103]
- The only way a collection to which members are being successively added could be actually infinite would be for it to have an infinite 'core' to which additions are being made. But then it would not be a collection formed by successive addition, for there would always exist a surd infinite, itself not formed successively
- but simply given, to which a finite number of successive additions have been made. But clearly the temporal series of events cannot be so characterised, for it is by nature successively formed throughout. Thus, prior to any arbitrarily designated point in the temporal series, one has a collection of past events up to that point which is successively formed and completed and cannot, therefore, be infinite. [William Lane Craig, *The Kalam*

Cosmological Argument, THE Macmillan Press LTD, 1979, p.105]

- Contemporary philosophers have proved. impotent to refute this reasoning. John Hospers, himself no friend of philosophical theism, acknowledges that it is insufficient simply to assert that an infinite series of events is possible because an infinite series of integers is impossible. For, he asks, If an infinite series of events has preceded the present moment, how did we get to the present moment? How could we get to the present moment-where we obviously are now-if the present moment was preceded by an infinite series of events? [48] [William Lane Craig, *The Kalam Cosmological Argument*, The Macmillan Press LTD, 1979, p.105]
- Presumably to such thinkers the beginning of the temporal series of events would not entail a beginning to time itself On the other hand, those who adhere to a relational view of time generally take the beginning of events to be synonymous with the beginning of time itself. Zwart, for example, asserts, "According to the relational theory the passage of time consists in the happening of events. So the question whether time is finite or infinite may be reduced to the question whether the series of events is finite or infinite.' [Zwart, Time, p. 237.] [William Lane Craig, *The Kalam Cosmological Argument*, The Macmillan Press LTD, 1979, p.107]
- This completes the philosophical case in support of the second premiss. We have argued that the impossibility of the existence of an actual infinite implies that the universe began to exist and that even if an actual infinite could exist, the inability of this infinite to be formed by successive addition implies that the universe began to exist. We may now turn to the empirical confirmation of this argument. [William Lane Craig, *The Kalam Cosmological Argument*, THE Macmillan Press LTD, 1979, p.110]
- With astounding rapidity, one breakthrough has come upon the heels of another so that now the prevailing cosmological view among scientists is that the universe did have a beginning. Our empirical Second Premiss argument is divided into two parts: (1) the argument from the expansion of the universe and (2) the argument from thermodynamics. To put the empirical evidence into a proper framework, I shall argue that a model of the universe in which the universe has an absolute beginning is not only logically consistent but also 'fits the facts' of experience. [William Lane Craig, *The Kalam*

Cosmological Argument, The Macmillan Press LTD, 1979, p.110-111]

- First, we shall consider the argument from the expansion of the universe. When Einstein formulated his relativity theories, he assumed that (1) the universe is homogeneous and isotropic, so that it appears the same in any direction from any place and (2) the universe is in a steady state, with a constant mean mass density and a constant curvature of space. But finding that his original general relativity theory would not permit a model consistent with these two conditions, he was forced to add to his gravitational field equations the cosmological constant Λ in order to counter-balance the gravitational effect of matter and so ensure a static model of the universe. Another solution to Einstein's difficulty was noted by de Sitter, who observed that in an empty universe the conditions and field equations would be satisfied. [William Lane Craig, *The Kalam Cosmological Argument*, The Macmillan Press LTD, 1979, p.111]
- Thus, according to the big bang model, the universe began with a great explosion from a state of infinite density about 15 billion years ago. Four prominent scientists describe that event in these words: " the universe began from a state of infinite density about one Hubble time ago. Space and time were created in that event and so was all the matter in the universe. It is not meaningful to ask what happened before the big bang; it is somewhat like asking what is north of the North Pole. Similarly, it is not sensible to ask where the big bang took place. The point-universe was not an object isolated in space; it was the entire universe, and so the only answer can be that the big bang happened everywhere. [76] [William Lane Craig, *The Kalam Cosmological Argument*, The Macmillan Press LTD, 1979, p.116]
- Some are unhappy about a theory of the origin of the universe which implies a beginning ex nihilo. But if one denies such an origin, then one is left with two alternatives; a steady state model or an oscillating model. Hoyle, the perennial champion of the steady state model, recoils at the notion of the origin of the universe from nothing (we shall see why later): According to our observations and calculations, this was the situation from 15,000 million years ago. This most peculiar situation is taken by many astronomers to represent the origin of the universe. The universe is supposed to have begun at this particular time. From where? The usual answer, surely an

unsatisfactory one, is: from nothing The elucidation of this puzzle forms the most important problem of present day astronomy, indeed, one of the most important problems of all science. [Fred Hoyle, *Astronomy Today* (London: Heinemann, 1975), p 165.] [William Lane Craig, *The Kalam Cosmological Argument*, The Macmillan Press LTD, 1979, p.118]

- The other model of the universe which attempts to escape the necessity of an absolute beginning is the oscillating model. John Gribbin comments, " The biggest problem with the Big Bang theory of the origin of the Universe is philosophical-perhaps even theological what was there before the bang? This problem alone was sufficient to give a great initial impetus to the Steady State theory; but with that theory now sadly in conflict with the observations, the best way round this initial difficulty is provided by a model in which the universe expands from a singularity, collapses back again, and repeats the cycle indefinitely." [John Gribbin, 'Oscillating Universe Bounces Back', *Nature* 259 (1976):15] [William Lane Craig, *The Kalam Cosmological Argument*, The Macmillan Press LTD, 1979, p.122]
- The evidence therefore appears.; to produce an oscillating model of the universe, since such a model requires a universe of closure density A model in which the universe begins at a singularity and expands indefinitely seems to be the model that best fits the facts. Adherents of the oscillating model might retreat to the position (though none to my knowledge have done so) that the current expansion is the last of a prior series of expansion, each of which was finite and ended in contraction. But besides being unable to explain how the universe could jump from a finite expansion to a potentially infinite expansion, this model would seem to be only a theoretical, not a real possibility; as Tinsley comments with regard to oscillatory models: even though the mathematics says that the universe oscillates, there is no known physics to reverse the collapse and bounce back to a new expansion. The physics seems to say that those models start from the big bang, expand, collapse, then end. [Tinsley, personal letter.]. In such a case one does not escape the necessity of an absolute beginning of the universe. [William Lane Craig, *The Kalam Cosmological Argument*, The Macmillan Press LTD, 1979, p.129-130]
- In summary, we have seen that (1) the scientific evidence related to the

expansion of the universe points to an absolute beginning of the universe about fifteen billion year ago; (2) the steady state model of the universe cannot account for certain features of observational cosmology, and (3) the oscillating model of the universe violates several constraints of observational cosmology which indicate that the universe is open. Therefore, we conclude that the universe began to exist. [William Lane Craig, *The Kalam Cosmological Argument*, The Macmillan Press LTD, 1979, p.130]

Second Empirical Confirmation

- We may now turn to our second empirical argument in support of our second premiss, the argument from thermodynamics. About the middle of the nineteenth century, several physicists sought to formulate a scientific law that would bring under a general rule all the various irreversible processes encountered in the world. The result of their efforts is now known as the second law of thermodynamics. [The following survey is taken from Zwart, *Time*, pp. 93-116] First formulated by Clausius, it stated that heat of itself only flows from a point of high temperature toward a point of low temperature; the reverse is never possible without compensation. But heat is only an instance of an even more general tendency toward levelling in nature; the same is true, for example, of gases and electricity. [William Lane Craig, *The Kalam Cosmological Argument*, The Macmillan Press LTD, 1979, p.130]
- Thus, the second law could be formulated: all systems have the tendency to pass from a more ordered to a less ordered state. A third important step in the development of the second law was the realisation that disorder is connected with entropy: the greater the disorder the greater the entropy. This yields a third formulation of the law: all systems have the tendency to pass from a state of lower entropy into a state of higher entropy. [William Lane Craig, *The Kalam Cosmological Argument*, The Macmillan Press LTD, 1979, p.131]
- Only two obstacles could prevent such a transition: (1) since the law concerns probabilities, it is conceivably possible for the transition to be avoided, and (2) the system could leak energy to its surroundings. But in the first case, these logical possibilities are inconsequential in macroscopic systems. It is theoretically possible for the bath to be boiling at one end and frozen at the

other, but this is a practical impossibility in the second case, a further stipulation must be introduced the system must be closed. This leads to a fourth formulation of the second law: spontaneously proceeding processes in closed systems are always attended by an increase in entropy. The law in this form is virtually certain. [William Lane Craig, *The Kalam Cosmological Argument*, The Macmillan Press LTD, 1979, p.131]

- Our interest in the second law concerns what happens when it is applied to the universe as a whole. For by definition the universe is a closed system, since it is all there is. [121] [William Lane Craig, *The Kalam Cosmological Argument*, The Macmillan Press LTD, 1979, p.131]
- No energy leakage or input is possible. What this seems to imply is that eventually the universe and all its processes will, so to speak, 'run down', and the entire universe will slowly grind to a halt and reach equilibrium. Zwart describes such a state: " ... according to the second law the whole universe must eventually reach a state of maximum entropy. It will then be in thermodynamical equilibrium; everywhere the situation will be exactly the same, with the same composition, the same temperature, the same pressure etc., etc. There will be no objects any more, but the universe will consist of one vast gas of uniform composition. Because it is in complete equilibrium, absolutely nothing will happen anymore. The only way in which a process can begin in a system in equilibrium is through an action from the outside, but an action from the outside is of course impossible if the system in question is the whole universe. So in this future state of maximal entropy, the universe would be in absolute rest and complete darkness, and nothing could disturb the dead silence. Even if there would by chance occur a small deviation from the state of absolute equalization it would of itself rapidly vanish again. Because almost all energy would have been degraded, i.e. converted into kinetic energy of the existing particles (heat), this supposedly future state of the universe, which will also be its last state, is called the heat death of the universe. [Zwart, *Time*, p. 136.] [William Lane Craig, *The Kalam Cosmological Argument*, The Macmillan Press LTD, 1979, p.131-132]

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