Towards a more persuasive kalām cosmological argument: Permitting the actual infinite

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Abstract

In this study I argue that the *kalām* cosmological argument (KCA) is an important theistic argument that *can* and *should* be revised to a more persuasive argument that permits the existence of the actual infinite. In order to reach this conclusion, firstly I evaluate the philosophical and historical significance of the doctrine of *creatio ex nihilo* and show that, based on the fact that the KCA supports this doctrine, the KCA is an important theistic argument which merits being revised into a more persuasive argument. Furthermore, I argue that the KCA is valuable because (1) it promotes interfaith dialogue, (2) it promotes interdisciplinary dialogue and, (3) it sheds light on the divine attributes. Secondly, after presenting a brief historical survey of the KCA, I argue that, historically, the most important argument in support of the KCA is the philosophical argument against the possibility of an actual infinite. I then argue, thirdly, that the argument against the actual infinite is problematic for it results in the KCA being incompatible with both Platonism and the standard definition of omniscience. Thus, a version of the

KCA that permits the actual infinite is more persuasive than a version that denies the actual infinite. Finally, I defend two philosophical arguments in favour of a beginning of the universe and that do not deny the actual infinite. I then supplement these arguments with a third philosophical argument to support the view that it is impossible for science, by itself, to justify a belief in a past eternal universe.

Keywords: *Kalām* Cosmological Argument, Actual and Potential Infinity, Platonism, Omniscience, *Creatio Ex Nihilo*

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Contents

Chapter 1

Introduction

1.1 Contextualisation

My overall claim in this study is this: *The* kalām *cosmological argument is an important theistic argument that can and should be revised into a more persuasive argument that permits the actual infinite.*

The *kalām* cosmological argument (also *kalām* argument or KCA) is a notable theistic argument that originated in the early attempts by Christians to defend the doctrine of *creatio ex nihilo* (creation out of nothing). It was then further developed by mediaeval Islamic philosophers and theologians of the *kalām* movement. The argument tries to prove three claims, namely, (i) that the universe began to exist, (ii) that the universe has a cause of its existence, and (iii) that this cause is a transcendent personal being (or God).

Accordingly, the KCA is often presented as a syllogism:

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 (Craig, 1979:63).

Once the argument's conclusion has been reached, the proponents of the KCA attempt to show that the cause of the universe possesses various divine properties such as being transcendent, personal, beginningless, spaceless, immaterial, changeless and extremely powerful.

The KCA is based on philosophical arguments against the possibility of an infinite past (i.e., an infinite temporal regress of events). One such argument in support of premise (2) is the philosophical argument in favour of the impossibility of an actual infinite. An *actual infinite* is a completed totality comprising infinitely many distinct elements and is, thus, an endless collection whose elements are, nevertheless, *present all at once*. Therefore, according to the argument against the actual infinite, if the universe is eternal, an actually infinite number of past events (such as years) have occurred. However, the existence of an actually infinite number of things (such as events) is impossible. Therefore, the series of past events must be finite and must have had a beginning. It follows, thus, that the universe began to exist.

This argument against the actual infinite is perhaps the most common

argument that is used by advocates of the KCA. Important contemporary defenders of the KCA include William Lane Craig (1979; 2008; 2012; 2013), Mark R. Nowacki (2007), and J. P. Moreland (2003). Each of these thinkers has championed the argument against the actual infinite to defend the view that the universe began to exist. It is, thus, not surprising that the KCA is sometimes identified as the cosmological argument that contends that "it is *impossible* for an *actual infinite* to exist" (Rowe, 2007:33 [original emphasis]).

Nevertheless, the possibility of an actual infinite is highly disputed. Graham Oppy (2006a:143-144), for example, believes that an actual infinite is possible because a supertask is possible (a supertask is an actually infinite series of operations that are accomplished in a finite duration of time). Wes Morriston (2013:23-26) argues that, because orthodox theism claims the future (in the afterlife) is endless, in terms of orthodox theism, the series of future events is actually infinite. Hence, according to Morriston, the proponents of the KCA should affirm the possibility of an actual infinite. John Byl (1996:78-79) maintains that, if God is omniscient, God knows the endless future and, so, His knowledge is actually infinite. Finally, Douglas Groothuis (2011:222) doubts the soundness of the argument against the actual infinite, since the actual infinite is a logically coherent entity and whatever is logically coherent in the abstract may be instantiated in reality.

In view of the fact that the argument against the actual infinite has not

convinced many scholars, there is a need to evaluate whether the KCA should permit the actual infinite. With the phrase "the KCA permits the actual infinite" I mean that the proponents of the KCA propose no argument against the actual infinite and, instead, they argue that the universe began to exist. However, they do this without denying the possibility of an actual infinite. Hence, it is worth investigating whether a version of the KCA that permits the actual infinite is more persuasive than a version that denies the actual infinite. By "a more persuasive KCA" I mean a *stronger*, *more convincing*, and *less controversial* version of the KCA than the versions offered thus far. Hence, the issue in question is as follows: Should advocates of the KCA revise the KCA into a more persuasive argument that permits the actual infinite?

This issue raises two other crucial issues. Firstly, why should theists try to revise the KCA and is the KCA worthy of serious academic reflection and improvement? More precisely: Is the KCA sufficiently important for theists to seek a more persuasive KCA? Several scholars, such as David Hume (1824:46), Richard Dawkins (2006:77-78) and Millard J. Erickson (2013:134-137), view theistic arguments such as the KCA as unimportant. These scholars argue that theistic arguments, even if successful, do not conclude to a god who possesses all the properties ascribed to a particular God and, thus, theistic arguments fail to *prove* God. These scholars suggest that, because theistic arguments do not conclude to a particular theistic God, these argu-

ments are both unimportant and worthless.

Furthermore, it is sometimes argued that the doctrine of *creatio ex nihilo* is not an important doctrine and this, in turn, implies that the KCA does not offer theists any value. For example, in his influential book, *Creatio Ex Nihilo* (2004), Gerhard May argues that the doctrine of *creatio ex nihilo* was not inherited by Christianity from Hellenistic-Jewish theology. May contends that *creatio ex nihilo* as a theory is found neither in Scripture nor in early Jewish theology. Instead, according to May, the doctrine of *creatio ex nihilo* arose in the second century CE as a response to the Greek and Gnostic notion that the universe was formed out of pre-existing, eternal matter. Although May admits that creation *ex nihilo* "corresponds factually with the Old Testament proclamation about creation" (May, 2004:xi), his argument gives one the impression that the doctrine of *creatio ex nihilo* is neither a biblical nor important Christian (or theistic) doctrine. However, if *creatio ex nihilo* is an insignificant doctrine and the KCA is essentially an argument in favour of *creatio ex nihilo*, then it would appear that the KCA is as insignificant as the doctrine of *creatio ex nihilo*. Therefore, before trying to improve the KCA, it is imperative that the following question is addressed: If the KCA does not conclude to a particular theistic God, would the KCA still be an important theistic argument that is worthy of serious academic reflection?

The second issue is as follows: If advocates of the KCA should revise the KCA into a more persuasive argument that permits the actual infinite, *how* can they do this? It is unhelpful to argue that the KCA would be more persuasive if it permitted the actual infinite and then fail to offer the proponents of the KCA alternative arguments in favour of a beginning of the universe. Therefore, if one argues that, in order to be more persuasive, the KCA should permit the actual infinite, then one should contribute to this argument by showing how the KCA may permit the actual infinite.

The following three issues go hand in hand. To investigate (1) whether advocates of the KCA should revise the KCA into a more persuasive argument that permits the actual infinite, (2) one must also investigate how this may be done, and (3) whether the KCA is an important theistic argument that is worthy of such an academic endeavour. To my knowledge no study exists that focuses on one of these three issues and, thus, there is clearly a gap in the contemporary debate on the KCA and this gap needs to be filled.

1.2 Problem Statement

In light of the contextualisation discussed above, the following issue needs to be explored: Is the *kalām* cosmological argument an important theistic argument that *can* and *should* be revised into a more persuasive argument

that permits the actual infinite and, if so, how may this be done?

1.3 Sub-Research Questions

This central research question may be addressed by answering the following four sub-research questions:

1. If the KCA does not conclude to a particular theistic God, would the KCA still be an important theistic argument that is worthy of being revised into a more persuasive argument?
2. How are the most significant versions of the KCA formulated, and do these versions permit the actual infinite?
3. Should the proponents of the KCA revise the KCA into a more persuasive argument that permits the actual infinite?
4. How can the KCA be revised into a more persuasive argument that permits the actual infinite?

1.4 Hypothesis and Outline of Chapters

This study concludes that the KCA is an important theistic argument that *can* and *should* be revised into a more persuasive argument that permits the actual infinite. I will now summarise each chapter of the study in order to

show the sequence that led to this conclusion.

Chapter 2: *Why Seek a More Persuasive* Kalām *Argument?* This chapter explores whether the KCA is sufficiently important to merit theists seeking a more persuasive KCA. The chapter concludes that, even if the KCA does not prove a particular theistic God, the KCA may still be regarded as an important and valuable argument that is worthy of serious academic reflection for the following four reasons: (1) The KCA supports the doctrine of *creatio ex nihilo* (creation out of nothing) – the central theistic belief that God created the universe out of nothing. (2) The KCA provides common ground for interfaith dialogue. (3) The KCA promotes dialogue between philosophers and scientists. (4) The KCA adds to the discussion about divine attributes.

Chapter 3: *Does the* Kalām *Argument Permit the Actual Infinite?* This chapter serves to inform the reader of what the KCA is and whether significant versions of the KCA permit the actual infinite. The chapter shows that three of the most important proponents of the KCA, namely, John Philoponus, al-Ghazālī, and William Lane Craig, argue against the possibility of the actual infinite to show that the universe began to exist. None of their versions of the KCA permits the actual infinite.

Chapter 4: *Should the* Kalām *Argument Permit the Actual Infinite?* This chapter investigates whether the argument against the actual infinite is problematic, and whether the proponents of the KCA should revise the KCA into

a more persuasive argument that permits the actual infinite. The chapter shows that the proponents of the KCA should not deny the existence of an actual infinite. By denying the actual infinite, the KCA becomes incompatible with both Platonism (or realism), that is, the view that abstract objects exist, and the standard definition of omniscience. Hence, the chapter concludes that a version of the KCA that permits the actual infinite is more persuasive than a version that denies the actual infinite.

Chapter 5: *How Can the* Kalām *Argument Permit the Actual Infinite?* This chapter contains a defence of two philosophical arguments in favour of a beginning of the universe. In view of the fact that these arguments do not deny the actual infinite, they are more persuasive than the arguments against the actual infinite. These two philosophical arguments are then supplemented by a third philosophical argument to support the view that it is impossible for science, by itself, to justify a belief in a past eternal universe. The chapter concludes that, if the advocates of the KCA abandon the argument against the actual infinite and use the three arguments discussed in this chapter to support the premise that the universe began to exist, they will have formulated a more persuasive argument.

Chapter 6: *Conclusion.* This chapter presents a summary of the research study and offers suggestions for further research into the study's central topic.

1.5 Research Approach

The research approach adopted in the study involved a literature study and review that explored the discussions surrounding the KCA and related topics as they appear in some of the leading academic journals, such as *Sophia*, *The International Journal of Philosophy of Religion*, *Faith and Philosophy* and *Philosophia Christi*, and in books that have been published on the topic. The databases consulted included the North-West University's Ferdinand Postma Library Catalogue and the university's online one-search. I then used the information obtained from analysing these various sources to formulate my own ideas on the main research topic.

1.6 Abbreviations

KCA *Kalām* cosmological argument

KCA$_1$ *Kalām* cosmological argument that denies the actual infinite

OT Old Testament

NT New Testament

ZF Zermelo-Fraenkel axioms

AC The axiom of choice

ZFC Zermelo-Fraenkel axioms with the axiom of choice

MM Mega-machine

MN Methodological naturalism

PN Philosophical naturalism

Chapter 2

Why Seek a More Persuasive *Kalām* Argument?

2.1 The Problem and the Solution

The problem: In view of the fact that this study attempts to develop a more persuasive *kalām* cosmological argument (KCA), the first question that this study addresses is as follows: *Why seek a more persuasive KCA?* By "a more persuasive KCA" I mean a *stronger*, *more convincing*, and *less controversial* version of the KCA than the versions offered thus far. In other words, essentially this study is seeking a *better* KCA. But why seek this? Why should theists, such as myself, try to improve the KCA? The answer to this question: *Because the KCA is an important theistic argument.* If the KCA is

an important theistic argument, i.e. if the KCA offers theists (or non-theists) value and significance, then theists should constantly strive to improve the KCA. However, if the KCA is *not* an important theistic argument, then it is also not worthy of serious academic reflection and this study would be futile. Therefore, the crucial question is: *Is the KCA an important theistic argument?*

Many philosophers, whether proponents or critics of the KCA, have ignored this crucial question; in fact, to my knowledge, no philosopher has yet conducted research into whether the KCA is important or not.[1] There are, however, several philosophers who defend natural theology, arguing that the activity of formulating theistic arguments is useful.[2] An outstanding example of such a defence is Douglas Groothuis' book *Christian Apologetics* (2011), in which he first defends natural theology (Groothuis, 2011:171-184) before defending several theistic arguments, including the KCA (Groothuis, 2011:185-563). On the other hand, several scholars perceive theistic arguments as unimportant. These scholars argue that theistic arguments, even if successful, do not conclude to a god who possesses all the properties ascribed to a particular God and, thus, theistic arguments fail to *prove* God. This

[1] The majority of the proponents of the KCA surely *think* the KCA is important for why else would they defend it? However, the problem is that they do not *offer any reasons* why they think the KCA is important.

[2] Natural theology may be defined as the attempt to provide rational, philosophical arguments that (i) rely on theologically neutral premises, and (ii) support the existence and nature of God.

point is succinctly made by David Hume, the eminent Scottish philosopher, in part 5 of *Dialogues Concerning Natural Religion* (1779). Hume's fictional characters, Philo and Cleanthes, discuss the design argument. Philo declares to Cleanthes that the design argument fails to show that the cause of the universe is divine, perfect, a singular cause, or still alive. Thus, according to Philo, the design argument leads one to an inadequate theology:

> In a word, Cleanthes, a man, who follows your [design] hypothesis, is able, perhaps, to assert, or conjecture, that the universe, sometime, arose from something like design: but beyond that position he cannot ascertain one single circumstance; and is left afterwards to fix every point of his theology by the utmost license of fancy and hypothesis. ... I cannot, for my part, think, that so wild and unsettled a system of theology is, in any respect, preferable to none at all (Hume, 1824:46).

According to Philo (or Hume), a theistic argument that fails to prove God, or fails to support a theist's theology, has no value for the theist as the perverted theology of such a theistic argument is no better than atheism. This unpleasant conclusion leaves one wondering about the significance, if any, of any theistic argument, such as the KCA.

Richard Dawkins, who is perhaps the most popular evangelist for athe-

ism, attacks cosmological arguments on similar grounds. While discussing Aquinas' cosmological argument, Dawkins protests:

> Even if we allow the dubious luxury of arbitrarily conjuring up a terminator to an infinite regress and giving it a name, simply because we need one, there is absolutely no reason to endow that terminator with any of the properties normally ascribed to God: omnipotence, omniscience, goodness, creativity of design, to say nothing of such human attributes as listening to prayers, forgiving sins and reading innermost thoughts ... [I]t is more parsimonious to conjure up, say, a 'big bang singularity', or some other physical concept as yet unknown. Calling it God is at best unhelpful and at worst perniciously misleading (Dawkins, 2006:77-78).

Dawkins dismisses cosmological arguments because they conclude to a cause lacking "any of the properties normally ascribed to God." His choice of words, for example, "dubious," "unhelpful" and "perniciously misleading", expose his distaste for cosmological arguments. It is, thus, fair to conclude that Dawkins deems cosmological arguments, such as the KCA, to be unimportant.

Similarly, Millard J. Erickson, a Christian theologian, is of the opinion that natural theology faces serious problems. "Even if the arguments [of

natural theology] succeed in proving the existence of a divine being," writes Erickson, "there is still a problem if this is to be considered a proof for the Christian God. For this is a bare theism. Further argumentation is needed to establish that this is the Christian God, with the attributes that are unique to him" (Erickson, 2013:135). Although Erickson does not state that theistic arguments are unimportant, he describes theistic arguments as demonstrating obvious "shortcomings," "difficulties" and "problems" (Erickson, 2013:134-135). According to Erickson (2013:137), the conclusion that theistic arguments "cannot be used to construct a natural theology ... seems to fit best all the data of Scripture on the subject." Taken at face value, Erickson's statements suggest that, because theistic arguments do not conclude to the Christian God, they are insignificant.

Hume's, Dawkins' and Erickson's criticism may apply to the KCA, as the KCA fails to prove a particular theistic faith.[3] If this objection is successful, there is no point in defending the KCA *unless* it is important for some other reason(s). Hence, the proponents of the KCA face several important questions: If the KCA does not conclude to a particular theistic God, would the KCA still be an important theistic argument? Does the KCA offer any value for theists? Is it sensible for philosophers of religion, theists and non-

[3] This criticism applies to the majority of theistic arguments. For example, if successful, the moral argument only establishes a being in which goodness is grounded, the fine-tuning argument merely demonstrates a cosmic designer, while the ontological argument fails to evince the Christian God.

theists alike, to pay serious attention to the KCA? These are the questions this chapter addresses.

The proposed solution: Two different approaches to the problem discussed above exist. The first and quickest approach is to respond that the Hume-Dawkins-Erickson objection fails to appreciate cumulative case arguments for God's existence.[4] The objection assumes that because each individual theistic argument cannot conclude to a being possessing the core properties ascribed to God, a group of such arguments *together* cannot conclude to such a being. However, this is fallacious because a few successful arguments presented as a cumulative case for God's existence may demonstrate a particular theistic God. For example, if the ontological argument, cosmological argument, moral argument and argument for Jesus' resurrection are valid, together they may conclude to a being who is self-existent, spaceless, timeless (at least without creation), beginningless, immaterial and personal and who has maximal power, knowledge, and goodness and also who has revealed himself in Jesus of Nazareth. However, this being is the Christian

[4] A cumulative case is when various individual arguments are used in combination to support a specific conclusion, with each individual argument increasing the probability of the conclusion. This is a legitimate method for obtaining truth and, as Paul Draper notes, "the vast majority of well-supported theories in both science and everyday life are established by cumulative cases, not by a single argument or a single piece of evidence" (Draper, 2010:414). For example, a homicide detective uses various bits of evidence to find out who murdered the victim. Similarly, many scientists believe that black holes exist because of various pieces of evidence, such as the observation of hot glowing gas and rapidly moving stars.

God. Accordingly, the KCA may play an important role in a cumulative case argument in favour of a *particular* theistic faith, such as Christianity.

This first approach, however, requires one to defend natural theology and its cumulative case arguments. The question in which I am interested is not whether natural theology is valuable for theists but, instead, I wish to explore whether the KCA is, by itself, an important theistic argument. The second approach concedes, for the sake of argument, that the KCA cannot be used to prove any individual faith. One then tries to show that the KCA is *still* an important and valuable argument that merits attention. This approach is taken in this chapter. I argue that the KCA is an important theistic argument because it supports the doctrine of *creatio ex nihilo*. My argument comprises three steps. Firstly, I offer a detailed analysis of the doctrine of *creatio ex nihilo* to show the coherence of the doctrine. In the process I respond to several objections to *creatio ex nihilo* because, if successful, these objections would invalidate the KCA. Secondly, I then argue that the KCA supports the various aspects of the doctrine of *creatio ex nihilo*. Finally, by examining the scriptural support for *creatio ex nihilo* and surveying the work of a few leading theists who affirm *creatio ex nihilo*, I show that *creatio ex nihilo* may, indeed, be regarded as a significant theistic doctrine. Although much of this chapter focuses on the doctrine of *creatio ex nihilo*, I conclude the chapter by offering three more reasons why the KCA is important, namely, it provides common

ground for interfaith dialogue, it promotes dialogue between philosophers and scientists, and it adds to the discussion about divine attributes.

This chapter is unique in both its philosophical evaluation of *creatio ex nihilo* and its survey of the Christian and Jewish affirmations of *creatio ex nihilo*. Furthermore, to my knowledge, no other study has tried to defend the view that the KCA *per se* is important.

2.2 The *Kalām* Argument Supports *Creatio Ex Nihilo*

The KCA endeavours to show that the universe began to exist. However, the ancients were divided on whether the universe had a beginning. This issue was passionately debated in antiquity, for it signified a fundamental difference between most Greek philosophers and most thinkers within the Judaeo-Christian tradition (see Dales, 1982:495; Sorabji, 2006:193).[5] On the one hand, most Greek philosophers denied that the material universe had a beginning while most thinkers within the Judaeo-Christian and Islamic traditions asserted that the universe had an absolute beginning at creation.

A central issue in the creation debate, and which the ancients rigorously

[5] Michael Chase (2013:40-41) maintains that the debate of the eternity of the world goes back to at least the pre-Socratic thinkers in the sixth-century BC, such as Pherecydes of Syros and the Orphics, and that "[t]hese sixth-century thinkers, in turn, may well have been inspired by Oriental myths that were very ancient indeed."

discussed, is the notion of *creatio ex nihilo*. This notion has become an important theistic doctrine[6] and states, broadly, that God brought all things into existence without pre-existing materials. Erickson clarifies the doctrine as follows:

> The expression *ex nihilo* or "out of nothing" has sometimes given rise to misunderstanding. "Nothing" has come to be regarded by some thinkers as virtually a something out of which everything has been made, a kind of substance. ... When we speak of creation out of nothing, however, we are not thinking of nothing as a something out of which everything was made. Nothing, rather, is the absence of reality. Thus, the expression "without the use of preexisting materials" is preferable (Erickson, 2013:342).

Thus, the doctrine of *creatio ex nihilo* (I shall hereafter omit "the doctrine of") is in stark contrast to the notion of *creatio ex materia* (creation out of matter) – the view that God formed the universe out of pre-existing, eternal matter.

Is it possible to be more precise about what *creatio ex nihilo* is, exactly?[7]

[6] Below I survey some of the most prominent theists who endorse *creatio ex nihilo*.

[7] The doctrine of *creatio ex nihilo* is often divided into two categories: *creatio originans* (originating creation) and *creatio continuans* (continuing creation). The former concerns God's initial act of bringing the universe into existence, while the latter concerns God's continuous conservation of the universe in existence. Unless otherwise indicated, I shall hereafter use the term *creatio ex nihilo* in the former sense.

According to the *Evangelical Dictionary of Theology*, *creatio ex nihilo* "means God brought the world into existence 'out of nothing' through a purposeful act of his free will. In this the Christian doctrine confesses God as the almighty and sovereign Lord of all existence. ... The creative act of God sets God apart from all that is created" (Elwell, 2001:304). Similarly, Erickson declares that *creatio ex nihilo* signifies "that the whole of what now exists was begun by God's act of bringing it into existence – he did not fashion and adapt something that already existed independently of him" (Erickson, 2013:340). According to Mark Harris (2013:111-112), *creatio ex nihilo* states (1) that time had a beginning, (2) that God made the world literally from nothing, and (3) that God is completely transcendent. For Gerhard May, however, the doctrine "specifies God's omnipotence as its sole ground" and is connected to the notion of God's "unconditioned freedom" (May, 2004:xi). Finally, Copan and Craig define *creatio ex nihilo* as follows:

> [W]hen we describe what creation out of nothing means, we affirm that without God's initiating creation, only God exists. Upon creation, we have a universe because God willed it into finite, temporal being. Thus, creation out of nothing affirms that the universe is contingent on God, not just in having its (continued) existence in being (ontological dependence) but also in having its

> temporal origination from nothing preexistent, but simply by the will and word of God (*ex nihilo*) (Copan & Craig, 2004:15).

Therefore, the doctrine of *creatio ex nihilo* comprises or entails at least six aspects: (1) Everything apart from God depends on God for its existence, (2) the universe is created by God, (3) time had an absolute beginning, (4) matter had an absolute beginning, (5) God transcends His creation, and (6) creation is an act of God's free will. Unfortunately, the scholars mentioned above do not elaborate further on these six aspects. Accordingly, I shall now expand on each aspect, offering a unique perspective of the way in which each aspect is supported by the KCA.

2.2.1 Everything Depends on God

According to the first aspect of *creatio ex nihilo*, *everything apart from God depends on God for its existence.*[8] In other words, everything is contingent on God because without Him nothing could exist. However, this does not imply that the universe had a temporal beginning[9] because God could sustain the universe in existence from eternity. As Thomas Aquinas (*Summa Theologica* 1a.44.1; 1a.46.1) notes, even if the universe were beginningless, it would still

[8] For the sake of readability, I shall hereafter use the phrases "everything" and "all things" as a synonym for "everything apart from God."

[9] By "the universe had a temporal beginning" I mean that the universe came into existence at some moment a finite time ago. I discuss the notion of temporal becoming in greater depth below.

depend on God for its ongoing existence.[10] By contrast, *creatio ex materia* does not state that everything depends on God for its existence because whether primordial matter depends on God is an open question. God may conserve matter in existence from eternity, or matter may exist necessarily and be independent of God. Therefore, creation *ex nihilo* postulates one absolute reality (i.e., God), while creation *ex materia* postulates one or more absolute realities (e.g., God and matter).

Now, what we want to know is whether the theist may offer the KCA to support the view that everything depends on God for its existence? It would appear that the theist may do so for, to some extent, the KCA promotes the first aspect of *creatio ex nihilo*. If the KCA is successful, it shows that the universe (all space, time, and matter) depends on God (or a transcendent personal being who may be identified with the theistic God) for its existence, for the universe would not exist if God had not brought it into existence. Thus, the KCA partially supports the view that everything depends on God. However, the KCA does not fully support this view, for the KCA does not show that God brought the realm of abstract objects (if such a realm exists) into being. The notion of an abstract object is difficult to describe. Nevertheless, for present purposes we may define an abstract object as the

[10] Similarly, Rodney D. Holder remarks, "The main lesson to draw from the doctrine of creation out of nothing is that the universe is totally dependent on God for its existence moment by moment, continuously. ... Creation is not confined to, or even necessarily dependent on, a first moment" (Holder, 2013:73).

opposite of a concrete object (I discuss the distinction between abstract objects and concrete objects in greater detail in chapter 4, pp. 149-155). A concrete object is an object that is either a person, a place (or space itself), a moment, a duration (or time itself), is spatially extended, or can bring something into existence. Examples of concrete objects include a substance, mind, human, place, time, event, and God. On the other hand, abstract objects are generally said to be those objects that are not persons, space, or time, and that are non-spatial, non-physical and not able to bring something into existence. For example, numbers, universals, properties, mathematical truths, and propositions are abstract objects.

According to *creatio ex nihilo*, then, all concrete objects (apart from God) *and* all abstract objects (if they exist) depend on God for their being. However, abstract objects, if they exist, exist timelessly, thus one cannot conclude that because time had a beginning abstract objects also have a beginning and so depend on God.[11] Therefore, if successful, the KCA does not show that

[11] Atemporal (or timeless) objects, such as abstract objects, do not come into being whereas temporal objects come into being. Thus, if time began, we may conclude at the most that all temporal objects have a beginning but we may not conclude that all atemporal objects depend ontologically on God. However, M. Oreste Fiocco (2014) has recently defended atemporal becoming – the view that certain atemporal objects may have a beginning or origin by coming into existence outside of time.

According to Fiocco, x exists in time if x exists at some moment, and x exists outside of time if x exists, but at no moment. Fiocco, then, distinguishes between temporal, absolute, and atemporal becoming as follows:

> A1 x comes into being *temporally* $=_{\text{def.}}$ x does not exist at any moment, then comes into existence at some moment.
>
> A2 x comes into being *absolutely* $=_{\text{def.}}$ x is a moment that comes into being for absolute becoming involves the coming to be of a moment (and a moment is

abstract objects depend on God for their existence but merely concludes that all temporal objects (and all moments and time itself) depend on God. The KCA, thus, supports the first aspect of *creatio ex nihilo* to some extent only. However, for those theists who maintain that abstract objects do not exist and that God alone is timeless, the KCA fully supports the first aspect of *creatio ex nihilo*. Nevertheless, by showing that every temporal object depends on God for its existence, the KCA provides significant support for *creatio ex nihilo*.

2.2.2 The Universe is Created by God

Secondly, according to the doctrine of creation out of nothing, *the universe is created by God*. The term "universe" in this context denotes physical reality, that is, all space, time (or space-time), and matter. What do we mean when we say that "x is created by y"? Several scholars, such as Stephen M.

not a temporal entity because it does not exist *at* some moment).

A3 x comes into being *atemporally* $=_{\text{def.}}$ x is an atemporal entity that comes into being but not at some moment.

The coming to be of simple facts is an example of atemporal becoming (A3). For example, the simple fact that *there is no elephant in my office at m*, where m is a past moment, is an atemporal, abstract object that comes into being timelessly.

If Fiocco is right about absolute and atemporal becoming, then the KCA proves far more than I have described above. By showing that the universe came into being, the KCA shows that all moments (which are timeless entities) and all simple facts (which are abstract objects whose existence depends on the universe because simple facts are the truthmakers of every true representation of the universe) come into being and, so, they depend on God for their existence. Nevertheless, even if we affirm atemporal becoming, the KCA would still show that part of the realm of abstract objects only depends on God since there may exist entities, such as numbers and logical truths, that do not ontologically depend on God's act of bringing the universe into existence.

Barr (2006:257-267), use the term "create" in two ways. The first and most common sense of "create" means to bring something into existence a finite time ago while the second sense means to ontologically cause something to exist, regardless of whether that thing had a temporal beginning or is eternal. Thus, "x is created by y" may mean one of two things:

B1 x is created by $y =_{\text{def.}}$ y brings x into existence at some moment.

B2 x is created by $y =_{\text{def.}}$ x depends on y for its existence.

These two definitions are extremely different. An example of B1 creation is an artist creating a painting – the artist brings the painting into existence at the moment he/she has finished painting it. An example of B2 creation is God's divine act whereby God gives being to something from eternity with that thing depending on God for its existence despite the fact that it had no beginning. The first aspect of *creatio ex nihilo*, which we discussed above and which states that *everything depends on God for its existence*, represents B2 creation. However, if the second aspect of *creatio ex nihilo* (which states that the universe is created by God) is different to the first aspect of *creatio ex nihilo* – and I submit it is different because, as we shall see below, several scriptural passages speak about "the beginning" (Genesis 1.1), "the very beginning, when the world came to be" (Proverbs 8:23), and the Logos who was "in the beginning" (John 1.1) and this strongly suggests

a temporal beginning – then God's act of creating the universe must involve something similar to B1 creation. Therefore, to distinguish between temporal origination and ontological dependence, the term "x is created by y" shall hereafter *not* refer to B2 creation.

Let us now try be more specific about what we mean when we say that y brings x into existence at some moment. If y creates x at some moment in time, then x had a temporal beginning. This, in turn, means that x is a temporal entity, which exists at a moment. Moreover, part of the nature of a temporal entity is that it changes over time and so it cannot exist in a timeless state with no change (a human being, for example, cannot exist unless his/her heart is beating and this involves change). Accordingly, if a temporal entity began, it came into being at some moment and it has endured for a finite time. Therefore, we may change our first definition of "x is created by y" as follows:

> B3 x is created by $y =_{\text{def.}}$ (1) x is a temporal entity and (2) y brought x into existence at the present moment or at some moment a finite time ago.

B3 provides a better and more descriptive definition than B1. However, B3 does not account for time itself for what if x denotes time? Time is not a temporal entity that exists at some moment but, rather, according to Fiocco,

> ... time is a thing, namely *the thing in virtue of which any entity changes*. An entity might have, by its very nature, the capacity to change – but without time itself it could not change. Time is, therefore, the thing that makes change possible. It does so by yielding the moments required for change. Time itself is distinct from any moment or collection of moments (Fiocco, 2014:89 [original emphasis]).

Fiocco's account of time is as good as any other account. Therefore, if y creates time itself, time came into being simultaneously with the first moment (t1) or event of time. Furthermore, if time had a beginning, it then comprises a finite series of events only (as opposed to an infinite series of events). Thus, we may adjust our definition of "x is created by y" accordingly:

> B4 x is created by $y =_{\text{def.}}$ (1) x is a temporal entity or time itself, and, (2) if x is a temporal entity, y brought x into existence at the present moment or at some moment a finite time ago, or, if x is time itself, y brought x into existence with its first moment or event and x comprises a finite series of events.

This definition encompasses the creation of either a temporal entity or time itself. However, what about the creation of events? An event is neither a temporal entity because it does not exist *at* some moment, nor is it time

itself because time makes events possible. An event, rather, is any change in the world that endures for a certain period of time. For example, pushing a chair across one's office represents an event that may endure for, perhaps, five seconds.

Events may be created. For example, a person may create an event by pushing a chair across an office; or God may create the very first event in time. However, what does it mean, exactly, for y to create some event? Firstly, if y creates an event or change, y causes that change to occur. The person who pushes a chair across the room causes the event in which the chair changes position over a certain period of time. Secondly, if an event is created, the event began to occur at the present moment or at some moment a finite time ago as a created event must have a beginning. Therefore, we may improve our definition of "x is created by y" as follows:

> B5 x is created by $y =_{\text{def.}}$ (1) x is a temporal entity, or time itself, or an event; and, (2) if x is a temporal entity, y brought x into existence at the present moment or at some moment a finite time ago; or, if x is time itself, y brought x into existence with its first moment or event and x comprises a finite series of events; or, if x is an event, y caused x to occur at the present moment or at some moment a finite time ago.

Although not perfect, definition B5 provides us with a clear enough understanding of what it means for something to create another thing. We are now in a position to assess what *creatio ex nihilo* means when it claims that God created the universe. According to *creatio ex nihilo*, the universe is created by God because, first, God brought space and all physical objects, which are temporal entities, into existence at some moment a finite time ago, second, God brought time into existence and so time comprises a finite series of events and, third, God caused the first event in the life of the universe to occur at some moment a finite time ago. Hence, not only does the universe ontologically depend on God, but it is also *created* (B5) by God and had a beginning in time.

It is important to note that the KCA fully supports this second aspect of *creatio ex nihilo*. If valid, the KCA shows that time comprises a finite series of events, that there is a first event, and that God (a transcendent personal being) brought the universe into existence at some moment a finite time ago. Hence, the KCA is, in essence, an argument in favour of the view that God created (B5) the universe.

2.2.3 Time Began to Exist

As we have seen, the second aspect of *creatio ex nihilo* claims that the universe is created by God. However, *creatio ex materia* also maintains that the universe is created but it goes further by declaring that the universe was created out of some other eternal, physical reality. Therefore, to distinguish creation *ex nihilo* from creation *ex materia*, we should stress that the former maintains that God created the universe literally *out of nothing* – God created our spatio-temporal reality without the use of pre-existing time or matter. Therefore, the third emphasis of *creatio ex nihilo* is that *time had an absolute beginning*. For time to begin means that the temporal series of past events is finite and not infinite (or eternal). In addition, if time had an *absolute* beginning then time is not preceded by another eternal time. Several Greeks entertained the notion that an eternal and disorderly time existed before the current orderly time (Sorabji, 2006:270). For example, in his *Quaestiones Platonicae* (*Platonic Questions*) 8.4, Plutarch (*c.* AD 46-120) interprets Plato to be affirming that, although *orderly* time had a beginning, it is preceded by *disorderly* or formless time:

> Plato says that time and heaven had being. But time was not. For then there neither was order, nor measure, nor determination; but indefinite motion, as it were, the formless and rude matter

> of time. ... But when matter was informed with figures, and motion with circuitions, from that came the world, from this time (Plutarch, 1878:440-441).

Regardless of how correctly Plutarch interprets Plato, the salient point is that the Greeks considered the possibility that time does not have an absolute beginning as disorderly time had no beginning. Conversely, the doctrine of *creatio ex nihilo* states that time had an absolute beginning because God brought time into existence, either before or simultaneously with His act of creating matter or with His act of creating spiritual beings.

However, because the KCA tries to show it is impossible for any temporal series of events to be infinite, the KCA fully supports the view that time had an absolute beginning. If every temporal series of past events is finite, then every temporal reality had a beginning. Hence, even if there were another temporal reality prior to this universe, that temporal reality must have had a beginning. If the KCA is successful, it shows that time began and had a first event.

2.2.4 Matter Began to Exist

Fourthly, *creatio ex nihilo* states that *matter had an absolute beginning.*[12] The issue here is whether matter is eternal, had a beginning, or is formed out of pre-existing primordial matter. The position of the ancient Greeks is that matter is eternal, yet the *order* of matter had a beginning. In other words, God or the demiurge forms matter out of an eternal and disorderly matter. Hence, although the Greeks deny a beginning of the material universe, several of them grant that the *kosmos* had a beginning. Unfortunately, the Greek term *kosmos* is ambiguous. Initially, *kosmos* meant "order," but, in around the fourth-century BC, the Greeks started to use *kosmos* to mean "world"

[12] The meaning of the term "matter" has evolved throughout intellectual history (see Toulmin, 2006:58). The ancient Greek philosophers distinguished between four kinds of material substance, namely, solid, air, liquid, and fire. Subsequently, Aristotle distinguished between an object's material components and its form, and he spoke about prime matter (*hulê*) as the most fundamental subject that carries the properties of a body (*Metaphysics* 7.3). In the seventeenth century, as a result of Sir Isaac Newton's laws of mathematics and gravitation, matter was distinguished from force – a material object possesses mass, inertia, and weight; whereas force denotes the measure of the system of interaction between material objects. However, in the eighteenth century, in light of the realisation that specific kinds of radiation carry energy but do not have mass, matter was distinguished from energy. Several years later, the work of Albert Einstein prompted scientists to reconsider the notions of matter, mass, and energy. Consequently, matter is believed to possess energy (i.e. the capacity to perform work), which comes in various forms, such as rest mass energy (as described by $E = mc^2$) or kinetic energy.

Suffice it to say, our contemporary understanding of "matter" is very different to that of the ancients (for a discussion of matter in antiquity see Sorabji, 1988:3-122; Haas, 1997). However, modern scientists use the term "matter" in different ways. For example, "matter" is sometimes used to simply denote atoms while, at other times, it refers to all elementary particles (such as electrons, photons, and quarks). Therefore, to avoid confusion, I shall use the term "matter" here to represent *all entities that exist within space and time (or space-time) and that form the fundamental building blocks of the natural world.* In this sense, matter includes all elementary particles, fields, and any other physical entities as yet unknown.

or "world-order". However, in his *Timaeus*, Plato uses *kosmos* synonymously with *ouranos*,[13] which means "heaven" (Share, 2014:7). Furthermore, *kosmos* was used on occasions synonymously with the term *to pan*, which means "the all" or "the whole," to denote the entire universe. Thus, when the Greeks claim that the *kosmos* had a beginning, they do not mean that matter has an absolute beginning but, rather, that the current "orderly arrangement of the earth and heavens" had a beginning (Sorabji, 2006:193).

In contrast to the Greek view of *creatio ex materia*, the doctrine of *creatio ex nihilo* insists that matter has an absolute beginning. However, one may raise the objection that God creating the universe without the use of pre-existing matter is puzzling. The problem, says the critic, is that all material objects have material causes (i.e. what the object is made out of). Thus, since the universe is a material object, the universe must have a material cause. However, this conclusion implies that the universe, if it is created, must be created out of matter and, thus, *creatio ex nihilo* is impossible.

This objection is, however, confusing. The term "universe," at least in *creatio ex nihilo*, refers to much more than all material or composite objects.[14]

[13] See, for example, *Timaeus* 28b: "Now the whole Heaven, or Cosmos, or if there is any other name which it specially prefers, by that let us call it, – so, be its name what it may, we must first investigate concerning it that primary question which has to be investigated at the outset in every case, – namely, whether it has existed always, having no beginning of generation, or whether it has come into existence, having begun from some beginning."

[14] Composite objects are distinguished from simple objects (also known as mereological or material simples). The former comprise proper parts while the latter comprise no parts. For example, rocks, planets, and people are composite objects made up of particles but

"Universe" denotes all physical reality, that is, all space, time, matter, and all composite objects. Therefore, no physical reality exists outside the universe and so the universe is not a material object made out of matter. Of course, the composite objects (such as stars and planets) within the universe are material objects. Nevertheless, space, time, and matter are not themselves material objects requiring material causes and the universe would exist even if space-time were devoid of any composite object. Thus, the universe is not a material object that requires a material cause.

Furthermore, it is important to stress that *creatio ex nihilo* insists that matter, whether once formless or not, has an absolute beginning because God creates *all* matter, including any primordial substratum. Therefore, *creatio ex nihilo* does not invalidate the so-called *two-stage creation* or *double creation* theory, which states that God first creates a material substratum out of which He subsequently forms the universe.[15] Instead, *creatio ex nihilo* merely denies that matter is co-eternal with God. In light of the fact that the view that God brought matter into existence out of nothing is logically coherent (What could be logically impossible about an all-powerful God creating matter?), *creatio ex nihilo* certainly appears possible.

We see, then, how the KCA supports this fourth aspect of *creatio ex*

fundamental particles are simple objects because they lack any parts.

[15] Several Church fathers, such as Tatian (*Address to the Greeks* 5), adopt such a two-stage creation theory.

nihilo. Because matter is a temporal entity (for its very nature involves continues change), matter cannot exist in a timeless state.[16] Therefore, by showing that time had a beginning, the KCA inadvertently shows that all matter had a beginning.

2.2.5 God is Transcendent

The fifth aspect of *creatio ex nihilo* is that *God transcends His creation*. Thus, because God created everything, He transcends everything.[17] Various theological models of divine transcendence exist, such as those of Søren Kierkegaard or Karl Barth (also see Stoker & van der Merwe, 2012). However, these models supplement the doctrine of *creatio ex nihilo* rather than oppose it. Creation *ex nihilo* includes the general view that (1) God is separate from His creation, (2) God is independent of His creation, and (3) God alone is eternal. Firstly, God is separate from creation because the universe is neither *identical* to God (pantheism) nor is it *in* or *part of* God's being (panentheism). Accordingly, *creatio ex nihilo* is opposed to *creatio ex deo* (creation out of God's being) which states that the universe emanates from God's being. Secondly, although everything depends on God, God depends

[16] Indeed, even the most perfect quantum vacuum is constantly changing for the vacuum comprises a host of fluctuating virtual particles (see Silk, 2001:387).

[17] Transcendence is also an important topic in contemporary philosophy of religion. Anné H. Verhoef, for example, argues that happiness is related to transcendence (2014a) and that evil may, to some extent, be associated with transcendence (2014b).

on nothing. In other words, God is completely independent and this entails, thirdly, that God alone is eternal because no metaphysical dualism exists in which God shares eternity with another reality. Rather, God alone is the absolute one, the ultimate reality and wholly other because eternity belongs solely to Him.[18]

The KCA, once again, supports the view that God is transcendent. Since the cause of the universe brought all space, time, and matter into existence, the KCA concludes that this cause must, itself, be spaceless, timeless, immaterial, beginningless and non-physical. Consequently, the cause of the universe (or first cause) is separate from the universe. Moreover, the first cause is independent of the universe because it does not depend on the universe for its existence. Therefore, according to the KCA, the cause of the universe (or God) is transcendent.

2.2.6 God Freely Creates

Finally, *creatio ex nihilo* emphasises that *creation is an act of God's free will*. God could have not created a reality distinct from Himself and, yet, He freely chose to create the universe. According to the *Evangelical Dictionary of Theology*, "God brought the world into existence 'out of nothing' through

[18] For an interesting discussion about the relationship between God's eternity and His transcendence, see Verhoef (2011).

a purposeful act of his free will" (Elwell, 2001:304). When we state that God "chooses" to create the universe, we do not mean that God changes His mind or will about creating the universe but, rather, God "chooses" to create the universe in the sense that He wills from eternity to create the universe in time. Creation *ex nihilo*, then, declares that God intentionally, purposefully, and freely wills from eternity to bring the universe into existence.

Wes Morriston (2000:163-168; 2003:105-107), however, has recently advanced a notable objection to the view that creation is an act of God's free will. Morriston argues that God's eternal will to create the universe is sufficient for the existence of the universe. However, since an eternal sufficient cause must have an eternal effect, the universe must be eternal.[19] Therefore, according to Morriston, if it is God's eternal will that the universe should exist, the universe would exist for as long as God's will has existed, namely, eternally. Morriston concludes that God cannot will from eternity to create a "universe with a beginning" and, thus, creation *ex nihilo* cannot be an act of God's free will.

Nevertheless, however interesting, Morriston's argument fails because God's will alone is not sufficient for the existence of the universe. Not only

[19] A *sufficient* cause brings forth its effect as soon as all the relevant conditions are in place. For example, a man placing his foot in sand is sufficient for a footprint in the sand. As soon as the sufficient cause occurs (i.e. the man placing his foot in the sand), the effect occurs (i.e. a footprint appears in the sand). Hence, if the man's foot is in the sand from eternity, the footprint must be eternal. This illustrates that, if a sufficient cause is eternal, its effect must be eternal.

must God will that the universe exist but God must also *actually create the universe*. Hence, God's will, together with His power and activity of creating the universe, are sufficient for the existence of the universe. As an analogy, imagine that, upon waking up in the morning, Jones desires to make himself a cup of coffee at noon. Now, although it is Jones' will to make a cup of coffee at noon, his will is not sufficient for the existence of the cup of coffee. When noon arrives, Jones must engage in the activity of making a cup of coffee, and this activity, together with Jones' will and ability to make a cup of coffee, is sufficient for the existence of the cup of coffee. Likewise, in order for God to create the universe in time, God must (1) will to create the universe, (2) possess the power to create the universe, and (3) actually create the universe.

There is no doubt that, if God creates a universe with a beginning, God must undergo an intrinsic change in terms of which He decides to create "now." In other words, prior[20] to His creative act, God desires to *create the universe but not immediately*, and, at the moment of creation, God undergoes an intrinsic change whereby He decides to *create the universe immediately.*[21]

[20] I use the term "prior" here, not in a temporal sense because there is no time temporally prior to God's creative act, but rather to denote the state of affairs in which God exists without the universe.

[21] If God cannot undergo an intrinsic change then either God would never decide to create the universe (for He will always desire to *create the universe but not immediately*) or God would bring the universe into existence from eternity (for He will decide from eternity to *create the universe immediately*). Moreover, if God undergoes such an intrinsic change, this would bring God into time at once.

However, it is important to note that such an intrinsic change does not mean that God changes His will or mind about creating the universe. At this point it is helpful to distinguish between *God's changing His mind about creating the universe* and *God's deciding to create the universe*:

C1 God changes His mind about creating the universe $=_{\text{def.}}$ prior to His creative act God did not desire to create the universe but, at the moment of creation, God changes His mind and now desires to create the universe.

C2 God decides to create the universe $=_{\text{def.}}$ prior to His creative act God desires to create the universe, but not immediately, and, at the moment of creation, God decides to act upon this desire by actually creating the universe.

Naturally, *creatio ex nihilo* rejects C1 because the latter conflicts with the scriptures that state that God's character, nature, and plans do not change.[22] Therefore, I suggest that *creatio ex nihilo* be understood in terms of C2 (or something very similar) and which allows God to undergo an intrinsic change in deciding to create the universe without changing His character, nature, or plans, because it is God's eternal plan to create the universe with a beginning and to act upon this plan by deciding to create the universe a finite time ago.

[22] See, for example, Psalm 33:11; 102:26-27; Numbers 23:19; Malachi 3:6; James 1:17.

C2 is a plausible account of how an eternal cause may have a finite effect.[23]

Now, proponents of the KCA maintain that the cause of the universe is a person because the only explanation for why the universe came into existence a finite time ago is that a free, personal agent decided to bring it into being. If the first cause lacked free will, the universe would either eternally co-exist with the first cause or never come into existence. Moreover, since the first cause brought everything into existence, its actions cannot be determined by factors outside of itself and, thus, its creative act must be free. Accordingly, the KCA fully supports the view that creation is an act of God's free will.

2.3 Is *Creatio Ex Nihilo* an Important Theistic Doctrine?

I have argued thus far that the KCA tries to prove, at least to some extent, the six theological assertions or implications of the doctrine of *creatio ex nihilo*. If successful, the KCA shows that (1) the universe (all space, time, and matter) depends on God for its existence, (2) the universe is created by God, (3) time

[23] The doctrine of divine immutability declares that God cannot undergo any intrinsic change whatsoever. Therefore, the defenders of divine immutability (and the defenders of divine timelessness) will find fault with the view that God undergoes an intrinsic change at the moment of creation. However, apart from C2, which affirms that God undergoes an intrinsic change by deciding to create at some moment, I see no other way of harmonising God's eternally willing to create with God's act of creating a finite time ago. Nevertheless, because Scripture does not rule out C2, and because the doctrine of divine immutability appears to conflict with *creatio ex nihilo*, I believe the theist is justified in affirming C2.

has an absolute beginning, (4) matter has an absolute beginning, (5) God transcends the universe, and (6) God freely chose to bring the universe into existence. Therefore, the KCA is not merely an argument in favour of God's existence, it is also an argument in favour of a theistic doctrine. This fact, in turn, sets the KCA apart from other theistic arguments that purely try to prove a deity. For this reason, even if the KCA cannot be used to prove a particular God, it may support the doctrine of *creatio ex nihilo*.

The following question then arises: *Is* creatio ex nihilo *an important theistic doctrine?* In view of the fact that the KCA supports *creatio ex nihilo*, the KCA may be important if *creatio ex nihilo* is extremely significant for theism. However, if *creatio ex nihilo* is a controversial doctrine that very few theists defend, the KCA may not be all that important. Therefore, I shall briefly evaluate whether *creatio ex nihilo* may be regarded as an important theistic doctrine.

2.3.1 Scriptural Support for *Creatio Ex Nihilo*

It is no surprise that many Jews and Christians believe Scripture upholds *creatio ex nihilo*. The Old Testament (OT) or Hebrew Bible begins with the proclamation, "In the beginning God created the heavens and the earth"

(Genesis 1:1).[24] There is good reason to believe that the first verse (v. 1) of Genesis 1 implicitly suggests *creatio ex nihilo*. Firstly, v. 1 should be read as a principal or independent clause and not as a subordinate clause (Westermann, 1994:95-97).[25] Reading v. 1 as a principal clause strongly suggests an absolute beginning of the universe *ex nihilo* (see Mathews, 1996:139-144; Craig, 2001a:249-250). Secondly, since the Hebrew OT does not have a term for "the universe," the phrase "heaven and earth" is a Hebrew idiom (or merism)[26] that refers to the entire universe (Waltke, 1991:3-4; Copan & Craig, 2004; Pennington, 2007:167-168; Erickson, 2013:342).[27] Thus, in the context of Genesis 1, "heaven and earth" denotes the totality of the universe and this, in turn, implies *creatio ex nihilo* (Mathews, 1996:142). Thirdly, throughout

[24] Unless otherwise indicated, Scripture quotations are taken from the New International Version (NIV) of the Bible.

[25] If v. 1 is taken as a subordinate clause, it would read "In the beginning, when God created the heavens and the earth, the earth was formless and empty ... " Thus, reading v. 1 as a subordinate clause gives the impression that God created the universe, not out of nothing, but out of a pre-existing chaotic state.

Claus Westermann (1994:95-97), however, offers the following grounds for reading Genesis 1:1 as a principal clause: Firstly, there is no reason why the phrase "In the beginning" cannot refer to an absolute beginning in time. Secondly, the syntax of vv. 1-3 does not imply that v. 1 is a subordinate clause part of a construct chain, especially in view of the fact that the phrase "the earth" in v. 2 is not equivalent to "heaven and earth" in v. 1. Thirdly, the structure of v. 1 does not correspond to other ancient creation stories. These other creation stories (such as *Enuma Elish*) begin by describing the state before creation occurred, but Genesis 1:1 begins immediately with God's creative act. Finally, reading v. 1 as a principal clause is in harmony with the style of the author of Genesis 1. Westermann concludes, "The first verse then is to be understood as a principal sentence" (Westermann, 1994:97).

[26] A merism is a rhetoric device that uses two contrasting parts to refer to an entirety. For example, the phrase "high and low" in the sentence "I searched my office high and low" is a merism referring to everywhere.

[27] According to the biblical scholar, Jonathan T. Pennington, "[i]t is common knowledge that the phrase heaven and earth in the OT is the Israelites' ordinary way to refer to the cosmos or the entire created world" (Pennington, 2007:167).

the OT, the Hebrew verb *bārā'* ("create"), which is used in v. 1, is always used with God as the subject and is never used with the object of the material out of which God creates (Westermann, 1994:97). Hence, although *bārā'* does not always refer to *creatio ex nihilo*, it may refer to God creating *ex nihilo*.

Finally, as Mark F. Rooker (1992:416-419) argues, because (1) *bārā'* is connected to the phrase "in the beginning" in v. 1, (2) *bārā'* is the most applicable Hebrew term the author of Genesis may use to denote *creatio ex nihilo*, and (3) it is significant that the author of Genesis refrains from mentioning pre-existing matter (given the cultural background of the ancient Near East in which pre-existing matter was of great importance for the pagans), v. 1 is best read as implying *creatio ex nihilo*. Rooker declares that "while [*creatio ex nihilo*] is not the inherent meaning of [*bārā'*] or of any word, for that matter, [*bārā'*] would be the best candidate from the semantic pool of Hebrew verbs for expressing a creation that is unprecedented, namely, *creatio ex nihilo*. ... [I]f Moses wanted to refer to God as the Reshaper of existing matter, there were better lexical choices at his disposal to convey this idea" (Rooker, 1992:418-419). In light of these four reasons, the most favourable interpretation of v. 1 is that God created the universe *ex nihilo*.

By affirming that God created everything, several other OT texts also imply *creatio ex nihilo*. For example, in Jeremiah we read that "God made

the earth by his power; he founded the world by his wisdom and stretched out the heavens by his understanding. ... [God] is the Maker of all things" (Jeremiah 10:12, 16). Similarly, in Isaiah 44:24 God says, "I am the Lord, the Maker of all things, who stretches out the heavens, who spreads out the earth by myself". The Hebrew term *kōl* ("all things") used in these verses literally means everything (Mounce, 2006:12), which would include, if necessary, any primordial substratum.

Proverbs 8 speaks about "the very beginning, when the world came to be. When there were no watery depths ... when he set the heavens in place, when he marked out the horizon on the face of the deep" (v. 23, 24, 27). According to this verse, even the "deep" and the "waters" of Genesis 1:2 are not eternal but created. The OT also refers to God as "the first and the last" (Isaiah 44:6) who is "from everlasting to everlasting" (Psalm 90:2). The phrase "first and last" is a merism meaning "the only one" (Mounce, 2006:254), while "everlasting to everlasting" emphasises God's eternity. Thus, these verses affirm God as the only eternal being and this, in turn, supports the notion of *creatio ex nihilo*.

The New Testament's (NT) proclamation of God's absolute creation is perhaps more explicit than the OT. St John proclaims that God (the Logos) created *all things* apart from Himself: "Through him [i.e. the Logos] all things were made; without him nothing was made that has been made"

(John 1:3). In addition, St John distinguishes between the eternal Creator (the Logos) who was "*in* the beginning" (v. 1:1) and all creation that came into being (v. 1:3). However, this distinction between Creator and creation would be pointless if St John means that God is not the sole eternal being. As Jack Cottrell remarks,

> Without *ex nihilo* origination, the things which "came into being" would have been in a real sense just as much "in the beginning" as was the Logos; and the whole point of the passage – the exaltation of the Logos – would be undermined (Cottrell, 2000:109).

Therefore, John 1:3 affirms that everything apart from God (which clearly includes, if necessary, a primordial substratum) was created by God.

Both St Paul and St Barnabas refer to God as the one "who made the heavens and the earth and the sea and everything in them" (Acts 14:15; *cf.* Psalm 146:6). This proclamation "strongly brings out the distinction between Christian and pagan cosmology" (Guthrie, 1981:135) with the former stressing that God is the creator of all things. Elsewhere, St Paul declares that "there is but one God, the Father, from whom all things came and for whom we live; and there is but one Lord, Jesus Christ, through whom all things came and through whom we live" (1 Corinthians 8:6). And again: "For from him [i.e. God] and through him and for him are all things" (Romans 11:36).

In his letter to the Colossian church, St Paul emphasises the view that God created everything:

> For in him all things were created: things in heaven and on earth, visible and invisible, whether thrones or powers or rulers or authorities; all things have been created through him and for him. He is before all things, and in him all things hold together (Colossians 1:16-17).

Therefore, according to St Paul, all things originate in God and, thus, "God ... gives life to the dead and calls into being things that were not" (Romans 4:17). St Paul's theology clearly excludes *creatio ex materia* and supports *creatio ex nihilo*.

Several other NT passages plainly express the concept of *creatio ex nihilo*. For example, Hebrews 11:3 states that "By faith we understand that the universe was formed at God's command, so that what is seen was not made out of what was visible." Taken at face value, this verse rules out *creatio ex materia* because primordial matter, which is visible, is excluded from the "invisible" stuff (or nothing) out of which what is seen was made. Ephesians 3:9 maintains that God "created all things." Likewise, Revelation 4:11 cries "You are worthy, our Lord and God, to receive glory and honor and power, for you created all things, and by your will they were created and have their

being."

Thus, in view of the fact that *creatio ex nihilo* is implied by both the OT and NT affirmations that God created all things outside Himself, *creatio ex nihilo* is an important scriptural teaching.[28]

2.3.2 Notable Theists Who Affirm *Creatio Ex Nihilo*

In addition to the scriptural affirmation of *creatio ex nihilo*, the majority of theists have zealously upheld *creatio ex nihilo* as an orthodox doctrine since at least the first century AD. I shall mention merely a few of the most prominent Christian and Jewish thinkers who affirm this doctrine. By doing this, I hope to show that *creatio ex nihilo* is regarded as a crucial doctrine of theism.

2.3.2.1 Christianity and *Creatio Ex Nihilo*

The very early Christians did not explicitly discuss *creatio ex nihilo* or use the exact phrase "creation out of nothing". Nevertheless, their statements

[28] 2 Peter 3:5 is often used as support for *creatio ex materia*, stating that "... long ago by God's word the heavens came into being and the earth was formed out of water and by water." However, as Paul Copan (2005:47-48) notes, there are three reasons why the phrase "the earth was formed out of water and by water" does not imply that God created the universe out of matter/water. Firstly, St Peter would have been familiar with the OT passages that exalt God as the creator of all things. Thus, 2 Peter embraces the biblical worldview that denies any eternal dualism. Secondly, by claiming that the world was formed out of water, St Peter is probably describing a two-stage creation in which God first creates the "waters" out of which He subsequently forms the world. Finally, St Paul's point is to link the world's creation "by water" in v. 5 with the world's destruction "by water" in v. 6. Therefore, we should not read *creatio ex materia* into 2 Peter 3:5.

regarding creation would appear to refer to the concept of creation *ex nihilo*. For example, St. Clement of Rome (AD *c.* 30-*c.* 99) declares that God is both the "Father and Creator of the universe" (*1 Clement* 19) and "the great Creator and Lord of all" (*1 Clement* 20).[29] According to Clement, God is "the Creator of all" and "the ultimate source of all creation" (*1 Clement* 59).[30] These passages clearly uphold the *concept* of creation out of nothing.

The *Shepherd of Hermas* (*c.* AD 110-140), a significant Christian work, asserts that God "created and completed all things, and made everything that exists" (*Commandment* 1.1.1) and that the Holy Spirit "preexisted and created all things" (*Parable* 5.6.5).[31] It is important to note that *Hermas* instructs us to believe that God created out of nothing:

> First of all, believe that God is one, who created and completed all things, and made everything that exists out of that which did not, who contains all things but is himself alone, uncontained (*Commandment* 1.1.1; Hermas, 2003:237).

Hence, according to *Hermas*, God created everything that exists out of non-being or nothing.

[29] Unless otherwise indicated, quotations of the early Christians are taken from Schaff (1885). Available from: `http://www.ccel.org/node/70` [Accessed September 18, 2014].

[30] This quotation is taken from Bart D. Ehrman's (Clement, 2003:141) translation of *1 Clement*.

[31] These quotations are taken from Ehrman's translation of *Hermas*. See Hermas (2003:237) and Hermas (2003:335), respectively.

Similarly, in his *Address to the Greeks*, Tatian the Assyrian (*c.* 120-*c.* 180 AD) declares that "the Logos, begotten in the beginning, begat in turn our world, having first created for Himself the necessary matter ... For matter is not, like God, without beginning, nor, as having no beginning, is of equal power with God; it is begotten, and not produced by any other being, but brought into existence by the Framer of all things alone" (*Address to the Greeks* 5). Tatian's contemporary, Theophilus of Antioch (died *c.* 183-185 AD), attacks those who claim that matter is uncreated and eternal. According to Theophilus, if we insist that matter is eternal, then it is not possible for us to claim that God is the creator of *all* things; in fact, we should then affirm that matter is equal to God (*Apologia ad Autolycum* [*Apology to Autolycus*] 2.4).

Aristides, the Christian apologist from Athens, in his *Apology of Aristides* (*c.* AD 125) describes God as the one "who made all things for the sake of mankind" (*Apology* 1 [Syriac]). Furthermore, Aristides stresses that "[God] has no name, for everything which has a name is kindred to things created" (*Apology* 1 [Syriac]). The obvious inference from this latter statement is that, since all matter (whether formless or orderly) has a name, it is created.

The three Church Fathers, Irenaeus of Lyons (*c.* 130-*c.* 202), Tertullian (*c.* 160-*c.* 225), and Origen (*c.* 184-*c.* 253), go even further and claim that *creatio ex nihilo* is a crucial aspect of the Christian faith. In his *Adversus*

haereses (*Against heresies*) 2.10.4, Irenaeus advocates *creatio ex nihilo* by distinguishing between a human architect, who creates out of existing materials, and the divine Creator, who creates out of nothing.[32] The notable Irenaeus scholar, M.C. Steenberg, expounds on Irenaeus' view:

> The nature of God as one who creates *ex nihilo* reveals to Irenaeus significant details on the character of the physical and spiritual worlds, about the very being of beings. In turn, that a being (or more specifically, all beings) are fashioned *ex nihilo*, is revelatory for him of the character of God as creator of such realities. ... Misconceptions over the manner of creation – especially those that deny or do not fully express a creation from nothing – ultimately serve to distort the notion of God as good and powerful which ... lies at the heart of Irenaeus' whole theology (Steenberg, 2008:39).

Thus, according to Irenaeus, *creatio ex nihilo* is a central tenet of Christianity.

Tertullian, the second century theologian who, in all likelihood, was the first to use the term *Trinitas* (Trinity) to describe the relationship between the Father, Son, and Holy Spirit, appears to be more relentless than Irenaeus. In his *Adversus Hermogenem* (*Against Hermogenes*) 1, Tertullian criticises Hermogenes for denying *creatio ex nihilo* and, in turn, for placing

[32] *Cf. Adversus haereses* 2.10.2; 2.10.3; 2.11.1; 2.14.4; 2.28.7; 2.30.9; 4.20.2.

matter on the same level with God. Furthermore, Tertullian argues that Genesis 1:1 plainly teaches that God created all things out of nothing (*Adversus* 19). Most noteworthy, however, is the fact that Tertullian identifies *creatio ex nihilo* as a "rule of faith," thereby implying that the doctrine is a fundamental and orthodox doctrine for all believers (*Adversus* 33; *De Praescriptione Haereticorum* [*Prescription against Heretics*] 13). Similarly, Origen expresses bewilderment at the fact that many of his peers believed matter is eternal. "I cannot understand how so many distinguished men," declares Origen, "have been of opinion that ... matter ... was uncreated, i.e., not formed by God Himself, who is the Creator of all things" (*De Principiis* [*On First Principles*] 2.1.4).

Clearly, *creatio ex nihilo* has become an extremely important tenet of Christianity. In fact, in 1215 the Fourth Lateran Council professed that God is the "creator of all things invisible and visible, spiritual and corporeal" and that "by his almighty power at the beginning of time [God] created *from nothing* both spiritual and corporeal creatures" (emphasis added). The gravity which the Church attaches to *creatio ex nihilo* is illustrated by Bishop Tempier's condemnation of 1277. In 1277, Pope John XXI heard reports of heresy committed by members of the Faculty of Arts at the University of Paris and he requested the Bishop of Paris, Stephen Tempier, to investigate

these reports.[33] Subsequently, on March 7, 1277, Bishop Tempier issued a list of 219 condemned propositions and threatened to excommunicate anyone teaching or supporting these propositions (Thijssen, 2013). Tempier's list is one of several lists that were assembled into organised collections of prohibited beliefs or articles. The propositions prohibited in these lists were clearly contrary to the orthodox teachings of the Christian Church.[34]

Concerning the doctrine of *creatio ex nihilo*, Tempier's list strongly prohibits any view referring to an eternal universe. In other words, any antithesis of *creatio ex nihilo* is condemned as heresy. For example, the twenty second condemned proposition states that "God cannot be the cause of a newly-made thing and cannot produce anything new" (Tempier, 2010:542). Thus, it was heresy to deny that God possessed the ability to create something "new," such as matter, which had not existed before. Proposition 39 denies the uniqueness of God's divine eternity because "all the separated substances are coeternal with the first principle [God]" (Tempier, 2010:543).[35] Proposition 85 states that "the world is eternal as regards all the species contained in

[33] Dominated by the Christian milieu of Paris at the time, the members of the Faculty of Arts were required to treat the authority of philosophy as inferior to the authority of faith. In addition, they were required to submit to the dogmas of the Church (see Ebbesen, 1998:269).

[34] As Hans Thijssen remarks, "[t]he collection of Parisian Articles must have had some kind of official status, and must have circulated among medieval scholars. Bachelors in theology were required by oath not to maintain anything 'in favor of articles that have been condemned at the Roman curia or in Paris'" (Thijssen, 2013).

[35] *Cf.* proposition 37: "That the first principle is not the proper cause of eternal things except metaphorically, because it conserves them – that is, because unless it existed, they would not exist" (Tempier, 2010:543).

it, and that time, motion, matter, agent, and receiver are eternal" (Tempier, 2010:545). Hence, belief in eternal matter was considered to be blasphemy. Furthermore, it was unacceptable for a Christian to believe that "time is infinite at both ends" (Tempier, 2010:545 [proposition 88]) or that "it is not true that something comes from nothing or was made in a first creation" (Tempier, 2010:549 [proposition 188]). Moreover, if one affirmed that God created the universe out of nothing, one was forbidden to state that this "nothing" was really something, namely, an empty void or vacuum that had been set up "before the world's generation" (Tempier, 2010:190 [proposition 188]).

These examples illustrate that the Christian Church does not merely consider *creatio ex nihilo* an *important* Christian doctrine, but it considers *creatio ex nihilo* to be an *orthodox* Christian doctrine.

2.3.2.2 Judaism and *Creatio Ex Nihilo*

In common with many Christian scholars, the majority of Jewish scholars uphold the doctrine of *creatio ex nihilo*. Some of the most prominent Jews who endorse the doctrine include, inter alia, Israeli, ibn Paquda, Chiyya, Maimonides, Albo, Abravanel, Shalom, Bibago, and Arama.

Isaac Israeli (*c.* 855-*c.* 955), who is believed to be the first Jewish Neoplatonist, distinguishes between two kinds of "creation," namely, (1) God's

act of creating out of nothing, and (2) nature's act of creation out of something (*Kitab al-Hudud* [*Book of Definitions*, date unknown] 42-45). According to Israeli, nature brings "into being existences from the existing" (*Kitab al-Hudud* 43), whereas only God engages in "making-anew," that is, "making existent existences from the non-existent" (*Kitab al-Hudud* 42). The Israeli scholar, Alexander Altmann, argues that these passages expose Israeli's "insistence on creation from nothing," and also suggest that Israeli "upholds ... the doctrine of *creatio ex nihilo*" (in Altmann & Stern, 2009:152-153).

Bachya/Bahya ben Joseph ibn Paquda (11 century), the notable Jewish philosopher and rabbi, argues in his major philosophical work, *Kitāb al-Hidāya ilā Farā'iḍ al-Qulūb* (*Duties of the Heart*),[36] chapter 4, that an investigation into the nature of God's unity should begin with a demonstration of *creatio ex nihilo*:

> What is the method for investigating the true nature of God's unity? ... One must first investigate whether or not the world has a Creator. Once it is established that the world has a Creator, Who created it and brought it into existence from nonexistence, one then inquires whether He is one or more than one (ibn Paquda, 1999:79-81).

[36] Judah ibn Tibbon was the first to translate *Duties of the Heart* into Hebrew around 1160.

Bachya then goes on to argue "that the world has a Creator, Who brought it into existence from nonexistence" (*Duties* 5; ibn Paquda, 1999:81).

Abraham bar Chiyya/Hiyya (*c.* 1065-1136), the influential astronomer, mathematician and philosopher (who introduced Ptolemy's writings to the Hebrews for the first time), appears to embrace a two-stage account of creation (*Hegyon ha-Nefesh ha-Atzuvah* [*Meditation of the Sad Soul*, date unknown], part 1). God first creates the potentiality of matter *ex nihilo*, and then He actualises this potentiality and gives matter form. Moreover, according to Chiyya, in view of the fact that time, matter, and motion come into existence, the universe cannot be eternal (see Rudavsky, 2003:165).

Moses Maimonides (*c.* 1135-1204), whose legacy and influence on Jewish history cannot be overestimated, goes a step further and stresses that the doctrine of creation is a principle of the Law. In his *Guide of the Perplexed* (12 century), which is considered the single most significant Jewish philosophical discourse ever written, Maimonides distinguishes between three theories regarding the eternity of the universe, namely, (1) that God brought all things, other than Himself, into existence out of non-existence, (2) that God formed the universe out of pre-existing eternal matter, and (3) that the orderly arrangement of the universe is both dependent on and co-eternal with God because the universe *has* always been and *will* always remain in this orderly state (*Guide* 13).

Maimonides goes on to state that all the arguments in favour of the second and third theories fail as conclusive proof of an eternal universe (*Guide* 14-22). On the other hand, the first theory of *creatio ex nihilo* is the superior and preferable theory (*Guide* 23). Indeed, according to Maimonides, *creatio ex nihilo* is a *fundamental* teaching of the Torah, ranked directly below the teaching of God's unity (*Guide* 13). "All who follow the Law of Moses, our Teacher, and Abraham, our Father," declares Maimonides, "assume that nothing is eternal except God, and that the theory of *Creatio ex nihilo* includes nothing that is impossible" (*Guide* 13). Maimonides maintains that the doctrine of creation out of nothing should be considered a fundamental Jewish doctrine because it demonstrates the possibility of miracles, revelation, and God's intervening in the universe at any moment (*Guide* 25). If God, of His own will, brought the universe into existence out of non-existence, then all the miracles recorded in Scripture are clearly possible and there is no doubt that God revealed the Law to Moses. Conversely, if the universe were eternal with events occurring out of necessity, as the third theory implies, then God could not intervene in history, miracles would not be possible, and the Torah could not have been revealed to Moses. Therefore, as Herbert A. Davidson points out, what is at stake for Maimonides is "the conception of a deity who can intervene in nature and interrupt the natural course of events. The thesis of creation entails, and the eternity of the world excludes, such a

deity" (Davidson, 2005:368). Therefore, the doctrine of *creatio ex nihilo* is, in the opinion of Maimonides, an extremely significant doctrine.

Joseph Albo (*c.* 1380-1444), the fifteenth century theologian and philosopher, held the doctrine of creation out of nothing in high regard. Although Albo did not consider *creatio ex nihilo* as one of the three fundamental Jewish beliefs nor as one of the eight derivative principles of the Law, he did regard it as one of the six Jewish dogmas that every Jew must believe (*Sefer ha-'Ikkarim* [*Book of Principles* (1425)] 1.23). The Jewish historian, Isaac Husik, describes Albo's position as follows:

> Creation *ex nihilo* is neither a fundamental nor a derivative principle of religion generally or of Judaism specially because ... they can exist without this dogma. At the same time it is a truth which it behooves every religionist and particularly every Jew to believe. It follows from the principle of the existence of God. If God cannot create *ex nihilo*, there is a defect in him (Husik, 1969:415).

Thus, Albo is yet another important Jewish scholar who endorsed the doctrine of *creatio ex nihilo*.

Both Isaac ben Judah Abravanel/Abrabanel (1437–1508), the Portuguese Jewish philosopher and theologian, and Abraham ben Isaac ben Judah ben

Samuel Shalom (died 1492), the Italian Jewish theologian, are noted for defending the doctrine of creation out of nothing. For Abravanel, "the doctrine of creation *ex nihilo* is the fundamental dogma of Judaism" (Feldman, 1993:33).[37] Consequently, Abravanel felt impelled to contribute to the Jewish defence of the doctrine. In common with Abravanel, Shalom claimed that *creatio ex nihilo* is the foundation of the Torah (*Neweh Shalom* [1574] 1.3). Similarly, Abraham Bibago (15th century), a notable Spanish Jewish philosopher and theologian of the fifteenth century, argued that *creatio ex nihilo* is one of the most important principles of the Torah (*Derek Emunah* [*The Path of Faith* (1521)] 3.1).

Another notable Jewish defender of *creatio ex nihilo* is Isaac ben Moses Arama (*c.* 1420-1494), the Jewish theologian and rabbi who has been called "one of the greatest" preachers of the fifteenth century (Heller-Wilensky, 1953:132). Arama is well known for his *Akeydat Yitzchak* (*Binding of Isaac* [date unknown]), which is a philosophical commentary on the Pentateuch. According to Sarah Heller-Wilensky (1953:136), Arama regarded *creatio ex nihilo* as the most important dogma of religion because all other religious beliefs are grounded in the doctrine of creation. In common with Chiyya, Arama offered a two-stage account of creation: God first brought matter into existence out of nothing, and then He created the universe out of this matter

[37] See *Mifalot Elohim* (*Works of God* [1503]) 1.3.

(Heller-Wilensky, 1953:140). Furthermore, although Arama believed that *creatio ex nihilo* is taught in Scripture, he nevertheless offered several arguments in favour of the doctrine. One such argument is the *kalām* argument concerning the impossibility of infinite time (Heller-Wilensky, 1953:138-139). Hence, we may consider Arama as a strong defender of creation out of nothing.

In short, the majority of influential Jewish thinkers have regarded *creatio ex nihilo* as a fundamental Jewish dogma. In fact, as Charles H. Manekin notes, shortly after the fifteenth century "the belief in the temporal creation of the world ex nihilo ... became a fundamental doctrine of philosophical Judaism" (Manekin, 2003:363). *Creatio ex nihilo* may, therefore, be regarded as an extremely important theistic doctrine.

2.4 Additional Usefulness of the *Kalām* Argument

This chapter has discussed and defended the following three contentions: Firstly, *creatio ex nihilo* is a coherent doctrine, secondly, *creatio ex nihilo* is an important theistic doctrine and, thirdly, the KCA is important because it supports *creatio ex nihilo*. However, there are three additional reasons why

the KCA should be regarded as both valuable and worthwhile, namely, (1) the KCA promotes interfaith dialogue, (2) the KCA promotes interdisciplinary dialogue and, (3) the KCA sheds light on the divine attributes. These three reasons do not require a detailed exposition and, thus, I shall discuss them briefly.

2.4.1 The *Kalām* Argument Promotes Interfaith Dialogue

The Abrahamic faiths often display hostility towards one another. The reason for this, according to Oliver Leaman (Leaman, 2013:72), "is that the most bitter violence often arises through minor disagreements and technical differences, and that conflict within a single religion is often more protracted than that between quite distinct religions." Accordingly, if Jews, Christians, and Muslims share a theistic argument that they regard to be worth studying, this would promote interfaith dialogue and it may even lessen the hostility between the Abrahamic faiths. The KCA is such a shared theistic argument because the "First Cause" of the KCA may be associated with Judaism, Christianity, or Islam. Similarly, the doctrine of *creatio ex nihilo* is shared by these three faiths. Thus, the KCA is important because it unites the Abrahamic faiths in studying and defending a common belief and

a shared theistic argument, thereby encouraging interfaith dialogue.

2.4.2 The *Kalām* Argument Promotes Interdisciplinary Dialogue

Prior to Einstein's *general theory of relativity* (GR) that he formulated in 1915, the origin of the universe was a topic that was left to the philosophers. However, GR enabled scientists to develop acceptable models of the cosmos and, today, cosmology is a flourishing science. Proponents of the KCA may no longer discuss the origin of the universe in a responsible way without referring to modern cosmology. Likewise, scientists should not neglect the philosophical arguments for and against an eternal universe (see Chapter 5).

However, many scientists are not in favour of philosophy. Joseph Silk notes that, according to most physicists, "the ultimate questions about the origin of the universe must be answerable by physics rather than by philosophy" (Silk, 2001:5). Similarly, Hawking and Mlodinow (2010:13) declare, "Traditionally these [questions about the origin of the universe] are questions for philosophy, but philosophy is dead. Philosophy has not kept up with modern developments in science, particularly physics. Scientists have become the bearers of the torch of discovery in our quest for knowledge." It is ironic that these assertions are, in themselves, *philosophical* and that these

scientists have failed to offer any good reason *why* philosophy is not able to contribute to the debate on the origin of the universe.

Nevertheless, several scientists do recognise the relationship between philosophy and cosmology. For example, the prominent physicists, George F. R. Ellis, Roy Maartens, and Malcolm A. H. MacCallum (2012:554) admit that "when one probes the far reaches of cosmology, one inevitably starts to engage with philosophical issues." Noting that one such issue concerns the existence of an actual infinite, they remark, "One of the reasons that we study cosmology is our fascination with its philosophical aspects; and one that recurs is the idea of infinity in cosmology" (Ellis, Maartens & MacCallum, 2012:553). Likewise, W. R. Stoeger, Ellis, and U. Kirchner (2008) evaluate the multiverse from a *philosophical* viewpoint. Using the same philosophical arguments against the existence of an actual infinite that proponents of the KCA use, Stoeger et al. (2008:14-17) argue "that a really infinite set of physical objects is not realisable or actualizable" (Stoeger, Ellis & Kirchner, 2008:17) and, thus, a multiverse comprising an actually infinite number of universes cannot exist. This reveals that philosophy, especially the philosophical aspects of the KCA, holds significant relevance for modern cosmology. Accordingly, the KCA is valuable because it promotes dialogue between philosophers and scientists, whether they are theists or non-theists.

2.4.3 The *Kalām* Argument Sheds Light on the Divine Attributes

An important task of the philosophy of religion involves analysing the concept and nature of God. This task includes formulating coherent definitions of the divine attributes, such as omnipotence, omniscience, omnipresence, omnibenevolence, transcendence, and eternality. The KCA requires us to explore these attributes. For example, the KCA leads us to consider God's relationship to time (If God created time, is He timeless?), God's omniscience (If an actual infinite cannot exist, how should we understand God's infinite knowledge?), God's omnipotence (Does creating the universe require omnipotence?), and God's transcendence (If God created the universe, is He completely transcendent?). These topics are all relevant to both philosophers and theologians and, thus, the KCA is important because of its contribution to the discussion about these crucial topics.

Therefore, the KCA is an important and valuable argument that is worthy of serious academic reflection. Scholars may no longer dismiss the KCA as insignificant on the grounds that, even if the KCA is successful, it does not prove a particular God.

2.5 Summary and Concluding Remarks

The KCA is sometimes dismissed as unimportant because it does not prove or conclude to any particular God. However, in view of the fact that this study is a defence of the KCA, a demonstration of the importance of the KCA reinforces the study's thesis. This chapter has addressed the first, overall research question of the study, namely, *If the KCA does not conclude to a particular God, why would one think it is an important and valuable argument that is worthy of serious academic reflection?*

Firstly, I demonstrated that the doctrine of *creatio ex nihilo* is a coherent theistic doctrine encompassing the following six aspects or implications: (1) Everything apart from God depends on God for its existence, (2) Everything apart from God is created by God, (3) Time had an absolute beginning, (4) Matter had an absolute beginning, (5) God transcends His creation, and (6) Creation is an act of God's free will. I then argued, secondly, that the KCA supports the doctrine of *creatio ex nihilo* and that theists may offer the KCA in support of this doctrine. Thirdly, I showed that *creatio ex nihilo* is an important orthodox theistic doctrine because (a) *creatio ex nihilo* is entailed by Holy Scripture and (b) most of the prominent theists endorse *creatio ex nihilo*. For this reason, the KCA may be regarded as an important and valuable argument that is worthy of serious academic reflection. Finally, I

argued that the KCA offers three additional benefits to scholars, namely, (1) It provides common ground for interfaith dialogue, (2) It promotes dialogue between philosophers and scientists, and (3) It adds to the discussion about divine attributes.

The next chapter discusses the second overall research question of this study, namely, *How are the most significant versions of the KCA formulated, and do these versions permit the actual infinite?*

Chapter 3

Does the *Kalām* Argument Permit the Actual Infinite?

3.1 The Problem and the Solution

The problem: *What is the* kalām *cosmological argument and does it permit the actual infinite?* The previous chapter argued that the *kalām* cosmological argument (KCA) is an important and valuable argument that is worthy of serious academic reflection and, thus, theists should constantly improve the KCA. However, in order to improve a theistic argument one must, firstly, identify a potential weakness in the argument, secondly, evaluate whether the versions of the argument offered thus far exhibit this weakness and, finally, offer a version of the argument that is not vulnerable to such weakness. Ac-

cordingly, this study focuses on the weakness of arguing against the existence of an actual infinite.

An *actual infinite* series is an endless, completed series comprising an infinite number of members that are all present simultaneously. The actual infinite is distinguished from the *potential infinite*, which is a finite, incomplete series that grows endlessly but never becomes actually infinite. Hence, chapter 4 argues that the KCA would be more persuasive if it permitted the actual infinite,[1] while chapter 5 offers philosophical arguments, which specifically permit the actual infinite, against an eternal universe.

To state that the KCA "permits the actual infinite" means the KCA does not use any argument against the existence of the actual infinite *per se*. Instead, the KCA is silent on the issue of the existence of the actual infinite, permitting its proponents to believe that actual infinities exist. However, even if the KCA permits the actual infinite, it may still argue against the possibility of an actually infinite *series of events* while leaving open the question of whether other actual infinities may exist.

Nevertheless, before evaluating whether the KCA should permit the actual infinite (chapter 4), it is essential that one first understand what the KCA is and whether the most significant versions of the KCA permit the

[1] Recall that, by the phrase "a more persuasive KCA", I mean a stronger, more convincing, and less controversial version of the KCA than the versions offered thus far.

actual infinite. This task requires a historical survey of the KCA. Such a survey is important because scholars often misrepresent the history of the KCA. For example, Mark R. Nowacki writes,

> [John Philoponus'] argument runs thus: 1. Whatever comes to be has a cause of its coming to be. 2. The universe came to be. 3. Therefore, the universe has a cause of its coming to be (Nowacki, 2007:13).

However, as we shall see below, Philoponus, in fact, presents no such argument. Nowacki appears to be confusing Philoponus with al-Ghazālī, the Islamic theologian who offered a similar syllogism in support of a First Cause.

Again, as Richard Sorabji (2006:202-203) observes, "Many philosophers nowadays, if they know of the 'infinity' arguments at all, will know them only from Kant's *Critique of Pure Reason*. But Kant's version, in the first antinomy, is only a faint echo of the ancient originals." As Sorabji notes, Kant's discussion of the infinity arguments that are used by the proponents of the KCA is neither original nor very thorough. Any philosopher who wishes to take part in the discussion about the KCA is advised to study the actual forerunners of the argument. It is, thus, important to survey the historical background of the KCA before attempting to defend it.

Accordingly, this chapter focuses on the following two questions:

1. How are the most significant versions of the KCA formulated?
2. Do these versions of the KCA permit the actual infinite?

The proposed solution: In order to answer these two questions, this chapter offers a brief historical survey of the KCA. Space constraints prevent a comprehensive survey of the argument and, thus, this chapter discusses four of the most significant thinkers who have contributed to the development of the KCA. These thinkers include: (1) Aristotle, whose notion of infinity encouraged the development of the KCA, (2) John Philoponus, whose infinity arguments against an eternal universe form the foundation of the KCA, (3) al-Ghazālī, who is one of the most important mediaeval defenders of the argument, and (4) William Lane Craig, the foremost contemporary proponent of the KCA. After discussing these thinkers, I conclude that Philoponus, al-Ghazālī, and Craig's cumulative case against an eternal universe does not permit the actual infinite.

Perhaps the finest discussions on the history of the KCA include Harry Austryn Wolfson's (1976:355-465) exposition of *kalām* arguments for the creation of the world, William Lane Craig's (2001b) thorough analysis of the cosmological argument from Plato to Leibniz, Richard Sorabji's (2006) study of time and creation in antiquity, and Herbert A. Davidson's (1987) excellent survey of the arguments in favour of creation in mediaeval Islamic and Jewish

philosophy. The survey of the KCA presented in this chapter is unique in four ways. Firstly, unlike the other works mentioned here, this chapter includes an extremely detailed and analytical exposition of Philoponus' infinity arguments. Secondly, the works mentioned above focus on al-Ghazālī's *The Incoherence of the Philosophers* (1095), whereas this chapter concentrates primarily on al-Ghazālī's *Moderation in Belief* (*c.* 1095) in order to offer a comprehensive account of his cosmological argument. Thirdly, this survey includes a modern version of the KCA. Finally, the chapter examines whether Philoponus, al-Ghazālī, and Craig's arguments permit the actual infinite.

We shall begin our survey by analysing Aristotle's unprecedented notion of infinity.

3.2 Aristotle on Infinity

Aristotle's unique account of infinity in *Physics* 3.5-7 profoundly influenced the development of the KCA. In *Physics* 3.4, 204a7, Aristotle distinguishes between two modes of infinity, namely, infinite addition (e.g. $\frac{1}{2}+\frac{1}{4}+\frac{1}{8}$ ...) and infinite division (e.g. $1-\frac{1}{2}-\frac{1}{4}$ ...). Aristotle distinguishes further between the *potential infinite* and the *actual infinite* (*Physics* 3.6, 206a14-206a25). An *actually* infinite series exists in fulfilment because it is a completed totality of infinitely many distinct elements. On the other hand, a *potentially* infinite

series denotes an indefinite process that is never complete because it is always possible to add another element to the series. Thus, according to Aristotle, one may distinguish between four types of the infinite:

1. Actually infinite addition
2. Actually infinite division
3. Potentially infinite addition
4. Potentially infinite division

Although Aristotle denies the first three types of the infinite (*Physics* 3.5),[2] he does affirm the existence of a potentially infinite series by division. "The infinite," Aristotle writes, "exists in no other way, but in this way it does exist, potentially and by reduction" (*Physics* 3.6, 206b13).[3]

However, when Aristotle ascribes "potential" existence to the infinite, he does not mean that the infinite *will be* actual but, rather, that the infinite can exist in a restricted sense only. Aristotle explains:

> We must not construe potential existence in the way we do when we say that it is possible for this to be a statue – this will *be* a statue, but something infinite will not be in actuality. Being is spoken of in many ways, and we say that the infinite is in the

[2] Aristotle affirms the existence of a potentially infinite magnitude *by addition* only if it is identical to, or the inverse of, some potentially infinite series *by division* (*Physics* 3.6, 206b4-206b12; 3.7, 207b16-207b21).

[3] All quotations of Aristotle are taken from *The complete works of Aristotle* (1984) edited by Jonathan Barnes.

> sense in which we say it is day or it is the games, because one thing after another is always coming into existence. For of these things too the distinction between potential and actual existence holds (*Physics* 3.6, 206a19-206a24).

Thus, Aristotle's potential infinite is characterised by at least three features. Firstly, it comprises an endless *process* of coming into being or going out of existence (*Physics* 3.6, 206a32-206a34). Secondly, it "is always finite, but always different" because, as an endless series, it never reaches infinity as a limit (*Physics* 3.6, 206a26-206a34). Thirdly, contrary to what Aristotle's predecessors claimed, Aristotle argues that a potentially infinite series does not have nothing outside itself; rather, it *always* has something outside itself (*Physics* 3.6, 206b34-207a6). In other words, because new elements may be added endlessly to a potential infinite, it always has potential elements outside itself.

Oddly enough, however, Aristotle believed that the notion of the potential infinite allows one to affirm that time is eternal and beginningless because time itself is merely potentially infinite (*Physics* 3.6, 206a9-206a13; 3.8, 208a20-208a21). But the question then arises as to why time is potentially infinite and not actually infinite? The reason, according to Aristotle, is because time's "infinity does not persist but consists in a process of coming

to be" (*Physics* 3.7, 207b15). Events come into being and go out of existence as time passes and, thus, an actually infinite number of events do not exist simultaneously. Consequently, Aristotle concedes that time is potentially infinite. As we shall see next, nearly nine centuries later, Philoponus charged Aristotle with being inconsistent because an infinite series of past days is, in fact, an actual infinite.

3.3 Philoponus

John Philoponus (*c.* 490-*c.* 570) was an influential Christian theologian, philosopher and scientist from Alexandria. Before Philoponus, Christians merely offered theological grounds for the doctrine of *creatio ex nihilo*. However, in the sixth century, Philoponus unsettled his Neoplatonist contemporaries (most notably Simplicius) by advancing philosophical arguments in favour of a universe with a beginning. Philoponus' most influential arguments make use of the concept of infinity to show that the universe cannot be eternal. These arguments are formulated in *de Aeternitate Mundi contra Proclum* (*Against Proclus On the Eternity of the World* [AD 529]), a treatise in which Philoponus responds to Proclus' (AD 411-485) eighteen arguments in favour of an eternal universe,[4] and developed further in the sixth book of *de*

[4] Proclus' treatise *de Aeternitate Mundi contra Christians* (*Against Christians On the Eternity of the World*) is lost. However, Philoponus conveniently summarises Proclus'

Aeternitate Mundi contra Aristotelem (*Against Aristotle On the Eternity of the World* [*c.* AD 530]), in which Philoponus criticises Aristotle's arguments in favour of eternal motion. These infinity arguments, which were available to the Arabic thinkers in the Middle Ages, "became a most important source for medieval proofs of creation" (Davidson, 1987:94). The mediaeval thinkers embraced, repeated and refined Philoponus' infinity arguments in support of their own versions of the KCA.[5]

Philoponus begins his set of infinity arguments in *Against Proclus* by emphasising that "Aristotle has proved by many arguments ... that the infinite can in no way actually exist, and this is agreed to be so by all without exception" (Philoponus, 2014a:23). Philoponus accepts Aristotle's potential/actual distinction of the infinite, and aims to use Aristotle's own arguments to demonstrate the impossibility of an eternal universe. Philoponus defines two types of the actual infinite, namely, one whose members exist all at once, such as an infinite collection of planets, and the other whose members come into existence bit by bit, such as an infinite series of human generations (*Against Proclus* 9.20-9.24). We will call the former the *simultaneous infinite* and the latter the *successive infinite*. According to Philoponus, neither a

eighteen arguments.

[5] In actual fact, Philoponus offers two sets of arguments against an eternal universe, one based on the concept of infinity and the other based on the notion that a finite universe contains finite power only (*cf.* Davidson, 1987:86). I shall be concerned exclusively with the former set of arguments.

simultaneous nor a successive infinite can exist. In fact, the possibility of the latter is even more difficult to affirm than the possibility of the former (*Against Proclus* 10.5-10.20). The reason for this is because the existence of a simultaneous infinite, whose members exist all at once, does not depend on the series being traversed while the existence of a successive infinite requires the impossible task of traversing the series.

Philoponus' overall argument against an eternal universe comprises various scattered propositions. A careful evaluation of these propositions reveals three distinct arguments – one based on the impossibility of the *existence* of an actual infinite, one based on the impossibility of *traversing* an actual infinite, and one based on the impossibility of *increasing* an actual infinite. We will explore each of these arguments.

3.3.1 The Argument Based on the Impossibility of an Actual Infinite

Philoponus' first argument against an eternal universe appears in *Against Proclus* 8.21-10.1 and comprises three main propositions. The first proposition states that if "the infinite cannot actually exist ... [then] the world cannot coexist with God from everlasting" (Philoponus, 2014a:23). The second proposition maintains that an inevitable consequence of an eternal universe is

that an actually infinite number of things, such as human beings, plants, or animals, will come into existence:

> So since, if the world is ungenerated, the time that has elapsed is also actually infinite, the individual things that have come to be in this infinite time must, I imagine, be actually infinite in number too. And so it will follow that, if the world is ungenerated, an infinite number actually exists and has occurred (Philoponus, 2014a:24).

The final proposition claims that an actual infinite cannot in any way exist, neither as a simultaneous series nor as a successive series. There is little offered in support of this third proposition because Philoponus is of the opinion that the proposition was proved by Aristotle, is uncontroversial, and is self-evident. Philoponus concludes that, because the actual infinite cannot exist, the universe cannot be eternal.

We will use these three propositions in order to summarise Philoponus' first argument based on the impossibility of an actual infinite as follows:[6]

1. If the universe is eternal, an actual infinite exists:

[6] Neither Philoponus nor al-Ghazālī offer formulations or outlines of their arguments and, thus, the formulations of their arguments presented in this chapter are my own. Of course, others may disagree with how I formulate or represent these arguments. Nevertheless, I believe that my formulations accurately represent the logical structure of Philoponus and al-Ghazālī's arguments.

(a) An eternal universe causes past time to be actually infinite.

(b) If past time is actually infinite, an actually infinite number of individuals have come into existence.

(c) Therefore, an eternal universe causes the existence of an actual infinite.

2. An actual infinite cannot exist because:

(a) This premise was proved by Aristotle.

(b) Everyone (i.e. Philoponus' contemporaries) agrees that this premise is true.

(c) This premise is self-evident.

3. Therefore, the universe is not eternal.

Needless to say, Philoponus' first argument does not permit the actual infinite because it denies that any actual infinite whatsoever may exist. According to Philoponus, even an actually infinite series of things that come into and go out of existence cannot exist. This is seen in his denying the possibility of a successive infinite series of individuals, who do not all exist simultaneously. Thus, the existence of the actual infinite – both the simultaneous infinite and the successive infinite – is impossible.

3.3.2 The Argument Based on the Impossibility of Traversing an Actual Infinite

The second argument in favour of a beginning of the universe appears in *Against Proclus* 10.1-11.2 and *Against Aristotle* 1178.16-1179.10, 15-25. This argument rests on the following four propositions. Firstly, if the universe is eternal, a successive infinite has come into existence bit by bit, such as an infinite series of motions generated one after the other. Secondly, a successive infinite must be traversed because its members do not come into existence all at once but they come into being one at a time and this coming into being may be counted. Thus, if a series is traversable, it is also countable. However, the third proposition maintains that a successive infinite cannot be traversed because the infinite is, by its nature, untraversable:

> [T]he traversing of the infinite by, as it were, counting it off unit by unit ... is impossible, even if the counter were everlasting. For the infinite is by its nature untraversable; otherwise it would not be infinite (Philoponus, 2014a:24).

Philoponus points out that, if the universe is eternal, various successive infinities have been traversed (*Against Aristotle* 1179.15-25). He argues as follows. Suppose the spheres move at different speeds and Saturn completes one revolution every thirty years, Jupiter completes one revolution every twelve

years, and the moon completes one revolution every month. Now, if the universe is eternal, Saturn has revolved an actually infinite number of times, Jupiter has revolved nearly three times this amount, and the moon has revolved three hundred and sixty times this amount. Therefore, different sized infinities have been traversed. "But how, if it is not even possible to traverse the infinite once," declares Philoponus, "is it not beyond all absurdity to assume ten thousand times the infinite, or rather the infinite an infinite number of times?" (Philoponus, 2014b:146).

Finally, the fourth proposition claims that, if the universe is eternal, motion could never occur or be generated. For if a motion M_1 may occur only after an actually infinite number of prior motions ($M_2, M_3, M_4,$ ...) have occurred, M_1 would never occur (*Against Aristotle* 1178.16-1179.10).[7] As an example, Philoponus asks us to suppose that the motion which causes fire to come into existence depends on an infinite series of prior motions and generations. For example, fire cannot be generated until a change in the air occurs, which could not occur until water changed into air, which could not occur until another motion occurred, and so on *ad infinitum*. According to Philoponus, because the infinite cannot be traversed, the fire – or any other motion – would never occur. This is an absurd conclusion because motions

[7] Philoponus is here presupposing that every motion that begins to occur depends on some other pre-existing thing.

have occurred. Therefore, the universe is not eternal.

We may summarise Philoponus' argument based on the impossibility of traversing an actual infinite as two distinct arguments. The first argument is as follows:

1. If the universe is eternal, an actually infinite series has been traversed:
    (a) If the universe is eternal, the series of revolutions of the spheres is a successive infinite.
    (b) Any successive infinite series has been traversed.
    (c) Therefore, if the universe is eternal, a successive infinite has been traversed.
2. An actually infinite series cannot be traversed because:
    (a) The actual infinite is, by definition, untraversable.
    (b) An actually infinite series is uncountable:
        i. If a series is uncountable, it is untraversable because counting involves traversing.
        ii. An actually infinite series is uncountable because, for every member that is counted, another always follows.
        iii. Therefore, an actually infinite series is un-

traversable.

3. Therefore, the universe is not eternal.

The second argument is as follows:

1. If the universe is eternal, motion could never occur because:
    (a) If the universe is eternal, any motion requires an actually infinite series of prior motions.
    (b) Any motion requiring an actually infinite series of prior motions can never occur.
    (c) Therefore, if the universe is eternal, no motion could occur.
2. Motion does occur.
3. Therefore, the universe is not eternal.

Unlike Philoponus' first argument (which is based on the impossibility of the existence of an actual infinite), his second argument, which is based on the impossibility of traversing the infinite, permits the actual infinite. For, although this second argument denies the successive infinite, it leaves open the possibility of a simultaneous infinite. The argument does not show, for example, that God could not create an actually infinite number of planets simultaneously, or that God knows an actually infinite number of truths.

The argument demonstrates, at most, that an actually infinite series whose members come into existence bit by bit cannot exist, for example, an actually infinite series of celestial revolutions. This second argument is, therefore, more modest than the first.

3.3.3 The Argument Based on the Impossibility of Increasing an Actual Infinite

Philoponus' final argument is based on the notion that an actual infinite cannot be increased in number. He argues:

> [I]f the world had no beginning and the number of men living before, say, Socrates was infinite, and those living from Socrates until the present time have been added to it, there will be something greater than the infinite, which is impossible. And if the number of men that have lived is infinite, the number of horses that have lived is certainly also infinite. So you will be doubling the infinite again. And if you add to these the number of dogs as well, you will triple the infinite, and if each of the other species is added it will be multiplied many times over. And this is among the greatest of impossibilities, for it is not possible to be greater than the infinite, not to mention many times greater (Philoponus,

2014a:24-25).

The key proposition in this argument is that one can neither add new members to an actual infinite, nor multiply an actual infinite, because the infinite cannot be increased. The principle that the infinite cannot be increased was accepted in the Peripatetic (Aristotelian) tradition until the fourteenth century when attempts were made to find a coherent theory of varying infinities (Davidson, 1987:88; Sorabji, 2006:217-218). However, because his opponents accepted this principle, Philoponus in all likelihood saw no need to defend it. Thus, Philoponus asserts that an eternal universe requires the impossible task of increasing the infinite. If the universe were eternal, new individuals would constantly be added to the infinite collection of previous individuals. However, this is impossible. Therefore, the universe is not eternal.

We may summarise Philoponus' argument based on the impossibility of increasing an actual infinite as follows:

1. If the universe is eternal, one infinite is larger than another:
    (a) If the universe is eternal, the series A of all individuals before 469 BC is actually infinite.
    (b) Adding all the individuals who existed after 469 BC to series A results in series B, which is larger than series A.

(c) Therefore, if the universe is eternal, series B is larger than series A.

2. It is impossible for one infinite to be larger than another.

3. Therefore, the universe is not eternal.

In view of the fact that this third argument denies that the actual infinite may be increased, but does not deny the existence of an actual infinite *per se*, the argument permits the actual infinite. Nevertheless, Philoponus' third argument would not convince many people today as contemporary set theory allows one infinite to be larger than another. Thus, this third argument is the weakest of the three.

To return to the main question: Does Philoponus' case against an eternal universe permit the actual infinite? No, it does not because his first argument denies the existence of any actual infinite. However, Philoponus' second and third arguments permit the actual infinite, with the former being the strongest of the two arguments. Therefore, a proponent of the KCA may permit the actual infinite by basing his/her argument solely on Philoponus' argument against the possibility of traversing the actual infinite.

3.3.4 Philoponus' Influence on *Kalām*

Philoponus' influence on subsequent thinkers, especially the followers of *kalām*, cannot be overestimated. The Arabic term *kalām* literally means "speech," "word," or "talk" (Haleem, 1996:71). The term was used in Muslim thought to refer to theological discussions, and it was later used to represent the movement in mediaeval Islamic theology that attempted to clarify and defend the core doctrines of Islam rationally. A practitioner of *kalām* is known as a *mutakallim* (plural: *mutakallimūn*). The *mutakallimūn*, as James Pavlin (1996:105) notes, "believe that the verses of the Qur'ān related to God's Attributes need to be interpreted through argument based on logical proofs."[8] Thus, *kalām*, or *'ilm al-kalām* (the science of *kalām*), may be translated as "scholastic theology."

The *mutakallimūn*, influenced by Philoponus' works, produced several proofs for a created world. Sajjad H. Rizvi (2011:12) remarks: "Inspired by John Philoponus's [*sic*] famous attack on Proclus (d. 485) and Aristotle's defense of eternalism, [Islamic theologians] have asserted that not only was the concept of an eternal cosmos coeval with God absurd, it was also heretical." In view of the fact that Philoponus' infinity arguments were available to the

[8] Hence, Ibn Khaldūn's (1332-1406) well-known definition of *kalām*, namely, "the science that involves arguing with rational proofs in defence of the articles of faith and refuting innovators who deviate from the beliefs of early Muslims and Muslim orthodoxy" (Ibn Khaldūn cited by Haleem, 1996:75).

mutakallimūn in the Middle Ages (see Davidson, 1987:93-94), the *mutakallimūn* welcomed these arguments, refined them, and used them in their own formulations of the cosmological argument. Important defenders of these *kalām* proofs include al-Kindī (*c.* 801-*c.* 873), al-Fārābī (872-950), Ibn Sīnā (980-1037), al-Ghazālī (1058-1111), and Ibn Rushd (1126-1198).[9]

The *mutakallimūn* supplement Philoponus' arguments in favour of creation with their own *kalām* proofs for a divine creator. Philoponus insists that the universe had a beginning but he stops there. He does not infer the existence of God from creation. However, in contrast to Philoponus, the *mutakallimūn* try to deduce a divine creator from the proposition that the world came into existence. Hence, the typical *kalām* approach for proving the existence of God comprises the following three steps: (1) Show that the universe came into existence, (2) Show that whatever comes into existence has a cause of its coming into existence, and (3) Show that the cause of the universe is divine. One of the most important adherents of this *kalām* approach was al-Ghazālī, who will be discussed in the next section.

[9] We also see traces of Philoponus' infinity arguments in the Jewish scholars Saadia ben Joseph (882-942), Maimonides (1135-1204), Gersonides (1288-1344), Crescas (*c.* 1340-*c.* 1410), and Arama (*c.* 1420-1494); and the Christian theologian St. Bonaventure (1221-1274). For a survey of the infinity arguments against an eternal world in mediaeval philosophy and theology, see Craig (2001b:48-126) and Davidson (1987:86-153).

3.4 Al-Ghazālī

Abū Ḥāmid Muḥammad al-Ghazālī, also known simply as al-Ghazālī (1058-1111), was a Muslim lawyer, theologian and mystic. Al-Ghazālī is one of the most important *kalām* scholars in Muslim intellectual history, and he is regarded as a scholar par excellence, the greatest figure in the history of Islam, and the greatest Muslim after Muhammad (Yaqūb, 2013b:xvii). Al-Ghazālī immersed himself in the work of Ibn Sīnā and other Arabic philosophers (*falasifa*)[10] until he was able to defeat them on their own grounds. It is in his *Tahāfut al-falāsifa* (*The Incoherence of the Philosophers* [1095]) that al-Ghazālī delivers his devastating attack on the *falāsifa*. Indeed, the *kalām* critique of Islamic philosophy culminates in the *Incoherence*. As Michael E. Marmura remarks:

> Al-Ghazālī's *Tahāfut al-falāsifa* ... marks a turning point in the intellectual and religious history of medieval Islam. It brought to a head a conflict between Islamic speculative theology (*kalām*) and philosophy (*falsafa*) as it undertook to refute twenty philosophical doctrines. ... [Furthermore,] al-Ghazālī ... explained [the

[10] One may distinguish *kalām* from *falsafa* ("philosophy") in early Islam (see Dhanani, 1994:3; Groff, 2007:162-164). The term *falsafa* came to denote the mediaeval Islamic philosophy that was heavily influenced by Aristotle and Neoplatonism. In contrast to the *mutakallimūn*, the *falāsifa* (practitioners of *falsafa*) asserted the supremacy of reason over revealed religion. Hence, the *mutakallimūn* held *falsafa* in contempt and charged the *falāsifa* with unorthodoxy. In about the twelfth century, *kalām* overcame *falsafa*. Important proponents of *falsafa* include al-Fārābī, Ibn Sīnā, and Ibn Rushd.

> Islamic philosophers] so clearly and so well that he rendered philosophical ideas accessible to nonphilosophers ... After al-Ghazālī, no Islamic theologian worth his salt avoided detailed discussion of the philosophical theories al-Ghazālī had criticized. *Kalām* thereafter became, as it had never been before, thoroughly involved with the theories of the *falāsifa* (Marmura, 2000:xv-xvi).

Although al-Ghazālī does not offer a complete argument in favour of God's existence in the *Incoherence*, he argues in this work that the world began to exist. In fact, of the twenty discussions in the *Incoherence*, the longest discussion concerns the past eternity of the world with al-Ghazālī championing Philoponus' argument based on the impossibility of an actual infinite to show that the world and time are created.

Al-Ghazālī completed another significant work, *Al-Iqtiṣād fī al-I'tiqād* (*Moderation in Belief*), at about the same time as the *Incoherence* in 1095. The *Moderation* is al-Ghazālī's most penetrating work of Ash'arite theology. The work comprises two prefaces, four introductions and four treatises. In the fourth treatise al-Ghazālī tries to show that a divine cause brought the universe into existence. Thus, the *Moderation* goes further than the *Incoherence* by including an extensive argument in support of the existence of God. However, these two works complement each other because, taken to-

gether, they reveal al-Ghazālī's complete cosmological argument based on the impossibility of an actual infinite. Al-Ghazālī's cosmological argument comprises two steps. Firstly, he argues that the world has a cause and, secondly, he argues that this cause is God. We shall now analyse these two steps.

3.4.1 The World Has a Cause

Al-Ghazālī begins the *First Proposition* of the *Moderation* with the following syllogism: "The occurrence of every occurrent has a cause; the world is an occurrent; it necessarily follows that it has a cause" (Al-Ghazālī, 2013:27). Al-Ghazālī goes on to define the key terms he uses in his argument. Firstly, by "world" he means "all existents other than God," that is to say "all the bodies and their modes" (Al-Ghazālī, 2013:27). Al-Ghazālī defines a *body* as something extended in space and a *mode* as something not extended in space and that requires a body in which to subsist. The world, then, comprises all bodies with their modes.

Secondly, by an "occurrent" he means "that which was nonexistent and then became existent" (Al-Ghazālī, 2013:28). In order to clarify what he means, al-Ghazālī (2013:28-29) distinguishes between impossibility, necessity and contingency. If something is *impossible*, it cannot be an occurrent because it cannot become existent. Nor can a *necessary* thing be an occur-

rent, for its nonexistence is impossible. Thus, an occurrent, according to al-Ghazālī, is something whose existence is *contingent* in the sense that both its existence and its nonexistence are possible.

Finally, by "cause" al-Ghazālī means "the giver of preponderance" or the deciding factor (Al-Ghazālī, 2013:29). The cause of an occurrent is that which changes the occurrent's nonexistence into existence with the cause giving the occurrent "preponderance over nonexistence" (Al-Ghazālī, 2013:27). In other words, an occurrent "can ... enter the domain of actual existence only through an agent that 'tips the scales ... in favor of its existing'" (Davidson, 1987:162). Thus, if the cause does not exist, the occurrent will remain nonexistent. Al-Ghazālī's argument may be represented as follows:

1. Any contingent thing that comes into existence has a cause.
2. The world is a contingent thing that came into existence.
3. Therefore, the world has a cause.

We shall now analyse al-Ghazālī's defence of the argument's two premises. According to al-Ghazālī, the first premise, which states that *any contingent thing that comes into existence has a cause*, is a self-evident truth. "This principle must be affirmed," he declares, "for it is a priori and necessary according to reason" (Al-Ghazālī, 2013:28). Al-Ghazālī asserts that, if a person does not affirm this principle, he/she probably does not understand

what is meant by "occurrent" or "cause". However, once a person understands these terms, which, as we have seen, al-Ghazālī defines, that person would naturally believe that every occurrent has a cause. Hence, al-Ghazālī defends the first premise, not by offering a proof, but by explaining the meaning of *occurrent* and *cause* and insisting that the premise is self-evident.

Secondly, *the world is a contingent thing that came into existence.* Al-Ghazālī does not consider this premise to be self-evident and, hence, he supports the premise with the following argument: "If we say that the world is an occurrent, then we now intend by 'the world' only bodies and substances ... [However,] no body is devoid of occurrents; whatever is not devoid of occurrents is an occurrent; it necessarily follows that every body is an occurrent" (Al-Ghazālī, 2013:30). The context of the argument clarifies that, by the phrase "no body is devoid of occurrents" al-Ghazālī means "no *body and extended substance* is devoid of occurrents".[11] Hence, the second premise is established by proving two other premises, namely, (1) all bodies and extended substances contain occurrents, and (2) whatever contains occurrents is itself an occurrent. Al-Ghazālī defends these two premises as follows.

Firstly, *no body and extended substance are devoid of occurrents* because they are not without *motion* or *rest*, which are themselves occurrents (Al-

[11] This is clear because al-Ghazālī responds to those who may ask, "Why did you say that every body and extended substance is not devoid of occurrents?" (Al-Ghazālī, 2013:30-31).

Ghazālī, 2013:31). According to al-Ghazālī, this premise is indubitable because a human body is not without modes, such as aches, sicknesses, hunger, or thirst, which are occurrents. Similarly, the bodies of the world are not without alterations of their states and these alterations, or motions, are occurrents. Consequently, bodies and modes contain motion. Furthermore, al-Ghazālī (2013:32) argues that *rest* is also an occurrent. If a stationary, extended substance, such as the earth, were in a state of rest from eternity, it would remain in this state forever and motion would be impossible. However, motion *can* take place in any extended substance; therefore, rest cannot be eternal and it must be an occurrent. The conclusion is that all bodies and extended substances contain occurrents.

The second premise, which claims that *whatever is not devoid of occurrents is itself an occurrent*, is at the heart of al-Ghazālī's argument. Drawing on Philoponus' infinity arguments, al-Ghazālī defends this premise by contending that,

> If the world were anteriorly eternal [i.e. eternal without a beginning] yet not devoid of occurrents, then there would be occurrents that have no beginning, from which it would necessarily follow that the revolutions of the celestial spheres are infinite in number; and that is absurd, because it leads to absurdity, and

what leads to absurdity is absurd (Al-Ghazālī, 2013:37).

Thus far we have examined the *Moderation*. However, al-Ghazālī defends the second premise in both the *Moderation* and the *Incoherence*. In the latter work he writes, "The world's past eternity is impossible because it leads to affirming circular movements of the heavenly sphere whose number is infinite and whose individual units are innumerable" (Al-Ghazālī, 2000:18). He then goes on to show the impossibility of infinity (Al-Ghazālī, 2000:18-19). The argument in support of the second premise may be outlined as follows:

(A1) If the world is eternal, the revolutions of the celestial spheres amount to an actual infinite.

(A2) An actually infinite number of revolutions of the celestial spheres leads to absurdity.

(A3) Therefore, an eternal world leads to absurdity and so is itself absurd.

Premise (A1) is straightforward: If Saturn, for example, completes one revolution every few years, and, if the world is eternal, Saturn would have completed an actually infinite number of revolutions in an infinite number of years. Therefore, al-Ghazālī argues, an eternal world leads to an infinite number of revolutions.

In support of premise (A2), al-Ghazālī (2000:18-19) offers the follow-

ing thought experiment to illustrate the absurdity of the infinite: Suppose Jupiter completes two and a half revolutions for every one revolution that Saturn completes. If both these planets have been revolving from eternity, both of them would have completed the *same* number of revolutions. However, this is absurd because Jupiter has completed two and a half revolutions more than Saturn has completed. Al-Ghazālī raises a further difficulty by asking "Is the number of the rotations even or odd, both even and odd, or neither even nor odd?" (Al-Ghazālī, 2000:18). According to al-Ghazālī, the supporter of the actual infinite is forced to affirm that the rotations are neither even nor odd and, again, this is absurd.

In the *Moderation*, al-Ghazālī (2013:37-38) underscores three different absurdities. Firstly, an infinite series of revolutions is a completed series that has come to an end. However, the nature of the infinite precludes the infinite both from being completed and from coming to an end. Secondly, the infinite number of completed revolutions must either be (a) even, (b) odd, (c) neither even nor odd, or (d) both even and odd. However, all four cases are impossible. Finally, the thought experiment shows that one infinite may be smaller than another infinite because the infinite series of revolutions completed by Saturn is smaller than the infinite series of revolutions completed by Jupiter. The problem, however, is that one infinite cannot be smaller than another because the infinite, by definition, cannot be short of something.

Although these three absurdities concern an infinite number of revolutions of the celestial bodies, al-Ghazālī appears to find the existence of any actual infinite difficult to accept. Aladdin Mahmūd Yaqūb comments,

> It is clear that al-Ghazālī believes that the concept of actual infinity is incoherent. ... The problem he sees ... that is implied by the concept of actual infinity is the *completion* of actually infinitely many terms. His point is that the concept of the actual infinite implies both (1) that it has no end and (2) that an infinity of terms has been completed. He sees these propositions as inconsistent with each other, because he takes (1) to imply that no infinite sequence has been completed (Yaqūb in Al-Ghazālī, 2013:16, note 38 [original emphasis]).

Hence, al-Ghazālī's thought experiment based on the celestial revolutions exposes his belief in the impossibility of an actual infinite. Nevertheless, because an actual infinite cannot exist and the world contains occurrents, al-Ghazālī concludes that the world is itself an occurrent requiring a cause.

At this point in his argument, al-Ghazālī remarks, "only the existence of the cause is now known to us. Whether it is eternal or occurrent and its attributes are not yet known to us" (Al-Ghazālī, 2013:41). His next step is to uncover the divine nature of the First Cause.

3.4.2 The Cause is God

After arguing in the *Moderation* that the world has a cause, al-Ghazālī devotes several chapters to the characteristics of this cause. The most important attributes which he ascribes to the cause of the world, and on which we shall focus, are eternality, incorporeality, oneness, power and volition. Al-Ghazālī believes God alone may possess these attributes. Moreover, he argues that the cause of the world must satisfy three conditions, namely, (1) the cause must have the necessary power to create the world, (2) the cause must have exhaustive knowledge of the world, and (3) the cause must have the free will to choose to create the world. According to al-Ghazālī, God alone satisfies these three conditions. Therefore, al-Ghazālī affirms that the cause of the world is God. Yaqūb comments,

> [According to al-Ghazālī,] God ... is the only being that has sufficient power, knowledge, and will to create the occurrents in the world. Since no created entity, human beings included, satisfies all these three conditions, none of them can be a causal agent. It follows that God is the sole causal agent in existence, who directly creates all occurrents (Yaqūb, 2013a:261).

Al-Ghazālī's cosmological argument does not stop at the existence of a *First Cause* but concludes to the existence of *God*. We shall now evaluate these

attributes of eternality, incorporeality, oneness, power and volition respectively.

3.4.3 The Cause is Eternal

Al-Ghazālī argues that the cause of the world must be both eternal anteriorly (i.e., eternal without a beginning) and eternal posteriorly (i.e., eternal without an end).[12] As regards the former, if the cause of the world were contingent, it would need another cause, and this cause would need another cause, and so on. However, an infinite regress of causes is impossible.[13] Therefore, the regress of causes must end at an uncaused, necessary being, whom al-Ghazālī calls "the Maker of the world" (Al-Ghazālī, 2013:41).

As regards the posteriorly eternal, al-Ghazālī maintains that a cause without a beginning must also be without an end. His reasons are as follows: If the anteriorly eternal ceases to exist, its annihilation would have a cause. This cause either (1) is an agent who annihilates the eternal through power, or (2) is an opposite to the eternal, or (3) is the termination of one of the necessary preconditions for the existence of the eternal. However, these three cases are impossible (Al-Ghazālī, 2013:42-45). Firstly, although an agent

[12] Al-Ghazālī (2013:41-42) defines *eternal anteriorly* as existence that is not preceded by nonexistence and *eternal posteriorly* as continuous, endless existence that never ceases.

[13] Although al-Ghazālī does not explain why an infinite *regress of causes* is impossible, one may assume his reason is that the existence of any actually infinite series is impossible.

may produce *existence* through power, *nonexistence* is not a thing and so it cannot be produced. Consequently, an agent cannot cause the annihilation of something through power.[14]

Secondly, the anteriorly eternal cannot be annihilated by its opposite or contrary "because the existence of the contrary, if it is assumed to be occurrent, would be annulled by its being contrary to the anteriorly eternal" (Al-Ghazālī, 2013:43). Furthermore, if the contrary were eternal, it would have annihilated the anteriorly eternal from eternity rather than now.[15]

Finally, al-Ghazālī argues that, if the anteriorly eternal is annihilated through the termination of a precondition for its existence, this precondition is either contingent or eternal. However, the precondition cannot be contingent because if it were, the anteriorly eternal would be contingent and, therefore, the precondition must be anteriorly eternal. But now we face the same problem, namely, how can this anteriorly eternal precondition be annihilated? The only answer is that the precondition is annihilated through the termination of one of its own anteriorly eternal preconditions and this, in

[14] This argument is not very convincing because surely it is possible for an agent to annihilate something through power. For example, if Jones throws a book into a fire and the book burns up, Jones' action of throwing the book into the fire *caused* the book to cease to exist. In that case, although Jones has not *produced* nonexistence, he has caused an existent to cease to exist.

[15] Al-Ghazālī offers no further explanation of this argument. As a result, it is unclear what he deems the opposite or contrary of the anteriorly eternal to be. Is it the created world? Some nonexistent? Some other eternal existent? Moreover, al-Ghazālī fails to explain why an eternal, personal being, who is endowed with free will, cannot annihilate another eternal being. I, therefore, find this second argument difficult to affirm.

turn, leads to the same problem. This will continue *ad infinitum*. Since such an infinite regress is impossible, the anteriorly eternal cannot be annihilated through the termination of one of its preconditions. Al-Ghazālī's conclusion is that the cause of the world is eternal and has neither beginning nor end.

3.4.4 The Cause is Immaterial

Next, al-Ghazālī (2013:45-48) tries to show that the cause of the world is *immaterial*. Firstly, he contends that the cause cannot be an extended substance because, if it were, it would not be eternal. According to al-Ghazālī, any extended substance is not devoid of occurrents, such as motion and rest. However, anything that is not devoid of occurrents is itself an occurrent and, therefore, an extended substance cannot be eternal. As al-Ghazālī has already argued that the cause is eternal, he concludes that it cannot be an extended substance.

Secondly, al-Ghazālī asserts that the cause of the world cannot be a body because a body comprises two or more extended substances. Finally, he argues that the cause cannot be a mode (i.e. something whose existence requires a body or substance in which to subsist) because "[i]nsofar as the body [or substance] is necessarily an occurrent, what resides in it must be an occurrent as well" (Al-Ghazālī, 2013:47). Thus, since the cause of the world

is neither an extended substance, nor a body, nor a mode, the cause must be an immaterial object.

3.4.5 The Cause is One

An essential attribute of the *kalām* concept of God is the attribute of *unity* or *oneness* (Davidson, 1987:164-165). Therefore, al-Ghazālī (2013:73-77) finds it necessary to argue that God is one. The phrase "God is one" means "that He [God], and no other, is the creator of everything other than Himself" (Al-Ghazālī, 2013:73).[16] In other words, one First Cause exists, as opposed to a plurality of existing causes. Al-Ghazālī summarises his proof for God's oneness as follows:

> [I]f a partner for Him were posited, it would be either similar to Him in all respects, higher than Him in rank, or lower than Him in rank. Since each of these is impossible, what leads to them is also impossible (Al-Ghazālī, 2013:73).

According to al-Ghazālī, if two First Causes exist, they are either similar in every way or one is superior to the other. However, both are impossible.

Firstly, the world cannot have identical causes because two things are distinct if they are *not* similar in every way. If two things are similar in all

[16] Because al-Ghazālī believes that God is the cause of the world, he uses the term "God" rather than "the cause of the world."

respects, they are the *same* thing. Therefore, if the world has a plurality of identical causes, the world, in fact, has only one cause (Al-Ghazālī, 2013:73-74). Secondly, al-Ghazālī argues that the world cannot have two (or more) causes that differ in rank because the superior cause would, in reality, be the ultimate cause of the world (Al-Ghazālī, 2013:74). When al-Ghazālī speaks about the "cause of the world," what he has in mind is a *First Cause* that created everything other than itself. Thus, the First Cause is the highest ranked cause. However, because al-Ghazālī argues elsewhere that an infinite regress of causes is impossible (Al-Ghazālī, 2013:41), he maintains that there exists one First Cause that created everything outside itself.

3.4.6 The Cause is Powerful

Another attribute ascribed to the cause of the world is *power*. In his typical fashion, al-Ghazālī offers the following syllogism in support of this contention:

1. Every well-designed product is produced by a powerful agent.
2. The world is a well-designed product.
3. Therefore, it is produced by a powerful agent (Al-Ghazālī, 2013:83).

This is a stock teleological argument in favour of a cosmic designer. Although it is an independent argument, al-Ghazālī offers this argument alongside his cosmological argument to support the claim that the First Cause possesses

power. Unlike his elaborate defence of the cosmological argument, however, al-Ghazālī's defence of the above teleological argument is straightforward: namely, the first two premises are self-evident. These two premises, he claims, are proved through observation and their truth is recognised through one's reason and, thus, no rational person can deny them. Davidson (1987:227) perceives that al-Ghazālī "indicates a preference for the teleological argument – which he describes as 'inborn' in man and as so evident that 'setting up a demonstration' is, in reality, superfluous." Hence, because al-Ghazālī believes that both premises are obvious, he concludes that the cause of the world must be endowed with incredible power.

3.4.7 The Cause is Personal

The final attribute on which we shall focus, and which al-Ghazālī associates with the First Cause, is *personhood*. His most important argument in favour of this attribute is the argument in support of divine will (Al-Ghazālī, 2013:105-110).[17] According to al-Ghazālī, the nonexistence and existence of the world are equally possible. Similarly, creation at one time and creation at another time are equally possible (Al-Ghazālī, 2013:105). Therefore, the First Cause must have *decided* to actualise the existence of the world a cer-

[17] Al-Ghazālī also contends that the First Cause possesses power, knowledge and life (Al-Ghazālī, 2013:83-105), thus suggesting that the First Cause is a person.

tain finite time ago. However, only a personal agent equipped with free will may decide between two equal or similar possibilities. Therefore, the First Cause must be a personal agent endowed with free will. He argues:

> The world came to existence whence it did, having the description with which it came to exist, and in the place in which it came to exist, through will, will being an attribute whose function is to differentiate a thing from its similar. ... But since ... there was an inescapable need for a specifying agent that would specify one thing from its similar, it was said: "The Eternal has, beyond power, an attribute that has as its function the specifying of one thing from its similar" (Al-Ghazālī, 2000:22).

Here al-Ghazālī appeals to the *principle of determination*. According to this principle, which was often used by the *mutakallimūn*, an agent is required to choose to bring the world into existence (see Craig, 2001b:54-58; *Cf.* Wolfson, 1976:440-441). Accordingly, the First Cause, as maintained by al-Ghazālī, is a "cause" in the sense that it freely determines to produce its effect, as opposed to necessarily coinciding with its effect. As Craig explains,

> According to Ghāzālī, ... God is not the 'cause' of the world in the sense that a cause is that which necessarily accompanies its effect. But God is a cause in the ... sense ... [that He is] a free

> agent that precedes its effect. Thus, the effect (the universe) need not follow upon the heels of the cause (God), but can appear a finite number of years ago when God willed from eternity that it should (Craig, 2001b:56).

When faced with the question "Why did the First Cause not create the world sooner?" the principle of determination allows al-Ghazālī to respond that the First Cause chose from eternity to create the world a particular finite time ago. The First Cause need not have a *sufficient reason* for choosing to create the world when it did, it merely needed to decide to do so. As an example, al-Ghazālī (2000:23-24) asks us to imagine a man gazing with desire at two equal dates (the fruit) that are in front of him. We are asked to further suppose that the man may take no more than one date. Moreover, nothing makes one date preferable to the other because both dates look identical, are equally good, are an equal distance away from the man, etc. Now, if the man lacks volition, he will remain undecided and never choose a date. However, if the man possesses volition, he will inevitably choose one date of his own free will, even if he has no particular reason for choosing that date. Likewise, if the First Cause lacked free will, it could not choose between creating the world and not creating the world, nor could it choose when to create the world. Consequently, the world would either exist eternally or it would never

come into existence. However, since the world began a finite time ago, its cause must have free will and so be a personal agent.

In short, al-Ghazālī argues that whatever comes into being has a cause and, because the world came into being, the world has a cause. Furthermore, through an analysis of the nature of this cause, al-Ghazālī concludes that the cause is one eternal, incorporeal and powerful agent who is equipped with free will, and God alone possesses these attributes. We may, thus, schematise al-Ghazālī's cosmological argument as follows:

1. Any contingent thing that comes into existence has a cause because:
    (a) This is a self-evident truth.
2. The world is a contingent thing that came into existence:
    (a) The world comprises all bodies and extended substances.
    (b) Every body and extended substance contain occurrents.
    (c) Whatever contains occurrents is itself an occurrent:
        i. If something containing occurrents may be eternal, the world may be eternal.
        ii. If the world is eternal, the revolutions of the celestial spheres amount to an actual

infinite.

iii. An actually infinite number of revolutions of the celestial spheres leads to three absurdities, namely:

A. That an infinite series has completed and come to an end,

B. That the infinite series of revolutions is neither even nor odd, and

C. That one infinite is larger than another infinite.

iv. Therefore, because an eternal world leads to absurdity, it is itself absurd.

v. Therefore, anything containing occurrents cannot be eternal.

(d) Therefore, every body and extended substance is an occurrent.

(e) Therefore, the world is an occurrent, i.e., a contingent thing that came into existence.

3. Therefore, the world has a cause.

4. If the world has a cause, this cause is God because:

    (a) The nature of the cause of the world is that it is eternal, incorporeal, one, powerful and endowed with free will, and God alone possesses each of these attributes.

5. Therefore, God caused the existence of the world.

Al-Ghazālī's cosmological argument does not permit the actual infinite. Indeed, it is surprising that he does not offer an argument against an eternal universe based on the impossibility of traversing an actual infinite. Nevertheless, at the heart of al-Ghazālī's cosmological argument lies the notion that, because an actual infinite leads to absurdities, it is itself absurd. Therefore, it is clear that al-Ghazālī sees no need in permitting the existence of certain actual infinities.

3.5 Craig

After being overlooked for several centuries, the *kalām* cosmological argument (KCA), based on the impossibility of an infinite temporal regress of events, was revived in Stuart Hackett's *The Resurrection of Theism* (1957). William Lane Craig, one of Hackett's students, entitled this version of the argument the "*kalām* cosmological argument" in view of "the substantive contribution made by its medieval Muslim proponents" (Craig, 2013:7). By formulating a

modern defence of the KCA, Craig brought the KCA into prominence in his book *The Kalām Cosmological Argument* (1979). As Quentin Smith observes, Craig's defence of the KCA has gained remarkable attention in recent years:

> A count of the articles in the philosophy journals shows that more articles have been published about Craig's defense of the Kalam argument than have been published about any other philosopher's contemporary formulation of an argument for God's existence. ... The fact that theists and atheists alike "cannot leave Craig's Kalam argument alone" suggests that it may be an argument of unusual philosophical interest or else has an attractive core of plausibility that keeps philosophers turning back to it and examining it once again (Smith, 2007:183).

In light of the fact that Craig is the foremost advocate of the KCA, this chapter will conclude with an analysis of his formulation and defence of the argument.[18]

[18] In view of the fact that Craig presents his long-running defence of the KCA in numerous publications, I shall treat several of his works as a coherent whole, rather than focusing on just one of his publications in my exposition of his *kalām* argument. The works on which I shall draw include Craig (1979; 2008; 2013) although I shall focus primarily on Craig and James D. Sinclair's article entitled "The *Kalam* Cosmological Argument" that is published in *The Blackwell Companion to Natural Theology* (2012). Although Craig and Sinclair co-authored the article, I shall credit Craig with the philosophical section of the article because, according to Craig (in Craig & Harris, 2008), he wrote the philosophical section of the article while Sinclair wrote the scientific section on the cosmological evidence in favour of a beginning of the universe.

3.5.1 Synopsis of Craig's *Kalām* Argument

Following al-Ghazālī, Craig (1979:63) represents the KCA as the following syllogism:

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.

The key terms in the argument may be defined as follows. Firstly, *universe* refers to all space, time (or space-time), matter, and energy. This includes any notion of a multiverse. Secondly, *begins to exist* may be defined as follows: x begins to exist if and only if x exists at some time t and there is no time t^* prior to t at which x exists and no state of affairs in the actual world in which x exists timelessly.[19] Thirdly, *cause* refers to what Aristotle termed an *efficient cause* – the primary source of the caused entity – and it may be anything besides the caused entity (Craig & Sinclair, 2012:195). For example, an artisan and his sculpting ability may be the efficient cause of a sculpture.[20]

[19] Craig's more technical definition of *begins to exist* is as follows: "x comes into being at t iff (i) x exists at t, and the actual world includes no state of affairs in which x exists timelessly, (ii) t is either the first time at which x exists or is separated from any $t' < t$ at which x existed by an interval during which x does not exist, and (iii) x's existing at t is a tensed fact" (Craig & Sinclair, 2012:184).

[20] See Aristotle's *Physics* 2.3 and *Metaphysics* 5.2, in which he presents his four well known causes, namely, material cause, formal cause, efficient cause and final cause.

Finally, Craig (in Craig & Sinclair, 2012:115-116, 124, 183-184) stresses that the KCA presupposes the dynamic theory of time, also known as the A-theory of time.[21] In terms of the A-theory the past, present, and future are objectively distinct with things coming into being and going out of existence as time passes. Every event has a beginning and an end. Thus, it is not possible for temporally sequential events to exist simultaneously – an event cannot occur simultaneously with the event immediately prior to it. For example, the event representing a clock's minute hand moving from the first numbered dial on the clock face to the second dial cannot exist simultaneously with the event representing the same hand moving from the second dial to the third dial.

The A-theory of time is in contrast to the B-theory (or static theory) of time, which affirms that time is a tenseless, four-dimensional, space-time block, and that the flow of time is merely a mind-dependent illusion. According to the B-theory nothing actually begins to exist because every event exists simultaneously in the space-time block. Thus, in view of the fact that the KCA assumes that things come into existence, it appears difficult to align

[21] John M.E. McTaggart (1908) distinguishes between two theories of time that he arbitrarily terms the "A-series" and the "B-series." The former theory affirms that there exists a present moment in the series of time while the latter theory denies such a present moment. Similar, non-descriptive names, such as "A-theory" and "B-theory," have since been used to differentiate between these two theories. For a brief introduction to McTaggart's views regarding time see McDaniel (2010).

the KCA with the B-theory of time.[22]

Craig offers three reasons in support of the first premise, namely, (1) it is a metaphysical principle that something cannot begin to exist uncaused, (1) it is inexplicable why only universes would not need a cause, and (3) this premise is constantly confirmed in our experience.

Premise two is supported by four arguments, two of which are philosophical: (1) the argument based on the impossibility of the existence of an actual infinite and (2) the argument based on the impossibility of the formation of an actual infinite by successive addition; and two of which are scientific: (3) the argument based on the expansion of the universe and (4) the argument based on thermodynamics.

Finally, through a conceptual analysis of the argument's conclusion, Craig shows that the cause of the universe must have various God-like properties. Thus, Craig's argument may be outlined as follows:

1. Everything that begins to exist has a cause of its existence because:
    (a) It is a metaphysical principle that something cannot begin to exist uncaused.
    (b) It is inexplicable why only universes would not need a cause.

[22] For a defence of the A-theory of time, see Craig (2000a; 2000b).

(c) We have experiential confirmation that something cannot begin to exist uncaused.

2. The universe began to exist:

   (a) The existence of an actual infinite is impossible:

      i. An actual infinite cannot exist.

      ii. An infinite temporal regress of events is an actual infinite.

      iii. Therefore, an infinite temporal regress of events cannot exist.

   (b) The formation of an actual infinite by successive addition is impossible:

      i. A collection formed by successive addition cannot be an actual infinite.

      ii. The temporal series of events is a collection formed by successive addition.

      iii. Therefore, the temporal series of events cannot be an actual infinite.

   (c) The expansion of the universe entails a finite universe.

   (d) The thermodynamic properties of the universe entail a finite universe.

3. Therefore, the universe has a cause of its existence.
4. If the universe has a cause of its existence, that cause is God because:
    (a) Conceptual analysis of the cause of the universe illustrates that this cause must have the essential properties traditionally ascribed to God.
5. Therefore, God caused the universe.
6. Therefore, God exists.

I shall now explore each supporting argument in more depth.

3.5.2 First Premise: Everything That Begins to Exist Has a Cause of Its Existence

One may expect premise (2) to be the only controversial premise in the KCA because premise (1) seems to be obvious. However, premise (1) has also come under tremendous attack. For this reason Craig supports the first premise for the following three reasons (Craig & Sinclair, 2012:182-190). Firstly, according to Craig, it is a metaphysical principle that something cannot come into being from nothing. In this context the term "nothing" is not used as is in the doctrine of creation *ex nihilo*, where nothing means no object or material substance apart from God's being, but it simply means

"not anything." It seems, therefore, metaphysically absurd that something could come into existence uncaused out of absolutely nothing.

Secondly, Craig argues that if something could come into being from nothing, it becomes inexplicable why just anything, such as microwaves and cows, do not merely pop into existence uncaused. What is special about a universe that it is able to come into existence from nothing? Craig remarks: "There cannot be anything about nothingness that favors universes, for nothingness does not have any properties" (Craig & Sinclair, 2012:186). Thus, it remains plausible that every object that begins to exist, including a universe, requires a cause for its existence.

Craig's third argument is that if premise (1) were false, we would constantly be observing objects spontaneously coming into being uncaused out of nothing. For example, rocks, horses, people and planets would be popping into existence all around us. However, premise (1) is constantly confirmed by our experience as we do not, and never have, observed things beginning to exist without a cause. Craig therefore concludes that we have good reason to believe that whatever begins to exist has a cause of its existence.

3.5.3 Second Premise: The Universe Began to Exist

3.5.3.1 Argument Based on the Impossibility of an Actual Infinite

Craig formulates the first philosophical argument as follows:

(B1) An actual infinite cannot exist.

(B2) An infinite temporal regress of events is an actual infinite.

(B3) Therefore, an infinite temporal regress of events cannot exist (Craig & Sinclair, 2012:103).

This argument is a refined version of Philoponus' argument against an eternal universe. According to Craig, if the universe did not begin to exist, there would be an actually infinite number of past events. However, because an actual infinite is impossible, the universe began to exist.

Craig (in Craig & Sinclair, 2012:103-106) defines his key terms as follows. Firstly, he underscores the general distinction between the potential infinite and the actual infinite. The former denotes a boundless, quantitative process, such as endless addition, endless division and endless succession. In other words, a potential infinite series is a series that increases endlessly towards infinity as a limit but never reaches it. It is never complete and is always finite at any given point. On the other hand, the *actual infinite* denotes a boundless, completed totality of infinitely many distinct elements. Mathematicians today define an actually infinite series as a series that may

be placed into one-to-one correspondence with a part of itself (Huntington, 2003:6), i.e., each member in the series may be paired with one and only one member of a subclass of the series. Thus, by describing an actual infinite as a "completed totality" one means that it is an unbounded collection whose members are, nevertheless, present all at once. The fundamental difference, then, between the potential infinite and the actual infinite is that the former is not a completed totality, whereas the latter is. Thus, Craig does not deny the existence of a potential infinite but, rather, he denies the existence of an actual infinite.

Secondly, with the term "exist" Craig means "be instantiated in the mind-independent world" (Craig & Sinclair, 2012:105). Craig draws a distinction between mathematical existence and real world existence. The former relates to the legitimacy of mathematical concepts, whereas the latter concerns the mind-independent existence of objects in the real world. Hence, Craig does not wish to deny that the actual infinite is a legitimate concept in contemporary mathematics or that its existence is logically possible but, rather, he wishes to deny the metaphysical possibility of an actual infinite, that is, the possibility of its being actualisable. He writes:

> By "exist" we mean "exist in reality", "have extra-mental existence", "be instantiated in the real world". ... Cantor's system

> and set theory are concerned exclusively with the mathematical world, whereas our argument concerns the real world. ... What I shall argue is that, while the actual infinite may be a fruitful and consistent concept in the mathematical realm, it cannot be translated from the mathematical world into the real world (Craig, 1979:69).

Finally, Craig defines "event" as any change in the world that has a finite, non-zero duration. Craig asks us to arbitrarily choose some event as our standard, such as a year, so that all the events in the temporal regress of events have the same duration. The *temporal regress of events*, then, is the series of all past events sorted according to their temporal sequence of *less than*. The issue is, therefore, whether an actually infinite regress of equivalent events, such as years, is metaphysically possible.

Like al-Ghazālī, Craig maintains that the most effective way in which to show that an actual infinite cannot exist in the real world is through thought experiments that illustrate the absurdities that would result if an actual infinite were to be instantiated in reality (Craig, 1979:82; Craig & Sinclair, 2012:108). I shall mention one such example. Craig (in Craig & Sinclair, 2012:108-110) asks us to consider David Hilbert's so-called "Hilbert's Hotel"

thought experiment:[23] Imagine a hotel with an infinite number of rooms, with every room being occupied. Now, suppose that a new guest arrives and asks for a room. "But of course!" declares the innkeeper, and he moves the guest in room no. 1 into room no. 2, the guest in room no. 2 into room no. 3, and so on. As a result of this displacement, room no. 1 becomes available and so it is given to the new guest. Oddly enough, however, before the guest arrived every room was occupied. Furthermore, although there is one more guest in the hotel, the number of guests in the hotel has not changed, the number has remained infinite!

Suppose further that an infinite number of new guests arrive at the hotel, each asking for a room. "Of course!" declares the innkeeper, and he moves the guest in room no. 1 into room no. 2, the guest in room no. 2 into room no. 4, the guest in room no. 4 into room no. 6, and so on. Consequently, each guest receives an even numbered room, and all the odd numbered rooms become available, which allows the innkeeper to move every new guest into a vacant room. However, before all the new guests arrived all the rooms were occupied! Once again, the number of guests in the hotel remains identical to the number of guests in the hotel *before* the infinity of new guests arrived.

[23] George Gamow (1947:17-18) accredits this thought experiment to David Hilbert (1862-1943), the distinguished mathematician of the nineteenth century.

The situation could become more peculiar if some guests leave the hotel. For example, if the guest in room no. 1 departs, there would still be an infinite number of guests in the hotel. Consequently infinity minus one equals infinity. Again, if each guest in an odd numbered room departs then, although an infinite number of guests have left, the number of guests in the hotel remains exactly the same, namely, infinity. Thus, infinity minus infinity equals infinity. However, if the guests in room numbers 4 and above (i.e., the guests in room numbers 4, 5, 6, ... *ad infinitum*) depart, then there would be three guests only remaining in the hotel – those in room numbers 1, 2, and 3. In that case, infinity minus infinity equals three. However, this results in three inconsistent situations:

1. Infinity minus one equals infinity ($\aleph_0 - 1 = \aleph_0$).
2. Infinity minus infinity equals infinity ($\aleph_0 - \aleph_0 = \aleph_0$).
3. Infinity minus infinity equals three ($\aleph_0 - \aleph_0 = 3$).

This, in turn, illustrates that, when it comes to an actually infinite number of objects in the real world, one may subtract equal quantities from equal quantities and yet reach different results. After discussing Hilbert's Hotel, Craig (in Craig & Sinclair, 2012:109) asks, "Can anyone believe that such a hotel could exist in reality?" According to Craig, "Hilbert's Hotel is absurd. But if an actual infinite were metaphysically possible, then such a hotel

would be metaphysically possible. It follows that the real existence of an actual infinite is not metaphysically possible" (Craig & Sinclair, 2012:110). Thus, Craig concludes that an actual infinite cannot exist in reality.

Finally, Craig maintains that premise (B2) is obvious because "if there has been a sequence composed of an infinite number of events stretching back into the past, then the set of all events in the series would be an actually infinite set" (Craig & Sinclair, 2012:115). Thus, an infinite temporal regress of events cannot exist and the universe began to exist.

3.5.3.2 Argument Based on the Impossibility of the Formation of an Actual Infinite by Successive Addition

Craig's second philosophical argument that supports premise (2) is formulated as follows:

(C1) A collection formed by successive addition cannot be an actual infinite.

(C2) The temporal series of events is a collection formed by successive addition.

(C3) Therefore, the temporal series of events cannot be an actual infinite (Craig & Sinclair, 2012:117).

This argument does not deny the existence of an actual infinity but, rather, it denies that it is possible to create an actual infinite collection by adding one member after another at a later time. Craig maintains that this appears obvious as, for any finite collection c, c will remain finite once a new member is added (Craig, 1979:103-104; Craig & Sinclair, 2012:117-118). However, the process of adding another member to a collection cannot be completed and this will hold true even if there is an infinite amount of time in which to perform the process. Craig illustrates this as follows:

> Suppose we meet a man who claims to have been counting down from infinity and who is now finishing: ... , -3, -2, -1, 0. We could ask, why did he not finish counting yesterday or the day before? By then an infinite time had already elapsed, so that he has had ample time to finish. Thus, at no point in the infinite past should we ever find the man finishing his countdown, for by that point he should already be done! ... But ... this contradicts the hypothesis that he has been counting from eternity (Craig & Sinclair, 2012:122).

Therefore, according to Craig, to form an actual infinite by never beginning yet arriving at an end is just as impossible as to begin at some point and then try to arrive at infinity. Since the collection of past events is formed by

successively adding one event after another in time (given the A-theory of time), Craig concludes that the past must be finite.

3.5.3.3 Scientific Arguments in Favour of a Finite Universe

Because this study is exclusively concerned with the philosophical arguments supporting the KCA, I will briefly mention Craig's scientific arguments in favour of an absolute beginning.

Craig argues that, apart from philosophical arguments, the second premise may be supported by two remarkable scientific confirmations, namely, the expansion of the universe and the thermodynamic properties of the universe (see Craig, 1979:110-140; 2008:125-150). These two scientific discoveries led to the development of the standard Big Bang model, also known as the Friedmann-Lemaître model. According to this model, as one goes back in time, the density of the universe increases until one reaches a state of infinite density in the finite past. This state is known as the initial singularity and it represents a boundary to space-time, marking the beginning of all matter, energy, and space-time itself. As John Barrow, the prominent physicist from the University of Cambridge, explains,

> Before [the initial] singularity, the Universe did not exist; afterwards, it did. The mathematical description of space and time predicts that both concepts must cease to exist at this singular-

> ity. It is the boundary of the Universe. Conversely, we are forced to regard universes which possess a past singularity as having an origin out of literally nothing at some past moment. At that moment, the material Universe, the laws of Nature, and the very fabric of space and time must come into being together (Barrow, 2007:39).[24]

Although several alternative cosmological models have been offered in an attempt to avoid the initial singularity, the standard Big Bang model is, as yet, one of the most successful models of our universe. Liddle and Loveday remark:

> The standard [Big Bang] cosmological model is a striking success, as a phenomenological description of cosmological data. ... The model's success in explaining high-precision observations has led a clear majority of the cosmological community to accept it as a good account of how the Universe works (Liddle & Loveday, 2009:8).

Thus, given the implications and wide acceptance of the Big Bang model, Craig maintains that contemporary cosmology shows premise (2) to be more true than false.

[24] Similarly, Andrew R. Liddle and Jon Loveday declare that "both space *and* time were created at the big bang" (Liddle & Loveday, 2009:28 [original emphasis]).

3.5.3.4 Conclusion: The Universe Has a Cause of Its Existence

Based on the conclusion that the universe has a cause, Craig (in Craig & Sinclair, 2012:191-194) conducts a conceptual analysis to show that this ultra mundane cause of the universe must possess the following theologically significant properties. Craig argues as follows. Firstly, the cause must, itself, be *uncaused* because, as the philosophical arguments for premise (2) show, there can be no infinite regress of causes. Furthermore, Occam's Razor instructs us to postulate causes only if necessary and, thus, we are justified in preferring one First Cause over a plurality of uncaused causes.[25] Secondly, the cause must be *beginningless* because an uncaused entity does not begin to exist. Thirdly, the cause must be *changeless* because an infinite regress of changes is impossible while, fourthly, this changeless cause must be *immaterial* because any material object is subject to constant change on the molecular and atomic levels. Fifthly, this cause must be *timeless* without the universe because this First Cause causes time itself to come into existence and, sixthly, this cause must be *unimaginably powerful* because it brought all space-time, matter and energy into being.

Finally, this cause must be *personal* (i.e. be a person) for at least three reasons. (1) There are two types of causal explanation only, namely, *scientific*

[25] Occam's razor is accredited to William of Occam (*c.* 1285-1349) and it is the principle that an explanation of a thing should not include more assumptions than are necessary.

explanations concerning physical laws and *personal explanations* concerning agents and their volitions. However, the origin of the universe cannot be a scientific explanation since there were no scientific laws before the universe. Accordingly, the cause of the universe may be explained only in terms of a personal agent and this personal agent's volition. (2) Two types of things only may be described as uncaused, beginningless, immaterial, timeless and spaceless, namely, an abstract object (such as a number) and an unembodied mind. However, abstract objects do not stand in any causal relations and, thus, cannot be the cause of anything. Therefore, this First Cause must be an unembodied mind. (3) Only "personal, free agency can account for the origin of a first temporal effect from a changeless cause" (Craig & Sinclair, 2012:193). A changeless and eternally existing object cannot cause a first event unless this object has the free will to do so and, thus, the cause of the universe must be a free, personal agent.

Based on these properties of the First Cause, Craig concludes:

> An uncaused, personal Creator of the universe exists who, sans the universe, is beginningless, changeless, immaterial, timeless, spaceless, and enormously powerful. ... This, as Thomas Aquinas was wont to remark, is what everybody means by "God" (Craig & Sinclair, 2012:194).

3.5.4 Craig's Unique Contribution

Although Craig's *kalām* argument is not totally unique, he advances the KCA in at least two distinct ways. Firstly, he takes modern set theory into account in his defence of the impossibility of an actual infinite, ensuring that the KCA is in line with contemporary mathematics. Secondly, unlike his predecessors, Craig presents scientific arguments together with the philosophical arguments in support of a beginning of the universe. As a result, Craig has helped foster interaction between philosophers and physicists regarding the origin of the universe.

Now, does Craig's version of the KCA permit the actual infinite? As with Philoponus' arguments against an eternal universe, if we take Craig's arguments in support of premise (2) as a cumulative case (and Craig appears to present these arguments in a cumulative case fashion), then his KCA does not permit the actual infinite. However, apart from his first philosophical argument, Craig's other arguments in support of a beginning clearly permit the actual infinite.

3.6 Summary and Concluding Remarks

This concludes our historical survey of the KCA. We may now note two important features of the argument. Firstly, the KCA originates from Philopo-

nus' attempt to use Aristotle's account of infinity in a defence of the Christian doctrine of *creatio ex nihilo*. Historically, the KCA is an argument in favour of the view that God brought the universe into existence out of nothing.

Secondly, the most prominent philosophical argument in support of the beginning of the universe is the argument based on the impossibility of the existence of an actual infinite *per se*. This infinity argument is advanced by Philoponus, al-Ghazālī, and the contemporary philosopher, William Lane Craig. Hence, their cumulative case arguments against an eternal universe do not permit the actual infinite. Therefore, it is not surprising that a few scholars associate the KCA with the philosophical arguments against the actual infinite. For example, William L. Rowe defines the KCA as the type of cosmological argument that maintains "it is *impossible* for an *actual infinite* to exist" (Rowe, 2007:33 [original emphasis]). Bruce Reichenbach defines the KCA in a similar fashion: "[T]he *kalām* argument ... holds that an infinite temporal regress is impossible because an actual infinite is impossible" (Reichenbach, 2013).

In view of the fact that part of my overall claim in this study is that important versions of the KCA do not permit the actual infinite, this chapter has served to inform the reader of these versions of the KCA by means of a historical survey. The next chapter examines whether proponents of the KCA should argue against the possibility of an actual infinite.

Chapter 4

Should the *Kalām* Argument Permit the Actual Infinite?

4.1 The Problem and the Solution

The problem: *Should proponents of the* kalām *cosmological argument argue against the existence of an actual infinite?* The previous chapter revealed that three of the most important proponents of the *kalām* cosmological argument (KCA), namely, John Philoponus, al-Ghazālī, and William Lane Craig, argue against the possibility of the actual infinite *per se* as proof that the universe began to exist.

However, whether it is possible for an actual infinite to exist is controversial. For example, Graham Oppy (2006a:143-144) maintains that it is

possible to perform a supertask – an actually infinite series of operations accomplished in a finite duration of time. Hence, Oppy is of the opinion that actual infinities may exist. As does Oppy, Wes Morriston (2013:23-26) has problems with the argument against the actual infinite. According to Morriston, theists should affirm that the series of future events is actually infinite. If the future is endless and if God has determined each future event, then God must have determined an actually infinite number of events. Accordingly, Morriston maintains that proponents of the KCA are not "entitled to conclude that no actual infinite whatever is possible" (Morriston, 2013:23). John Byl raises another important objection to the KCA. According to Byl (1996:78-79), if God is omniscient, then God's knowledge encompasses the endless future and, thus, an actual infinite exists in God's mind. Therefore, Byl believes omniscience entails an actual infinite. Douglas Groothuis (2011:222) also has doubt about prohibiting the actual infinite, for he claims that "set theory poses a genuine problem" for the KCA. According to set theory, argues Groothuis, the actual infinite is a logically coherent entity, and whatever is logically coherent in the abstract may be instantiated in reality.

It is, thus, clear that scholars are not unanimous in their views about the possibility of the actual infinite and, thus, there is clearly a need to investigate whether the KCA should permit the actual infinite. To state that the KCA

"permits the actual infinite" is to claim that the KCA uses no argument against the actual infinite. Such a KCA would remain silent on the question of the possibility of the actual infinite *per se*, thus permitting its proponents to affirm the existence of several actual infinities. However, such a KCA may still argue against the possibility of an actually infinite *series of events* and it should just leave open the question as to whether other actual infinities may exist. The problem, then, is this: Will the KCA be more persuasive if it permits the actual infinite? Is a version of the KCA that permits the actual infinite *stronger*, *more convincing*, and *less controversial* than a version that prohibits the actual infinite? If not, there is no need for the proponents of the KCA to permit the actual infinite but, if so, they should permit the actual infinite.

The proposed solution: For the sake of simplicity, I shall refer to the most prominent versions of the KCA that argue against the actual infinite the KCA_1. Hence, I shall argue that, because the KCA_1 denies the actual infinite, it is incompatible with both Platonism and the standard definition of omniscience and, thus, the proponents of the KCA should permit the actual infinite. My argument may be formulated in greater detail as follows:

A1 Arguing against the actual infinite results in the KCA_1 being incompatible with both (a) Platonism and (b) the standard defini-

tion of omniscience.

A2 However, a version of the KCA that is *compatible* with (a) and (b) is more persuasive than a version that is *incompatible* with (a) and (b).

A3 A version of the KCA that argues against the equi-successive infinite, but permits the actual infinite, is compatible with (a) and (b).

A4 Thus, a version of the KCA that argues against the equi-successive infinite, but that permits the actual infinite, is more persuasive than the KCA_1.

A5 Therefore, to ensure a more persuasive KCA, the proponents of the KCA should argue against the existence of an equi-successive infinite only and permit the existence of the actual infinite.

This chapter proceeds as follows. Firstly, I present an overview of modern set theory and define the various infinite collections that are required in order to evaluate the KCA. Secondly, I clarify what is meant by the claim that the KCA should "permit the actual infinite." Thirdly, I argue that the KCA_1 is incompatible with Platonism. Fourthly, I argue that the KCA_1 is incompatible with the standard definition of omniscience. Finally, by building on the earlier sections of the chapter, I show that the proponents of the KCA

should permit the actual infinite.

This chapter is unique in two ways. Firstly, to my knowledge, there is no other study that has addressed whether the proponents of the KCA should argue against the actual infinite. Secondly, this chapter presents an original evaluation of both Platonism and omniscience.

4.2 Set Theory and the Actual Infinite

Before the nineteenth century there was no coherent mathematical theory of the actual infinite. Aristotle had distinguished between the potential infinite and the actual infinite (*Physics* 3.6, 206a14-206a25). According to Aristotle, it is not possible for an infinite magnitude to exist in actuality but, rather, an infinite is purely potential because something may be divided or be added to endlessly without ever reaching infinity as a limit.

Aristotle's understanding of the infinite was widespread until the nineteenth century. As Charles C. Pinter notes, "classical mathematicians made a distinction between the 'actual' infinite – in which infinitely many objects are conceived of as existing simultaneously – and the 'virtual' infinite, which is simply the potential to exceed any given finite quantity. The 'virtual' infinite was regarded as safe, hence admissible, whereas the 'actual' infinite was taboo" (Pinter, 2014:1). This understanding of the infinite is seen, for

example, in Carl Friedrich Gauss' (1777-1855) letter to Heinrich Christian Schumacher (1780-1850) on July 12, 1831 and in which Gauss denies the actual infinite:

> But concerning your proof, I protest above all against the use of an infinite quantity as a completed one, which in mathematics is never allowed. The infinite is only a manner of speech specifying a limit to which certain ratios may approach as closely as desired when others may increase indefinitely (Gauss, 1860:269).[1]

Despite Gauss' claim that the infinite is but a manner of speaking, there was a distinct trend in Germany in the nineteenth century to accept the coherence of the actual infinite (Ferreirós, 2007:18). The most influential mathematicians who defended the actual infinite during this period included Bernard Bolzano (1781-1848), Bernhard Riemann (1826-1866), Richard Dedekind (1831-1916), and Georg Cantor (1845-1918). The work of these thinkers, especially that of Cantor, initiated the development of set theory.[2]

[1] Gauss' original German passage reads: "Was nun aber Ihren Beweis ... betrifft, so protestire ich zuvörderst gegen den Gebrauch einer unendlichen Grösse als einer Vollendeten, welcher in der Mathematik niemals erlaubt ist. Das Unendliche ist nur eine Façon de parler, indem man eigentlich von Grenzen spricht, denen gewisse Verhältnisse so nahe kommen als man will, während anderen ohne Einschränkung zu wachsen verstattet ist."

Some suggest that, in this passage, Gauss' aim is not to criticise the actual infinite *per se*, but to condemn Schumacher's unjustified assumptions about geometrical figures in infinity. Nevertheless, Gauss' clear disapproval of the actual infinite in this passage shows he favoured the potential infinite (see Ferreirós, 2007:20-21).

[2] For a detailed survey of the early development of set theory, see Ferreirós (2007). For a shorter discussion, see Ferreirós (2012).

Modern set theory is the mathematical theory of the formal properties of sets as units. In everyday speech a set is equated with a collection. Set theory, however, regards a set as not simply a collection but as a special type of collection. For example, Cantor defines a set as

> ... any collection into a whole ... M of definite and separate objects m of our intuition or our thought. These objects are called the 'elements' of M (Cantor, 1915:85).

Cantor's concept of a set has intuitive appeal. Unfortunately, this concept of a set was found to generate various contradictions and paradoxes (Fraenkel, 1966:10-11; Pinter, 2014:3-18). One of the most famous of these paradoxes is Russell's Paradox, the brainchild of Bertrand Russell. Russell describes the paradox as follows:

> Form ... the assemblage of all classes which are not members of themselves. This is a class: is it a member of itself or not? If it is, it is one of those classes that are not members of themselves, *i.e.* it is not a member of itself. If it is not, it is not one of those classes that are not members of themselves, *i.e.* it is a member of itself. Thus of the two hypotheses – that it is, and that it is not, a member of itself – each implies its contradictory. This is a contradiction (Russell, 1919:136).

This paradox invalidates the view that any well-defined condition or property may determine the elements of a set. If any condition may generate a set, the set of *all sets that are not elements of themselves* may be generated. However, such a set is absurd because, if it is an element of itself, it is not an element of itself and, if it is not an element of itself, it is an element of itself. Thus, the intuitive notion that any condition or property may determine a set must be false.

Russell's Paradox, together with various other paradoxes, resulted in mathematicians abandoning Cantor's general concept of a set. Abraham A. Fraenkel notes that "During many decades the attempts to 'improve' Cantor's definition [of a set] have remained utterly unsuccessful, and it has become inevitable *to renounce a definition of the general concept of set*" (Fraenkel, 1966:11 [original emphasis]). Most mathematicians have, therefore, adopted an axiomatic approach to defining a set with such an approach using axioms (i.e. underlying propositions) to abstractly define certain terms, such as "set" and "is element of," in such a way so as to avoid contradictions. The first axiomatisation of set theory was offered by Ernst Zermelo (1908). The axioms of set theory were further developed by Thoralf Skolem (1887-1963), Fraenkel (1891-1965), and John von Neumann (1903-1957) into the standard axiom system of set theory, also known as the Zermelo-Fraenkel axioms (ZF) together with the Axiom of Choice (AC), or ZFC. In view of

the fact that the axiomatic approach to set theory is the easiest way in which to avoid contradictions, ZFC "is probably the best-known, and best-loved, version of set theory" today (Oppy, 2006b:20).

Although Cantor's concept of a set has been abandoned, Fraenkel (1966:10) highlights two important features of Cantor's concept of a set, both of which are used in modern set theory. Firstly, the elements of a set are *separate* objects because they cannot be included in a set more than once, such as in the sequence ($\frac{1}{2}$, 1, $\frac{1}{4}$, 1, $\frac{1}{8}$, 1, ...). Secondly, the elements of a set are *definite* because the intrinsic nature of a set and its elements determines which elements it contains. Accordingly, a set is specified by its elements because two sets are identical if they have the exact same elements while adding an element to or removing an element from a set produces a distinct set; for example, adding the number 3 to the set (1, 2) produces a distinct set (1, 2, 3).[3] Hence, a set is a static collection and not a dynamic collection that may change.

This feature of a set results in the fact that, as regards infinity, set theory is solely concerned with the actual infinite rather than the potential infinite (Nowacki, 2007:37-40). In view of the fact that the potential infinite is a

[3] In set theory addition is defined as the union of two sets M and N, and this union produces the set of all elements each of which belong to either M or N. Subtraction is defined as the intersection of two sets, and this intersection produces the set of elements each of which belong to both M and N. For example, the union set of (1, 2, 3) and (2, 3, 4) is (1, 2, 3, 4); whereas the intersection set of (1, 2, 3) and (2, 3, 4) is (2, 3).

dynamic concept that describes a finite collection that may grow indefinitely, set theory has no room for the potential infinite. Rather, set theory relates to a certain static class, termed a set.

Therefore, to investigate whether the KCA_1 should permit the actual infinite, I shall distinguish between two main types of collections, namely, a class and the potential infinite. Following the terminology of set theory, I shall further distinguish between two types of classes, namely, a proper class and a set. By using John Philoponus' distinction, I shall further subdivide an actual infinite set into the successive infinite and the simultaneous infinite. However, I shall go further than Philoponus and subdivide a successive infinite into a supertask and what I shall term an equi-successive infinite. Thus, there are ten different collections to be keept in mind, namely, a potential infinite, a class, a proper class, a set, a finite set, an actual infinite, a successive infinite, a simultaneous infinite, a supertask, and an equi-successive infinite (Figure 1.1).[4] I shall now describe in greater detail each of these collections.[5]

[4] This taxonomy of collections (Figure 1.1) is my own. I have not found a similar systematic representation in the literature. Although one may add to this taxonomy, the various collections listed here are sufficient for the purposes of this study.

[5] The mathematical world of set theory exhibits a bewildering view. However, it is fortunate that it is not necessary to describe all of set theory in order to evaluate the KCA. I shall, therefore, describe these various collections informally, and not in terms of formal, mathematical language. In the presentation of the collections in set theory (i.e. class, proper class, set, and actual infinite) that follows, I draw from Huntington (2003) and Pinter (2014).

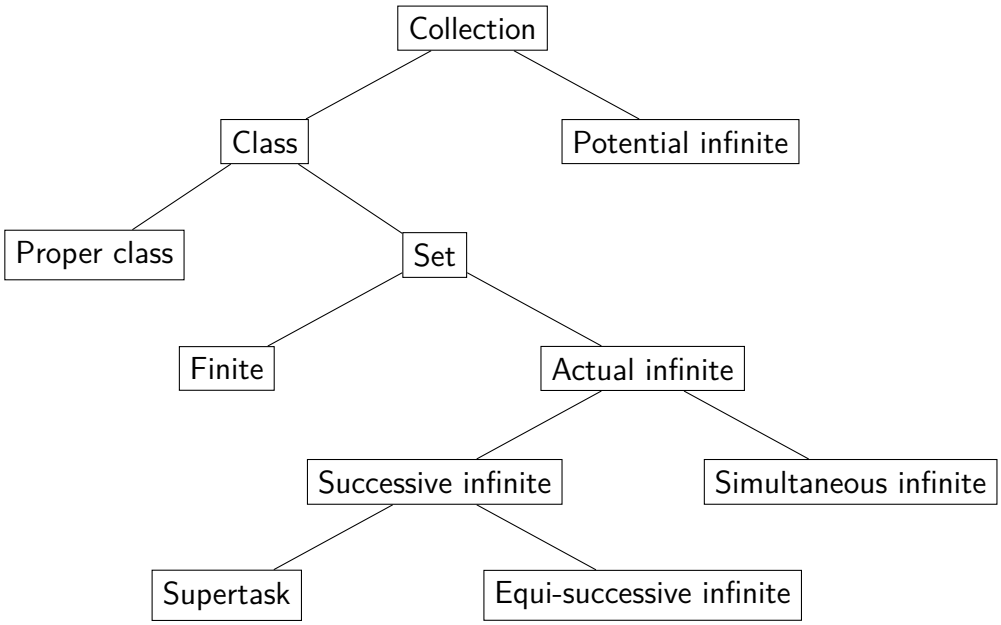

Figure 1.1 A taxonomy of collections.

1) A *class* is a collection of entities, each satisfying a common condition. Each entity (in the world being taken into account) that satisfies the condition belongs to the class and is called a *member* or *element* of the class. A class may, however, be empty if no entity in the world considered satisfies the condition. Consider, for example, the class P of planets in our solar system. P's world or domain is *our solar system*, and P's condition is that *each element must be a planet*. Therefore, P has eight elements: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune. However, the class of tigers under my bed is empty and has no elements.

Another feature of a class is that it is a unit or completed totality because

all its elements belong to the set simultaneously. This does not, however, mean that the elements of the set exist in reality simultaneously (or exist at all) but, rather, that they form the set all at once. In this context we may differentiate between mathematical existence and real existence. Any entity that may be used in mathematical discourse has mathematical existence, regardless of whether that entity corresponds to reality. For example, each element of *the class of all books I hope to write* belongs to a mathematical class and so has mathematical existence but does not exist in the real world. However, if one day I write a book in this class, that book would come into existence – it would really exist. Therefore, the elements of a class do not need to simultaneously exist in reality, they merely need to belong to a mathematical class all at once.

If the elements of a class are arranged or ordered according to some relation, then the class is called a *series*. For example, ordering the class of planets in our solar system from largest to smallest generates the following series: Jupiter, Saturn, Uranus, Neptune, Earth, Venus, Mars, Mercury.

2) A *proper class* is any class that *cannot* be an element of another class. The notion of a proper class was introduced in set theory to avoid the contradictions and paradoxes discovered in Cantorian set theory. For example, *the collection of all sets that are not elements of themselves* is a proper class. However, by defining a proper class as a class that is not an element, one

avoids Russell's Paradox because *the collection of all sets that are not elements of themselves* is not itself a set, but a proper class.

Any proper class has the same number of elements as the infinite class of all sets (Pinter, 2014:47) and is, therefore, infinite as well. Consequently, a proper class is a type of actually infinite collection that cannot be an element of another class.

3) A *set*, on the other hand, is any class that *can* be an element of another class. It is any class that is not a proper class. This implies that any operation carried out on a set always generates another set and never creates a proper class. Examples of a set include the collection of planets in our solar system, the collection of colours, or the collection of apples on my desk. Since a class is a completed totality, a set may either be finite or actually infinite, but not potentially infinite.

4) An *actually infinite* (*proper infinite* or just *infinite*) set is a set that may be placed into a one-to-one correspondence with a proper part of itself. In order to better understand the notion of the actual infinite, let us describe what is meant by a one-to-one correspondence and by a proper part. A one-to-one correspondence occurs between one set and another set when some rule is used to pair each element of the first set with one, and only one, element of the second set. For example, the set of the first three planets in our solar system may be placed into a one-to-one correspondence with the

set of each planet's radius (km):[6]

Set 1:	Mercury,	Venus,	Earth
Set 2:	2439.7,	6051.8,	6371

A proper part of a set P is any set containing some, but not all, elements of P, and contains no other element. For example, the set of planets in our solar system whose names (in English) begin with the letter "M" (i.e. Mercury, Mars) is a proper part of the set of planets in our solar system. Thus, an *actual infinite* is any set whose elements may be paired with one and only one element of a proper part of itself. An example of an actual infinite is the set of natural numbers as this set may be placed into a one-to-one correspondence with the set of even numbers, which is a proper part of itself:

Set 1:	1,	2,	3,	...
Set 2:	2,	4,	6,	...

The actual infinite is a *completed totality* because it is an endless set whose members are, nevertheless, present all at once. Thus, we may define the actual infinite as any endless, completed set that may be placed into a one-to-one correspondence with a part of itself.

[6] These figures of the planets' radii are taken from NASA's planet chart, available online at `http://solarsystem.nasa.gov/planets/charchart.cfm` [Accessed 13 March, 2015].

5) A *finite* set may be defined as any set that is not actually infinite; it has n elements, where n is any natural number. A finite set cannot be placed into a one-to-one correspondence with a proper part of itself. For example, the set of the first seven natural numbers (1, 2, 3, 4, 5, 6, 7) cannot be placed into a one-to-one correspondence with the set of the first four natural numbers (1, 2, 3, 4) because the last three elements of the first set (5, 6, 7) cannot be assigned to any element in the second set.

6) The *potentially infinite* (or *virtual infinite*, *improper infinite*, *variable finite*) denotes an indefinite process, such as endless addition or endless division. The potential infinite is neither a class, a proper class, nor a set; but rather, a potential infinite is any dynamic collection or series that increases endlessly towards infinity as a limit but never becomes actually infinite. For example, the process of counting all the natural numbers (1, 2, 3, ...) resembles a potential infinite for it is not possible for one ever to complete this counting process because, once a number has been counted, another always follows. Thus, although a potential infinite increases endlessly towards infinity, it is always finite.

In view of the fact that a potentially infinite series increases indefinitely, it is not a completed totality. In other words, it is not an unbounded collection whose members are present all at once. Thus, the fundamental difference between the potential infinite and the actual infinite is that the former is not

a completed totality whereas the latter is.

Now, the argument against the possibility of the actual infinite tries to show that an actually infinite series cannot exist in reality. An actually infinite series exists in reality if all its elements either (1) exist simultaneously or (2) have come into existence successively. Thus, we may distinguish between two types of the actual infinite, namely, the successive infinite and the simultaneous infinite.

7) A *simultaneous infinite* is any actually infinite set whose elements all exist simultaneously. For example, if all the matter in the universe comprises an actually infinite set of particles, then the set of all particles in the universe is a simultaneous infinite because each particle exists right now.

8) In contrast to the simultaneous infinite, a *successive infinite* is any actually infinite series whose elements have each come into existence one after another. Unlike the potential infinite, the successive infinite is complete because each and every member of a successive infinite has already come into existence. A successive infinite series should be understood in temporal terms because each element in the series is preceded by another element in time. If, for example, the human race has been procreating from eternity past, then the series of all past generations is a successive infinite, since each generation is preceded by another generation *ad infinitum*. A successive infinite comes in two main types, namely, a supertask and an equi-successive infinite.

9) A *supertask* is a successive infinite series of progressively shorter operations accomplished in a finite duration of time. A classic example of a supertask is seen in Zeno of Elea's *Achilles and the Tortoise* paradox. Suppose that Achilles is chasing a tortoise, with Achilles running much faster than the tortoise. Now, Achilles can catch the tortoise only after he reaches the tortoise's starting point. However, by the time Achilles reaches this point, the tortoise has crawled forward. So once again, Achilles can catch the tortoise only after he reaches this new point but by then the tortoise has crawled forward again. This continues *ad infinitum*. Thus, before Achilles can catch the tortoise, he must traverse an actually infinite number of progressively shorter distances. Therefore, once Achilles catches the tortoise, he has performed a supertask.[7]

10) Finally, I shall term any successive infinite series whose elements each come into existence over an equal duration an *equi-successive infinite*. Whereas the duration of the operations of a supertask becomes progressively shorter, an equi-successive infinite comprises an infinite number of elements of equal duration. For example, if the universe is eternal, the temporal series of all past years would be an equi-successive infinite, since each element (or year) in the series has the same duration.

[7] Although Zeno concludes that Achilles can never catch the tortoise, many philosophers, such as Oppy (2006a:143), believe that such a supertask is possible because all the progressively smaller intervals in a supertask add up to a finite interval.

4.3 Permitting the Actual Infinite

The previous chapter (chapter 3) revealed that the KCA_1 argues against the actual infinite. "Existence" in this context should be understood as metaphysical existence or existence in reality. The KCA_1 does not show that the actual infinite cannot exist as a coherent mathematical concept but, rather, the KCA_1 argues that an actually infinite set or series cannot be instantiated in reality, such as an infinite number of planets, people, thoughts, or events. Thus, proponents of the KCA_1 deny the existence of any proper class or actual infinite, such as a supertask, equi-successive infinite, or simultaneous infinite (Figure 1.2):

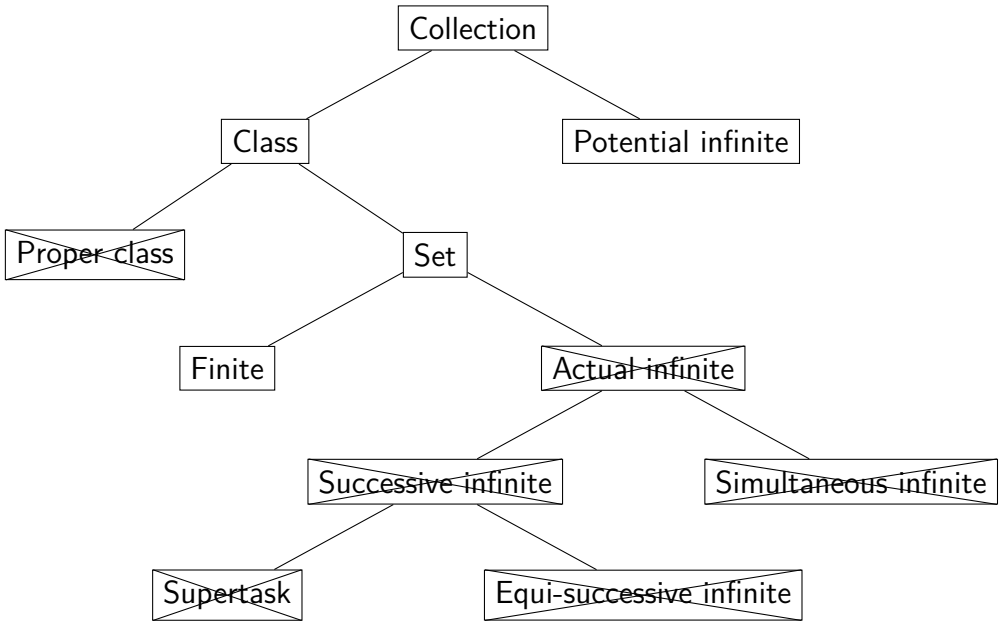

Figure 1.2 By arguing against the actual infinite, the KCA_1 denies any proper

class, successive infinite, supertask, equi-successive infinite, and simultaneous infinite.

However, I shall argue that it is unnecessary for the proponents of the KCA to deny the actual infinite because, to show that God brought the universe into existence out of nothing, the theist has merely to deny the equi-successive infinite (Figure 1.3).

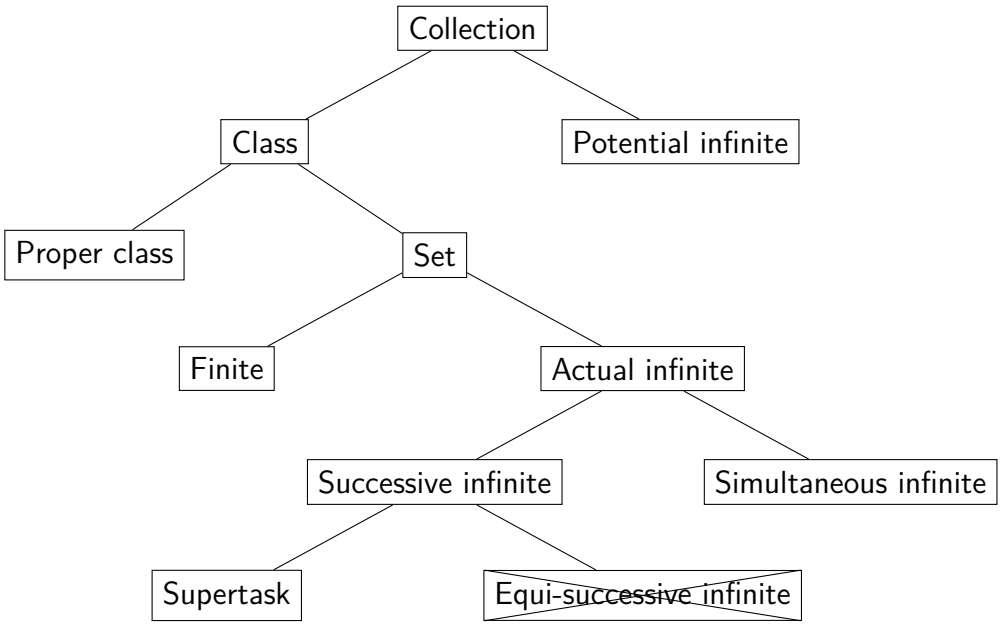

Figure 1.3 The KCA_1 will be more persuasive if it denies the equi-successive infinite but permits the actual infinite.

I shall further argue that, not only is it unnecessary for proponents of the KCA to deny the actual infinite, but that they *should* permit the actual

infinite. My argument may be summarised thus:

A1 Arguing against the actual infinite results in the KCA_1 being incompatible with both (a) Platonism and (b) the standard definition of omniscience.

A2 However, a version of the KCA that is *compatible* with (a) and (b) is more persuasive than a version that is *incompatible* with (a) and (b).

A3 A version of the KCA that argues against the equi-successive infinite, but permits the actual infinite, is compatible with (a) and (b).

A4 Thus, a version of the KCA that argues against the equi-successive infinite, but that permits the actual infinite, is more persuasive than the KCA_1.

A5 Therefore, to ensure a more persuasive KCA, the proponents of the KCA should argue against the existence of an equi-successive infinite only and permit the existence of the actual infinite.

Since premises (A4) and (A5) follow from the previous premises, the key premises in this argument are (A1), (A2), and (A3). The first premise (A1) is, however, the most controversial premise in the argument. Therefore, I shall argue in detail, firstly, that the KCA_1 is incompatible with Platonism

and, secondly, that the KCA_1 is incompatible with the standard definition of omniscience. I shall thereafter present a brief defence of premises (A2) and (A3).

4.4 The *Kalām* Argument and Platonism

4.4.1 What is Platonism?

Platonism, also termed realism, is the view that abstract objects exist.[8] Abstract objects are unusually difficult to define. There is agreement, however, that abstract objects should be distinguished from concrete objects, and that every object that exists is either abstract or concrete.[9] But, how do abstract objects differ from concrete objects? J. P. Moreland presents the following definition of Platonism and abstract objects:

> Platonism entails a commitment to the existence of abstract objects, where 'abstract object' is straightforwardly ontological. In this sense, an entity is abstract just in case (a) it is not a person, and (b) it exists outside space and time in that it has no spatial or temporal location or duration. So understood, an abstract object

[8] It should be noted that Platonism, as the view that abstract objects exist, is a contemporary view that does not necessarily reflect the beliefs of Plato (Balaguer, 2014). Furthermore, I shall use the terms "Platonism" and "realism" synonymously.

[9] I use the term "object" as the broadest count noun, synonymous with "entity," "item," and "thing."

> is an immutable, necessary being (Moreland, 2003:376).

Thus, an abstract object, according to Moreland, is any object that is not a person and is neither spatially nor temporally located or extended. For example, numbers, universals (such as properties; e.g. the property of *being green*), mathematical truths, and propositions (i.e. the content of sentences that are either true or false) are abstract objects. However, there are two problems with this definition of an abstract object. Firstly, it implies that moments, events, and time itself are abstract objects (because moments, events, and time are not themselves spatially or temporally located). However, as Joshua Hoffman and Gary S. Rosenkrantz (2003:47) note, philosophers agree that space, places, moments, events, and time are concrete objects.

Secondly, Moreland's definition implies that all abstract objects are timeless and this is controversial. Many philosophers believe that the truth value of a proposition is permanent; thus, propositions are timeless. Other philosophers argue to the contrary, namely, that the truth value of a proposition that is stated in tensed terms may change; thus, some propositions are temporal because they undergo intrinsic change. For example, the sentence "Socrates is married to Xanthippe" expresses a proposition that was true during the fifth century BC when Socrates was married to Xanthippe, but became false once Socrates died. Therefore, Moreland's definition does not

offer a sufficient condition for being an abstract object.

How else might one explain what an abstract object is? Paul Copan and William Lane Craig (2004:168-170) offer a slightly different definition to that of Moreland. According to Copan and Craig, abstract objects are characterised by the following three features. Firstly, abstract objects are causally powerless and devoid of any causal relations. The number twelve, for example, does not cause bad weather; and bad weather does not cause an intrinsic change in the number twelve. Furthermore, "causal impotence seems to be an essential feature of abstract objects" (Copan & Craig, 2004:168). Thus, Copan and Craig maintain that there is no possible world in which abstract objects can effect something.

Secondly, abstract objects do not occupy space and are, thus, immaterial and space-less. If an abstract object were material or spatially extended, it could stand in causal relations with other material objects. Thus, because an abstract object is causally effete, it must be immaterial and space-less.

Finally, Copan and Craig assert that, according to Platonism, most (if not all) abstract objects have necessary existence. If no universe at all existed, certain abstract objects would still exist, such as numbers, propositions, and properties. For example, both the proposition that "no universe at all exists" and the property of *being a universe* would exist without the universe. Therefore, certain abstract objects exist in all possible worlds and, thus, exist

necessarily.

In short, Copan and Craig define an abstract object as an object that is causally powerless, immaterial, and space-less, adding that most abstract objects exist necessarily. This definition, however, faces two problems. Firstly, it does not seem that all abstract objects are causally powerless. Copan and Craig suggest that some abstract objects are mutable and temporal. As an example, they claim that the proposition that *George W. Bush is the president of the United States* intrinsically changed from *being false* to *being true* at Bush's inauguration in 2001 (Copan & Craig, 2004:169). After offering a similar example regarding properties, they conclude, "While all abstract objects are causally impotent and immaterial, some of them have potentialities and are arguably even mutable and temporal in their being" (Copan & Craig, 2004:170).

The problem, however, is that a proposition that undergoes an intrinsic change enters a causal relation. For example, Bush's inauguration in 2001 *caused* the proposition that *George W. Bush is the president of the United States* to become true. If it were not for the event, the proposition would have remained false. Thus, an event may effect a proposition, and this is a causal relation. However, if causal inability is an essential attribute of abstract objects, as Copan and Craig argue, then propositions cannot undergo intrinsic change and so must be timeless. It would, thus, appear that Copan

and Craig are inconsistent because they claim that some abstract objects are mutable and temporal and yet their definition of abstract objects implies that all abstract objects are timeless and immutable.

It may be that Copan and Craig mean that, although an abstract object may be effected by something, it cannot itself effect or cause something. However, Platonism entails that physical objects are the way they are because certain abstract objects exist. For example, a red apple is red because the property of *being red* exists. If this property did not exist, the apple could not be red. But, if by "a causes b" we understand the causal relation whereby b depends on a for its existence, then properties cause things. The property of *being red*, for example, is the cause (or part of the cause) of red apples. Therefore, it does not seem that all abstract objects are causally powerless and devoid of any causal relations.

Secondly, Copan and Craig's definition of an abstract object does not account for space, places, moments, events, or time. According to their definition, space and time are abstract because they are causally powerless, immaterial, and space-less. Hence, Copan and Craig's definition of abstract objects is inadequate.

Despite the problems with the attempts to define abstract objects discussed above, I believe that, by adjusting these definitions slightly, we may achieve an adequate abstract-concrete distinction. I suggest that, for any

object x, x is abstract if it satisfies none of the following seven conditions, and x is concrete if it satisfies at least one of the following seven conditions:

1. It is a person (whether physical, such as a human, or non-physical such as a soul, spirit, or God).
2. It is spatially extended.
3. It is a place.
4. It is space itself.
5. It is a time (i.e. a temporal instance, moment, or duration such as an event).
6. It is time itself.
7. It can bring something into existence.[10]

This account of the abstract-concrete distinction avoids the problems discussed above. Firstly, although space and places are space-less, they are concrete objects. Similarly, moments, events, and time are space-less and timeless and, yet, they are concrete objects. Secondly, despite the fact that some propositions are mutable, they are abstract objects. Finally, even if an abstract object can stand in causal relations, it cannot bring something into

[10] By "y brings x into existence" I mean that (1) x is a temporal entity, or time itself, or an event; and, (2) if x is a temporal entity, y brought x into existence at the present moment or at some moment a finite time ago; or, if x is time itself, y brought x into existence with its first moment or event and x comprises a finite series of events; or, if x is an event, y caused x to occur at the present moment or at some moment a finite time ago.

existence, whereas some concrete objects can bring something into existence. For example, a person can create a statue and God can create the universe, but no abstract object can create either a statue or a universe.

Examples of abstract objects, thus, include a number, a universal, a property, a mathematical truth, and a proposition. Examples of concrete objects include a dog, a tree, a person, a mind, God, a body, an event, a space, a time, and the universe. Thus, Platonism is the view that *such* abstract objects exist.

4.4.2 Is the *Kalām* Argument Incompatible with Platonism?

The KCA_1 would be compatible with Platonism if the latter affirmed that the number of abstract objects is finite and not infinite. However, it is not at all clear how, according to Platonism, a finite number of abstract objects only exist. The following argument appears to show that Platonism entails an actual infinite:[11]

B1 The series of natural numbers S is endless.

B2 If numbers exist necessarily, S's elements are simultaneously present and so S is a completed totality.

[11] I have re-written and included several of the arguments cited below in an article, co-authored with Anné H. Verhoef, and entitled *The Kalām Cosmological Argument and the Infinite God Objection*, to be published in *Sophia*.

B3 Numbers exist necessarily.

B4 Therefore, S is a completed totality.

B5 Any endless series that is a completed totality is actually infinite.

B6 Therefore, S is actually infinite.

B7 Therefore, an actual infinite exists.

Thus, by affirming the existence of numbers, the platonist inadvertently affirms the existence of an actual infinite. Of course, the platonist may deny (B3) and argue that numbers are simply contingent beings. However, Chris Swoyer (1996:260) points out that most philosophers identify numbers with properties or necessary entities and this, in turn, requires "an infinite collection of necessarily existing properties." Most platonists, therefore, believe that numbers exist necessarily and this entails the existence of an actual infinite.

However, if Platonism entails an actual infinite, it would seem that an advocate of the KCA_1 cannot be a platonist. In response to this problem, the platonist may claim that the arguments against the actual infinite, which form part of the KCA_1, concern the concrete infinite only, with the "concrete infinite" being distinguished from the "abstract infinite." The former denotes an actually infinite set of concrete objects, while the latter denotes an actually infinite set of abstract objects. Therefore, the platonist may argue that a

concrete infinite is impossible while an abstract infinite is possible.

For example, Moreland (2003), who endorses both Platonism and the KCA_1, rejects the concrete infinite only and not the abstract infinite. Moreland claims that an actually infinite number of concrete objects cannot exist in the real world, even though there exist an actually infinite number of abstract objects. Therefore, Moreland (2003:380) suggests that, instead of claiming that

> C_1 "An actually infinite number of things cannot exist,"

proponents of the KCA should rather claim that

> C_2 "An actual infinite number of finite, contingent entities that (1) can be added to or subtracted from a set and (2) are spatially (or spatio-temporally or temporally) extended cannot exist."

Moreland explains further:

> An abstract object cannot be added to or subtracted from anything, so they are not proper candidates for members of sets included in thought-experiments employed against the existence of actual infinite collections. Further, abstract objects are neither spatially (or temporally) located or extended, so there is no need to find room for them next to each other or at some other location. And [C_2] allows one to accept [the] claim that the denial

> that a whole is greater than any of its proper parts generates "all sorts of absurdities ... when one tries to translate that theory to reality" (Moreland, 2003:380).

Therefore, according to Moreland, C_2 has the benefit of allowing the abstract realm to be infinite, while denying an actually infinite number of past events.

However, I do not believe that Moreland's response is tenable. According to Moreland, absurdities (such as those illustrated by Hilbert's Hotel, or al-Ghazālī's infinite celestial revolutions thought experiment) would result if an actual infinite were instantiated in the real world, but no such absurdities would result within the realm of abstract objects. Nevertheless, it is difficult to justify why the realm of abstract objects is exempt from such absurdities. What, exactly, makes abstract objects improper "candidates for members of sets included in thought-experiments employed against the existence of actual infinite collections?" One cannot respond that this is the case because abstract objects cannot be added to or subtracted from anything, for new propositions *can* be added to (and subtracted from) one's knowledge.

Moreover, abstract objects may be elements of sets or collections in a thought experiment employed against the actual infinite. Consider, for example, the following thought experiment. Suppose Jones and Smith possess identical knowledge. All that Jones and Smith know is the following actu-

ally infinite series of mathematical equations: 1 + 1 = 2, 1 + 2 = 3, 1 + 3 = 4 and so on *ad infinitum*. Now suppose that Smith forgets every second mathematical equation in the series and no longer knows that 1 + 2 = 3, 1 + 4 = 5, 1 + 6 = 7 and so on *ad infinitum*. Nevertheless, Smith still knows an actually infinite number of propositions. Hence, Jones knows an infinite number of propositions that Smith does not know, yet they both know *exactly* the same amount of propositions. Therefore, infinity minus infinity equals infinity. But suppose that Smith forgets all but the first three equations he previously knew and now knows three propositions only. Consequently, infinity minus infinity equals three.[12] However, this is absurd, for how can infinity minus infinity equals infinity, yet infinity minus infinity equals three? This thought experiment illustrates that the abstract infinite is not exempt from absurdities because one may subtract equal amounts of abstract objects from equal amounts but reach different results.

The illustration could become even more bizarre. For, suppose that Jones somehow becomes omniscient, acquiring knowledge of all true propositions (which we will assume amounts to an actual infinite). In this case, Jones knows an actually infinite number of propositions, which is the exact same number of propositions he knew before he was omniscient. Thus, a non-

[12] As shown above, proponents of the KCA over similar thought experiments to illustrate the absurdity of the actually infinite. See pp. 118-120.

omniscient person may know the identical number of propositions that an omniscient person knows!

The underlying reasoning in this thought experiment, i.e. that subtracting from the actual infinite results in genuine absurdities, parallels the thought experiments used in the KCA_1. However, I shall not try to examine whether this underlying reasoning successfully shows the impossibility of an actual infinite. Nevertheless, if we assume that it does, then the thought experiment about infinite knowledge discussed above successfully shows that absurdities would result if the abstract infinite were to exist. Accordingly, the platonist proponent of the KCA_1 faces a problem as the KCA_1 invalidates the view that an actually infinite number of abstract objects exist. Therefore, the platonist who wishes to maintain that the philosophical arguments supporting the KCA_1 are sound may choose one of at least four options:

D1 Affirm Platonism and declare (a) that a concrete infinite is impossible, (b) that an abstract infinite is possible, and (c) that this will eventually be proved.

D2 Affirm Platonism and try to show that the realm of abstract objects is free from the absurdities concerning infinity.

D3 Affirm Platonism and assert that there exist only a finite and not an actually infinite number of abstract objects.

D4 Reject Platonism.

The first choice (D1) is undesirable because the platonist must, at least, show why the above thought experiment about infinite knowledge fails. Without any arguments in favour of the possibility of an abstract infinite, it remains more plausible that the existence of the abstract infinite is as impossible as the concrete infinite. The second choice (D2) may be warranted if the platonist could show that the realm of abstract objects is impervious to the seeming metaphysical absurdities associated with an actual infinity. However, it is unclear how one could achieve this. The third choice (D3) requires abstract objects to be contingent and not necessary entities, and this the platonist will probably criticise as scarcely credible, arguing that a world without abstract objects is incomprehensible. However, as noted above, if numbers exist necessarily, the series of natural numbers would be actually infinite. Therefore, it appears that (D4) is the best choice for the proponents of any version of the KCA that denies the actual infinite. Nevertheless, this of course implies that Platonism is incompatible with the KCA_1. We thus have good reason to believe that it is not possible for a theist to advocate both Platonism and the KCA_1.

4.5 The *Kalām* Argument and Omniscience

4.5.1 What is Omniscience?

Omniscience is the attribute of being all-knowing. According to orthodox theism, God alone is omniscient; God's knowledge is perfect and no other being could surpass His knowledge. The Jewish and Christian scriptures describe at least four features of God's knowledge. Firstly, God knows everything that has occurred and is occurring throughout the universe. As Proverbs 15:3 states, "The eyes of the Lord are everywhere, keeping watch on the wicked and the good." Secondly, God knows our inner thoughts (Psalm 44:21; 1 Chronicles 28:9). For example, in Jeremiah 17:10, God declares, "I the Lord search the heart and examine the mind, to reward each person according to their conduct, according to what their deeds deserve." Thirdly, God has foreknowledge of the entire future (Psalm 139:1-6; Acts 2:23; Romans 8:29; 11:2; 1 Peter 1:2). In fact, in the book of Isaiah God's foreknowledge is used to distinguish Him from the pagan gods (Isaiah 41:21-24), for only God makes "known the end from the beginning, from ancient times, what is still to come" (Isaiah 46:10). Thus, God knows each and every future event that will occur. Finally, God's knowledge is unsurpassable because He alone knows everything (Romans 11:33-36; Job 21:22; Psalm 147:5). Therefore, a theological description of omniscience may state that omniscience is the property

of knowing every event and thought that has, is, and will occur throughout the universe.

Analytic philosophers offer a more technical definition of omniscience. In the philosophy of religion, the standard definition of omniscience states that omniscience is knowledge of all true propositions, where a proposition is the content of a sentence. Accordingly, for any person S, S is omniscient if, for every proposition p, if p is true, then S knows p. Several philosophers believe this standard definition of omniscience to be problematic and, thus, they suggest variations of the standard definition.

For example, Hoffman and Rosenkrantz (2002:112) claim that the standard definition of omniscience faces the problem of indexicals, according to which each person has "first-person" knowledge that is not available to any other person. Thus, a person cannot know an indexical or perspectival proposition that someone else asserts. For example, if Smith declares "I am hungry," then only Smith can grasp this proposition, and no one else can believe or know this proposition (of course, others can know the proposition that *Smith is hungry* but, according to the problem of indexicals, this proposition is different to the proposition expressed by Smith. Smith alone can experience the first-person knowledge that *he* is hungry). Hoffman and Rosenkrantz (2002:124) redefine the standard definition of omniscience in terms of knowledge of any true proposition p, where either p can be grasped

by different persons, or p can be grasped by S alone. Nevertheless, for the present purposes of this study, we need not concern ourselves with all the issues associated with the standard definition of omniscience, and we shall accept the standard definition.

4.5.2 Is the *Kalām* Argument Incompatible with Omniscience?

An important objection to the KCA_1 states that omniscience entails an actual infinite. More precisely, this objection claims that if God is omniscient, His knowledge must encompass an endless series of future events or abstract objects at once. However, the elements of an endless series may be known simultaneously only if the series is actually infinite. Therefore, either an actual infinite exists in God's knowledge, or God is not omniscient. This objection may be formulated in greater detail as follows:

E1 If God is omniscient, He knows an actually infinite number of truths.

E2 If God knows an actually infinite number of truths, an actual infinite exists.

E3 Therefore, if God is omniscient, an actual infinite exists.

E4 Therefore, if an actual infinite is impossible, God cannot be om-

niscient.

E5 Therefore, the proponents of the KCA_1 face the following dilemma: either an actual infinite cannot exist or God cannot be omniscient.[13]

Premises (E2) to (E5) appear to be uncontroversial. (E2) claims that knowledge encompassing an actually infinite number of things entails an actual infinite because such knowledge implies that there exist an actually infinite number of things (such as propositions or truth values). Premises (E3) to (E5) logically follow from the previous premises. Thus, the controversial premise is (E1). Therefore, let us examine two reasons put forward by the critics of the KCA_1 to support (E1):

Firstly, if God has foreknowledge and the future is endless, then God's knowledge of all future events must be actually infinite. Not all theists affirm that God has foreknowledge or that the future is endless. However, I believe that the scriptures mentioned above (Psalm 139:1-6; Acts 2:23; Romans 8:29; 11:2; 1 Peter 1:2; Isaiah 41:21-24; 46:10) imply that God knows the future. Furthermore, I believe that an endless future is supported by three scriptural teachings, namely, (a) that all believers will receive physical, resurrected

[13] This appears to be a true dilemma because the proponents of the KCA_1 must choose one of three possibilities: (i) God is omniscient and an actual infinite exists, (ii) God is not omniscient and an actual infinite cannot exist, or (iii) God is not omniscient and an actual infinite exists.

bodies,[14] (b) that God will create a new physical earth,[15] and (c) that the new earth is the eternal destination of believers.[16] Therefore, because a physical body and physical earth require the presence of time, and because believers will live forever, the future must be endless, making up at least a potentially infinite series of events. Thus, God knows the elements of an endless series of future events all at once.

However, by knowing all the elements of an endless series of future events at once, God's knowledge comprises a completed totality of infinitely many distinct truths. God must, therefore, know an actually infinite number of things. This conclusion, as John Byl contends below, is inconsistent with the KCA_1:

> Let us suppose for the sake of the argument that [the] proof against the actual infinite were valid. It would seem that such a ban would have some awkward theological consequences. ... If the future is indeed endless, then to an omniscient God it exists as a definite actual infinity, rather than as an indefinite potential infinity ... [implying that] God has an infinite stock of memories or thoughts. ... [However, if the] argument against an actual in-

[14] Daniel 12:2, Luke 13:28-29, Matthew 5:29; 10:28, John 5:28-29, Philippians 3:21, 1 Corinthians 15, Romans 8:11.
[15] Isaiah 65:17, 2 Peter 3:13, Revelation 21:1.
[16] Revelations 22:1-5.

> finity is valid it implies that God's knowledge encompasses only a finite number of future events. This leads to the conclusion that either the future is finite, and there is a last event, or God's knowledge of the future is incomplete (Byl, 1996:78-79).

According to Byl, by prohibiting the actual infinite, the KCA_1 backfires on the theist, who believes the future is endless, by posing a threat to God's omniscience and foreknowledge.

A theist may argue that omniscience excludes foreknowledge (as an advocate of open theism argues) and so God does not know an infinite series of future events. However, even in this case, the theist still faces the second argument in favour of (E1) and which states that if God is omniscient, He knows every mathematical truth, of which there are an actual infinite (Morriston, 2002:156-160). For example, Wes Morriston declares, "Since the number of mathematical truths (to say nothing of all the other eternal truths concerning properties and propositions and the like) is clearly infinite, it follows – does it not? – that an *actual* infinity is present in God's knowledge" (Morriston, 2002:157 [original emphasis]). Consequently, God knows that 1 + 2 = 3, 2 + 3 = 5, 3 + 4 = 7, ... and so on *ad infinitum*, thus knowing an actually infinite number of mathematical truths.

One cannot assert that abstract objects do not exist and, thus, this second argument fails. For, although a mathematical truth or proposition is an abstract object, the argument does not require that abstract objects exist. A person can know, for example, that $1 + 2 = 3$ without asserting that this equation exists as an abstract object. In such a case, one's *thought or knowledge about* the equation exists, yet the equation itself does not exist. Hence, even if abstract objects do not exist, God's knowledge of an actually infinite number of mathematical truths would exist. The problem, then, is that, if omniscience entails an actual infinite, omniscience is incompatible with the KCA_1, and, thus, either an actual infinite cannot exist or God cannot be omniscient.

Is there a way out of this dilemma? As far as I am able to tell, the only way for the proponents of the KCA_1 to avoid the dilemma is to show that omniscience does not entail actually infinite knowledge. Craig (in Craig & Smith, 1993:94) attempts to do this by suggesting that God's knowledge is non-propositional in nature. Craig's view of God's knowledge is similar to Aquinas' understanding that God has one simple object or representation through which He knows many things (*Summa Contra Gentiles*, 1.51-53). According to Craig, God's knowledge is simple because it lacks diversity – there is no distinction between God's knowledge and its object. Thus, God has one simple intuition of all reality, and this simple intuition may be broken

down into propositions endlessly:

> Finite creatures break up the whole of what God knows into propositions which they know. But the fact that God's simple intuition can be broken down into a potentially infinite number of propositions does not entail that what God knows is an actually infinite number of propositions (in Craig & Smith, 1993:94).

Hence, Craig maintains that because we, as human beings, use propositions to understand the world, we are forced to describe God's knowledge in terms of propositional knowledge. However, this fact does not commit us to thinking that God's knowledge of all reality is propositional in nature. Furthermore, according to Craig, propositions do not exist, let alone an actually infinite number of them. Our propositional representation of God's knowledge, then, simply helps us to understand God's non-propositional knowledge. Therefore, God's omniscience does not entail actually infinite knowledge.

Craig's argument, however, has two problems. Firstly, Craig's description of God's non-propositional knowledge is not sufficiently comprehensive to address the important issue that, if mathematical and future truths do not exist, they are not part of reality and, therefore, not part of God's simple intuition of all reality. In terms of Craig's view, it remains inexplicable as to

how God knows mathematical truths and future events. However, if God's simple intuition of all reality encompasses all mathematical and future truths, these truths form part of "all reality" and, thus, an actually infinite number of abstract objects exist simultaneously in reality.

Secondly, if future truths do not exist but, nevertheless, God's simple intuition encompasses the entire future, then Craig's argument entails that the series of all future events may be grasped as a completed totality (likewise with the series of all mathematical truths). However, any endless series that may be grasped as a completed totality is, by definition, actually infinite. Therefore, God could grasp the entire future in one simple intuition *only if* the series of future events that will occur is actually infinite. If the series of future events is merely potentially infinite, it cannot be grasped as a completed totality – regardless of how far into the future God sees, so to speak, there will always be future events beyond which God sees. Consequently, even if propositions do not exist, God's simple intuition may be broken down into an actually infinite number of propositions and not merely a potentially infinite number of propositions. Therefore, Craig's argument fails to show that omniscience does not entail actually infinite knowledge.

There is, however, another solution to the above dilemma, albeit an unconventional one. One may avoid the conclusion that omniscience entails actually infinite knowledge by rephrasing the standard definition of omni-

science as follows:

> F. For any proposition p, if God consciously thinks about p, God will immediately identify the truth value of p.[17]

According to (F), for God to *know* any true proposition p means that, if God thinks about p, God will accept p as true. This is similar to human knowledge. For example, if a person will accept the proposition that *Socrates was married to Xanthippe* as true if he/she consciously thinks about it, we state that he/she knows this proposition. Likewise, God knows that *Socrates was married to Xanthippe* because, if God consciously thinks about this proposition, God will accept it as true. However, unlike human beings, God's knowledge is not based on discursive reasoning, which involves formulating conclusions by inference from premises. Instead, God immediately knows the truth value of a proposition when considering it.

As noted above, because the KCA_1 is incompatible with Platonism, the proponents of the KCA_1 must deny the existence of abstract objects. Consequently, the proponents of the KCA_1 must view abstract objects as being similar to fictional characters that one may think about although they do not exist. For example, one may talk about the fictional detective Sherlock Holmes even though "Sherlock Holmes" refers to nothing more than an idea

[17] A more technical definition is as follows: For any person S, S is omniscient iff for any proposition p, (i) S can comprehend p, and (ii) if S consciously thinks about p, S will either accept p as true iff p is true, or accept p as false iff p is false.

in the mind. In that case, God may construct mental images denoting such fictional propositions, mathematical equations, numbers, or future events without these objects existing independently of God's conscious thought. God's knowledge, then, may be actually infinite only if God consciously thinks about an actually infinite number of things all at once.

Now, if we affirm both that abstract objects do not exist and that (F) accurately describes God's knowledge, then it is possible that God is consciously entertaining only a finite number of ideas at any moment (or in some timeless state). Moreover, if God is temporal, His cognitive state may change endlessly, allowing God to have a potentially infinite number of thoughts. Consequently, according to (F), God's knowledge is not actually infinite but potentially infinite, for God may endlessly construct mental ideas of fictional propositions without necessitating an actual infinite.

This second solution has the benefit of defining omniscience in such a way that it does not entail an actual infinite. However, although I believe that this solution is defensible, it faces at least three problems. Firstly, one must explain why God is, at any moment or in some timeless state, entertaining those thoughts that He is entertaining and not entertaining other thoughts? Why would God be eternally thinking about, for example, the truth of $2 + 1 = 3$ but not the truth of $1436 + 782 = 2218$? Or, before His creative decree, if God were thinking about only some of the potentially infinite possible worlds

He could create, how did God then decide which world to create?

In response, one may claim that God's divine nature entails that He refrain from entertaining unnecessary thoughts while entertaining those thoughts that are best for Him to entertain. Furthermore, because God does not use discursive reasoning with which to judge the truth value of a proposition, God immediately knows whether a proposition is true simply by considering the proposition. Thus, God does not *decide* between various alternatives but, instead, He is instantly aware of the best alternative without having to consider all the alternatives. Therefore, God need not compare every possible world with its entire future to decide which world to actualise. Instead, through His divine intuition, God is eternally aware that it is good for Him to actualise this world. Of course, if God had compared every possible world to decide which world to actualise, He would have reached the same conclusion, which was to actualise this world. Nevertheless, the central point is that God is always aware of which action is best to perform without having to consider each of the actions He could perform. Likewise, God is always aware of the fact that He does not need to entertain thoughts other than those thoughts He is entertaining.

Secondly, one must explain why this second solution does not render God extremely ignorant. If God is not consciously entertaining every idea He could entertain, God appears to be ignorant in the sense that there is an

endless series of propositions of which He is consciously unaware. In response, one may highlight that, according to (F), for God to know the truth value of some proposition p does not mean that God is currently thinking about p, nor does it mean that God has thought about p before but, rather, that God will identify the truth value of p simply by considering p.[18] Therefore, God knows *everything*, and this fact does not render God extremely ignorant in any negative sense. Moreover, God's act of entertaining only some of the ideas He could entertain is not necessarily an imperfection. Someone who is able to immediately identify the truth value of any proposition appears to be greater than someone who lacks this ability. Similarly, someone who is entertaining only those ideas that are the best to entertain appears to be greater than someone who cannot control his/her mental state and is engulfed in an infinite number of unnecessary thoughts. Therefore, perhaps it is a perfection, and not an imperfection for God to be aware that it is unnecessary for Him to think about an actually infinite number of things all at once.

Finally, this second solution requires that one defend an unusual view of God's relationship to time. One must affirm that God is timeless without creation because, if God exists in a temporal state only and if past time is

[18] According to (F), for any proposition p, if God can immediately identify the truth value of p, then, whether God has thought about p before makes no difference to God's knowing p, for it is God's divine nature, not His previous considerations of p, that enable Him to see whether p is true.

finite, both God and time began to exist. However, one must also affirm that God is temporal subsequent to creation because, if God is timeless, His cognitive state cannot change and, thus, His knowledge is static and finite, not dynamic and potentially infinite. Hence, this second solution implies that God is atemporal without creation and temporal subsequent to creation. It is beyond the scope of this study to examine this view of God's eternity. Nevertheless, if the second solution is to succeed, a view of God's eternity similar to the above view should be defended.

In light of these three problems, I believe that most theists will not endorse the second response. It is much simpler to understand omniscience in terms of the standard definition (i.e. for any person S, S is omniscient if for every proposition p, if p is true, then S knows p) while affirming that an actual infinite may be present in the mind or knowledge of God. I submit, therefore, that the KCA_1 is incompatible with the standard definition of omniscience.

4.6 Should the *Kalām* Argument be Compatible With Platonism and Omniscience?

I have defended the first key premise (A1) of the central argument of this chapter and which states that, because the KCA_1 argues against the actual infinite, it is incompatible with both (a) Platonism and (b) the standard definition of omniscience. In this section I defend the last two key premises, (A2) and (A3), of the central argument and I conclude that the proponents of the KCA should argue against the equi-successive infinite only while permitting the existence of an actual infinite.

The second premise (A2) states that a version of the KCA that is *compatible* with (a) Platonism and (b) the standard definition of omniscience is more persuasive than a version that is *incompatible* with (a) and (b). By a "more persuasive" version of the KCA I mean a stronger, more convincing, and less controversial version than the KCA_1. It is important to note, however, that I am not claiming that the KCA_1, with its argument against the actual infinite, is unsound, nor am I claiming that Platonism is true and that the standard definition of omniscience is correct. Rather, my claim is more modest: A version of the KCA that is less controversial than the KCA_1 is a better version than the KCA_1.

Of course, a controversial argument may be a sound argument. For ex-

ample, Copernicus' (1473-1543) unprecedented argument against the Ptolemaic view that the earth was the fixed centre of the universe was controversial in his day, but this fact, on its own, does not imply that his argument was unsound. Nevertheless, for any two arguments, x and y, that both support the same view z, if x relies on more controversial and difficult premises than the premises on which y relies, then y should be considered to be the better argument of the two. Furthermore, if y is less controversial than x, y will convince more thinkers and, thus, it will be regarded as the stronger, more convincing argument. Thus, in this case, one may say that y is more persuasive than x, and the proponents of z should use y, rather than x, to support z.

The proponents of the KCA_1 find themselves in a similar situation. In order to show that the universe began to exist, the proponents of the KCA_1 argue against the actual infinite. This approach, however, results in the KCA_1 being incompatible with both Platonism and the standard definition of omniscience. Hence, the platonist who believes he/she has formulated sound arguments in favour of Platonism will discard the KCA_1 as unsound. Likewise, the theist who believes that God has actually infinite knowledge will not accept the KCA_1. Moreover, the KCA_1 places an unnecessary burden on its proponents by requiring them to both (i) take on the difficult task of refuting all the arguments in favour of Platonism, and (ii) to (creatively)

defend some view of omniscience that does not entail actually infinite knowledge. However, a version of the KCA that permits the actual infinite would obviate these problems. As noted above (in chapter 3), there are other arguments in favour of the view that the universe began to exist that do not deny the actual infinite (in the next chapter I shall defend two such arguments). Therefore, a version of the KCA that is compatible with both Platonism and the standard definition of omniscience is more persuasive than the KCA_1.

The third premise (A3) states that a version of the KCA that argues against the equi-successive infinite, but permits the actual infinite, is compatible with both Platonism and the standard definition of omniscience. Both the realm of abstract objects (if such a realm exists) and God's knowledge of an actually infinite number of truths are examples of a simultaneous infinite (whose members exist simultaneously). According to Platonism, abstract objects have not come into existence one at a time because they exist necessarily. Similarly, most theists maintain that God's knowledge is simultaneous, rather than successive, because God knows all things at once. Thus, a version of the KCA that denies the equi-successive infinite (whose members come into existence one at a time) and permits the successive infinite is compatible with both Platonism and omniscience.

Given the truth of (A1), (A2), and (A3), it follows that a version of the KCA that argues against the equi-successive infinite but permits the actual

infinite is more persuasive than the KCA_1. This entails, finally, that to ensure a more persuasive KCA, the proponents of the KCA should argue against the equi-successive infinite only while permitting the existence of the actual infinite.

4.7 Summary and Concluding Remarks

The most prominent versions of the KCA, which I refer to as the KCA_1, argue against the actual infinite. However, the claim that an actual infinite is impossible is highly disputed. Therefore, in this chapter I have addressed the third overall research question of this study, namely, *Should the proponents of the KCA argue against the actual infinite?* My conclusion is that the proponents of the KCA should argue against the equi-successive infinite while permitting the actual infinite.

Firstly, by drawing on modern set theory, I distinguished between the potential infinite and the actual infinite. The potential infinite is a type of dynamic collection or series that increases endlessly towards infinity as a limit but never becomes actually infinite and never completes. The actual infinite, on the other hand, is a completed set of infinitely many distinct elements that can be placed into a one-to-one correspondence with a proper part of itself. The actual infinite may be divided into the simultaneous infinite and the

successive infinite. The elements of the former all exist simultaneously while the elements of the latter have each come into existence one after another in time. A successive infinite may be further subdivided into a supertask and an equi-successive infinite. A supertask denotes an actually infinite series of progressively shorter operations accomplished in a finite duration of time whereas an equi-successive infinite denotes an actually infinite series whose elements have each come into existence over an equal duration, such as an endless series of past years.

Secondly, after defining an abstract object as an object that is not a person, place, space itself, a time, nor time itself; that is space-less and timeless; and that cannot bring something into existence, I argued that the KCA_1 is incompatible with Platonism (or realism) – the view that abstract objects exist. Platonism entails that certain abstract objects, such as numbers, exist necessarily. However, if numbers exist necessarily, the series of all natural numbers is actually infinite. Platonism, thus, entails an actual infinite and, therefore, Platonism is incompatible with the KCA_1.

Thirdly, I argued that the KCA_1 is incompatible with the standard definition of omniscience, which states that, for any person S, S is omniscient if for every proposition p, if p is true, then S knows p. Theists have traditionally held that the future is endless and that God's omniscience includes absolute foreknowledge. However, if God knows each element of an endless series of

future events all at once, He must know an actually infinite number of things, for an endless series that can be grasped as a completed totality is, by definition, actually infinite. Furthermore, the standard definition of omniscience entails that God knows an endless series of mathematical truths (such as 1 + 2 = 3, 2 + 3 = 5, 3 + 4 = 7, ...) all at once and this, in turn, entails that God's knowledge is actually infinite. Therefore, the proponents of the KCA_1 face the following dilemma: either an actual infinite cannot exist or God cannot be omniscient.

Finally, I showed that a version of the KCA that argues against the equi-successive infinite but permits the actual infinite is more persuasive than the KCA_1. This fact, in turn, leads one to conclude that, to ensure a more persuasive KCA, the proponents of the KCA should argue against the existence of an equi-successive infinite only while permitting the existence of the actual infinite.

This chapter has assumed that, apart from the argument against the actual infinite, there is at least one other sound argument in favour of a beginning of the universe. In the next chapter I justify this assumption by defending two arguments in favour of a beginning, both of which permit the actual infinite.

Chapter 5

How Can the *Kalām* Argument Permit the Actual Infinite?

5.1 The Problem and the Solution

The problem: The earlier chapters defended the following three claims. Firstly, the *kalām* cosmological argument (KCA) is an important theistic argument and, therefore, theists should constantly try to render the KCA more persuasive, that is, improve it into a stronger, more convincing, and less controversial argument than it is at present. Secondly, three of the most significant proponents of the KCA, namely, John Philoponus, al-Ghazālī, and William Lane Craig, all argue against the existence of the actual infinite to support the premise that the universe had a beginning. Indeed,

the majority of advocates of the KCA use the arguments against the actual infinite with such vigour that the KCA is sometimes identified with these arguments (Rowe, 2007; Reichenbach, 2013). Finally, because the arguments against the actual infinite are incompatible with both Platonism and the standard definition of omniscience, the KCA would be more persuasive if its proponents permitted the existence of an actual infinite. This is because, unlike the most prominent versions of the KCA, a version of the KCA that permits the actual infinite may be accepted by both platonists and those who believe that God's knowledge is actually infinite.

We have assumed that at least one sound argument in favour of a beginning of the universe, and which does not deny the actual infinite, exists. However, if the overall thesis of this study is to be successful, this assumption must be defended. Accordingly, the question arises: *Without denying the actual infinite, how may the proponents of the KCA show that the universe began to exist?*

The proposed solution: In this chapter I defend two philosophical arguments in favour of a beginning of the universe. These arguments do not deny the possibility of an actual infinite and, thus, they are more persuasive than the arguments against the actual infinite. I then reinforce these two philosophical arguments with a third argument in favour of the view that

science cannot, by itself, justify belief in a past eternal universe. This third argument is important because many scientists attempt to justify their belief that the universe is, or may be, eternal solely on the basis of the fact that there are promising scientific theories that entail an eternal universe (see, for example, Vilenkin, 2006; Stoeger, 2010; Penrose, 2011; Ellis, Maartens & MacCallum, 2012:532-533; Stenger, 2012:165-197; Drees, 2013). However, if a scientific theory is able to justify, on its own, a belief in an eternal universe, then modern cosmology poses a serious threat to my two philosophical arguments. Thus, I argue that, before one's belief that the universe is, or may be, eternal may be justified by science, it is essential that one first show why the philosophical arguments against an eternal universe fail.

My contribution, in this chapter, to the discussion about the KCA is unique because (1) I revise a classical KCA argument, (2) I defend a neglected philosophical argument in favour of a beginning of the universe, and (3) I address a question that is overlooked in the modern discussion about the origin of the universe, namely: Is science able to justify, by itself, a belief in a past eternal universe?

5.2 First Philosophical Argument

The first philosophical argument is a revised version of the infinity arguments of Philoponus and Craig and which are based on the impossibility of traversing an actual infinite. The argument may be represented as the following syllogism:

(A1) If the universe had no beginning, the present event could not occur.

(A2) The present event is occurring.

(A3) Therefore, the universe had a beginning.

The key terms used in our argument may be defined as follows. Firstly, the term "universe" denotes all space, time (or space-time), matter, and material objects. But what exactly are space, time, matter, and a material object? There are two different views of space and time (or space-time), namely, substantivalism and relationism. These two views regard space and time as united into a four-dimensional continuum known as space-time. However, I shall define space and time separately in order to provide a better understanding of the nature of each than may otherwise have been the case.[1]

Substantivalism holds that space is a substance that is able to exist by itself, independent of material objects. Space is the container in which ma-

[1] I assume time to be metaphysically distinct from space because, unlike space, time has the property of having its moments ordered by the relation *less than*.

terial objects can exist and move – an invisible substance that forms the "empty spaces" between objects. Relationism, however, denies that space is an entity that may exist without material objects. Rather, space is seen as a relation because it denotes the relations between material objects. In order to remain neutral on the nature of space, I shall define space as the three-dimensional extent – whether a substance or relation – in which all matter and material objects exist and move.[2]

Time is more difficult to define than space and we must first understand what we mean by an "event" before we define "time." An event is any change in the world and, because change requires time, any event endures for some non-zero duration. Now, as in the case of space, substantivalism views time as an entity that may exist with no change. In this sense, time is "the thing that makes change possible" and it is distinct from any event or series of events (Fiocco, 2014:89). Relationism, however, states that no time exists without change; time is the set of temporal relations between things and, thus, it is the series of all events ordered by the relation *earlier than*. Once again, I

[2] There is, however, a good reason to favour substantivalism over relationism with regard to space: relationism is consistent with the Special Theory of Relativity (SR) but it is inconsistent with the General Theory of Relativity (GR), whereas substantivalism is consistent with both SR and GR (Maudlin, 1993). Tim Maudlin (1993:199) notes that the geometrical structure of space-time is given *a priori* in SR but not in GR. In GR the space-time structure needs to be resolved to allow prediction. However, there is insufficient information in the collection of all relations between objects alone to resolve the geometry of the embedding space-time in GR. Therefore, as Dean Zimmerman (2011:180) remarks, "The relationalist needs a 'plenum' of entities – a field of some kind – upon which to hang GR's web of spatiotemporal relations; and the best candidate for this field is very hard to distinguish from the kind of entity substantivalists have always wanted".

shall remain neutral on the debate as to whether time is an entity or relation because my argument is solely concerned with the series of events. Hence, for the sake of simplicity, I shall use the term "time" synonymously with "the temporal series of all events ordered by the relation *less than*". In view of the fact that the first philosophical argument requires real temporal passage in which events *become present* one after another, my understanding of time presupposes the A-theory or dynamic theory of time according to which the present, past and future are objectively distinct because the passage of time is a real, mind-independent feature of reality.[3]

The term "matter" is used in various ways. Sometimes "matter" is defined as all atoms, at other times the term stands for all elementary particles (including all electrons, photons and quarks). Another common phrase is "matter and energy" but this, unfortunately, suggests that energy is a physical entity that may exist without matter. However, energy is a *property* of matter – i.e. the property of being able to perform work, such as causing motion – that comes in various forms, such as rest mass energy (as described by $E = mc^2$) or kinetic energy. It is also common for energy to be associated with light or photons although a photon carries energy and is not energy itself. Therefore, to avoid confusion, by "matter" I shall mean *all entities*

[3] The A-theorist also affirms that the present exists, the past did or does exist (depending on which version of the A-theory one adopts), and that the future does not exist.

that exist within space and time (or space-time) and that form the fundamental building blocks of the natural world. In this sense, matter includes all elementary particles, fields and any other physical entities as yet unknown. A material object, then, is any object composed of matter. Therefore, the term "universe" refers to all matter and material objects that exist within space and time (or space-time), and space and time themselves.

The second key term that will be defined is "had no beginning." By the phrase "the universe had no beginning" I mean that the temporal regress of events is beginningless or actually infinite. However, this does not mean that the universe is "eternal" in the theological sense that incorporates the notion of necessary existence (e.g. God is eternal because He exists in all possible worlds). Instead, I mean that time had no first event. Thus, the phrase "the universe had a beginning" means that the series of past events is finite and time had a first event.

Thirdly, by "the temporal regress of events" I mean the series of all past *congruent* events, that is, events of equal duration and ordered according to the relation *less than.* This, in turn, requires us to specify an arbitrary duration for the events in the series. So, for example, by specifying that each event has a duration of one minute, the temporal regress of events would comprise one minute events ordered by the relation *less than.* Since the first philosophical argument presupposes the A-theory of time, such a series, if it

is beginningless, is an equi-successive infinite (see chapter 4) because each of its elements have come into existence (or have *been present*) one after another.

Finally, the last key term we shall use is "traversed." To traverse a series means to go through the series completely and one element at a time. If a series has been traversed, each of its members has been singled out at a unique time. Thus, a traversed series is a completed totality. Accordingly, we may define the traversal of a series *of events* as follows: for any series of events S, S has been traversed if and only if each event in S has occurred at a unique moment. Having defined these key terms, I shall now defend the two premises of the first philosophical argument.

5.2.1 First Premise

The first premise (A1) states that, if the universe had no beginning, the present event could not occur. A beginningless universe entails that the regress of past events has no beginning (or first event) and ends at a particular moment (which is the last event in the series). Let us call this regress the *beginningless past*. As Claude Gratton (2010:26) notes, the property of *being beginningless* causes the beginningless past to be actually infinite, and not merely potentially infinite. For, if the past were beginningless, an actually

infinite number of events *have already* occurred prior to the last event in the series and so a one-to-one correspondence exists between each event that has occurred and each element in the series of natural numbers. The beginningless past, then, is the temporal regress of events that (1) has no beginning, (2) has an end, and (3) is actually infinite.

According to (A1), although the beginningless past is said to end with a particular event, it cannot end with the present event, E_0, (e.g. ... E_{-3}, E_{-2}, E_{-1}, E_0) because E_0 would never be reached. Given the A-theory of time in which events occur in a sequence one after another, the following holds for the beginningless past:

(B1) For any event E in the beginningless past, E may occur if and only if all the events prior to E have occurred.

Hence, if we define an event as one day (i.e. twenty-four hours), then (B1) states that, before today could occur, yesterday had to occur, and before yesterday could occur, the day prior to yesterday had to occur, and so on *ad infinitum*. For any day D, D cannot occur until an actually infinite series of days has been traversed.

The problem, however, is that an actually infinite series of congruent events cannot be traversed. In order to explain this, I will begin by illustrating how a finite series may be traversed. Suppose there exists a machine

known as the mega-machine (MM) whose job it is to paint marbles red. White marbles are placed at equal distances apart on a conveyor belt that moves at a constant velocity and goes through the MM, which then paints the marbles. The conveyor belt moves from left to right and, thus, marbles must be placed on the belt to the left of the MM. Suppose further that it takes one minute for each marble to pass through the MM and come out red on the other side (the MM is not the most productive machine!) Now, suppose three marbles are placed on the conveyor belt and, after three minutes, the MM has painted each marble red. Three events have then occurred: event *E1* where the MM paints the first marble, event *E2* where the MM paints the second marble, and event *E3* where the MM paints the third marble. In that case, the finite series (*E1*, *E2*, *E3*) has been traversed because each event has occurred one after another. Thus, a finite series of events can be traversed.

However, suppose that an actually infinite collection of marbles are placed on the conveyor belt all at once (the conveyor belt is infinite) and the MM starts painting the marbles, beginning with the first marble. Can the MM paint the entire collection of marbles one per minute? Clearly not, for no matter how many marbles the MM has painted, there will always be an infinite number of marbles still to be painted. This situation is similar to someone trying to count through all the natural numbers one per second (i.e. 1, 2, 3, ...). For any number n that one counts, there will always be another

number $n + 1$ yet to be counted. Therefore, it is impossible to traverse an actually infinite series of congruent events and, thus, if the universe had no beginning, the present event could not occur. Accordingly, our first premise (A1) is true. I shall now respond to several objections to the notion that an equi-successive cannot be traversed.

5.2.1.1 Objections

The four most common objections raised against (A1) include the following. Firstly, Graham Oppy (2006a:143) objects that an actually infinite series can be formed by successive addition (i.e. be traversed) because a supertask is clearly possible. A *supertask* is an actually infinite series of progressively shorter operations accomplished in a finite duration of time. To illustrate the possibility of a supertask, Oppy asks us to suppose that a ball is bouncing at one minute to twelve, and that both the time lapse between each bounce and the height of each bounce is halved with each bounce. Accordingly, the ball hits the floor at one minute to twelve, then at $\frac{1}{2}$ minute to twelve, then at $\frac{1}{4}$ minute to twelve, and so on until the ball stops bouncing at twelve. The ball, according to Oppy, has then completed an actually infinite series of bounces between one minute to twelve and twelve, thus accomplishing a supertask. Oppy concludes, "In this example, we have a process – the bouncing of the ball – that plainly does form an actual infinite by successive addition.

Consequently, ... there are perfectly ordinary processes that involve formation of an actual infinite by successive addition in not obviously impossible worlds" (Oppy, 2006a:143). Thus, according to Oppy, if a supertask may be traversed, then an actually infinite regress of past events may be traversed.

Oppy's argument is easily refuted. An actually infinite series of past events is an example of an equi-successive infinite, not a supertask as it is a series of equal intervals that amount to an infinite duration, not progressively shorter intervals that amount to a finite duration. Oppy's argument, if successful, merely shows that a supertask is possible and not that an equi-successive infinite is possible. Therefore, one may grant the possibility of a supertask without conceding that an actually infinite series of congruent events can be traversed.

A second objection that Oppy (2006b:61) raises is that, if a person never stops counting, then that person *does* count to infinity. In other words, given an infinite amount of time, an actually infinite series of events can be traversed if whatever is going through the series never stops trying to go through the series. But why think this? Oppy's answer is as follows: "One counts to infinity just in case, for each finite number N, one counts past N. But unless one stops counting, one will eventually reach any given finite N" (Oppy, 2006b:61).

However, the problem with Oppy's argument is that he appears to con-

fuse *counting endlessly* with *having traversed an endless series*, the former representing a potential infinite and the later representing an actual infinite. The difference is that the process of *counting endlessly* is never complete and there will always be numbers that have not yet been counted, whereas *having traversed an endless series* means that one has already gone through each element in the series one at a time and no more numbers need to be counted. Accordingly, even if a person never stops counting, there will always be an endless series of numbers the person has not yet counted (because, for any given finite number N, even if the person eventually counts N, he/she still has to count all the numbers after N, such as $N + 1$, $N + 2$, and so on *ad infinitum*). Therefore, it is false that, if a person never stops counting, he/she will eventually traverse an actually infinite series.

Richard Sorabji (2006:221-222) raises a third objection, namely, that a beginningless series does not face the same difficulties as an endless series. According to Sorabji, the crucial difference between these two series is that, if the former has been traversed, it has only one terminus (i.e. a finish, which would be the present moment), whereas if the latter has been traversed, it has two termini (i.e. a start, which would be the present moment, and a finish, which would be some future moment). "And [having two termini] is what prevents the future series of traversed years from being more than finite" (Sorabji, 2006:222). Therefore, Sorabji concludes, because a traversed series

of past events has only one terminus, it can be traversed. Sorabji's argument is, however, confused. What causes the impossibility of traversing an endless series is *not* that it will have two termini once it is traversed, but rather that it *can never have* two termini because an infinitely distant future event can never be reached. Similarly, it is that an actually infinite series of past events *can never have* two termini that causes the difficulties of traversing such a series. This brings us to our final objection.

Several critics, such as Paul Draper (2011:174) and Wes Morriston (2013:26-27), try avoid the difficulties associated with traversing infinite time by insisting that *if the past is beginningless, an actually infinite series of events has always been traversed.* For example, Morriston retorts,

> Well, yes, before the present event occurred, the event immediately prior to it must have occurred; and before it occurred, the one immediately prior to it must have occurred. ... But it's hard to see what the problem is supposed to be, since on the hypothesis of a beginningless past each of those infinitely many events *has* occurred. When the present arrives, all of its (infinitely many) predecessors are past (Morriston, 2013:27 [original emphasis]).

Thus, the objection is that, for any past event E, if the regress of events is beginningless, then E can occur because all events prior to E have occurred.

This objection is, however, circular. It presupposes that an actually infinite series of events *has been* traversed to try to show that an actually infinite series of events *can be* traversed. Hence, the objection amounts to saying that an actually infinite past can be traversed if it has been traversed! However, this response fails to refute the intuitively obvious notion that an actually infinite number of congruent events can occur one after another. It is important to remember that we are dealing with an equi-successive infinite series, whose elements do not come into being or occur all at once, but occur one at a time with equal duration. In addition, because the set of *events that must occur before the present event can occur* is endless, the process of events occurring before the present moment never ends. Therefore, the present moment may never be reached.

Furthermore, if an equi-successive infinite that has a beginning cannot be traversed, then an equi-successive infinite that has no beginning, but reaches an end, cannot be traversed. To illustrate this, suppose that the universe is eternal. Suppose also that Jones, who is immortal, has been video recording himself non-stop from eternity past. Now, suppose that Jones wishes to watch his entire life in reverse. Accordingly, he stops recording himself, plugs the video recorder into a television, and starts watching, in reverse and at normal speed, his recorded life beginning from the last recorded moment. Can Jones watch the entire recording of his life in reverse? Clearly not, for the same

reasons offered above. However, if Jones is not able to watch the entire recording of his life, how could he record his entire life? If the one action is impossible, so is the other. Thus, the impossibility of traversing an equi-successive infinite stems from the properties of *being actually infinite* and *being congruent*, and has nothing to do with *being beginningless*. Therefore, because an equi-successive infinite cannot be traversed, we are justified in affirming (A1), namely, that if the universe had no beginning, the present event could not occur.

5.2.2 Second Premise

The second premise (A2) claims that the present event is occurring. Given the A-theory of time, this premise is obvious. If we define an event as any year, then the current year is busy happening or, if we define an event as any day, then today is busy occurring. Therefore, we have no reason to doubt (A2).

5.2.3 Conclusion

It follows from (A1) and (A2) that the universe had a beginning, that is to say, the series of past events is finite. The universe is not eternal but came into existence a finite time ago. In order to reach this conclusion, we

have not denied the possibility of an actual infinite. Our argument simply denies the possibility of traversing an actually infinite series of congruent events. The argument, therefore, does not rule out either Platonism or the standard definition of omniscience. One may endorse this argument while affirming that an actually infinite number of abstract objects does exist and that God knows an actually infinite number of propositions. Therefore, this first philosophical argument permits the actual infinite.

5.3 Second Philosophical Argument

Apart from the philosophical argument discussed above, there is a second sound philosophical argument in favour of an absolute beginning of the universe. This second argument is neglected by the majority of contemporary proponents of the KCA. My own formulation of the argument is as follows:

(D1) Whatever leads to impossibilities is itself impossible.

(D2) A universe without a beginning leads to impossibilities.

(D3) Therefore, a universe without a beginning is impossible.

(D4) Therefore, in view of the fact that the universe exists, the universe had a beginning.

The key terms in the second philosophical argument include "universe," "without a beginning," "impossibility," and "lead to". The first two terms

have already been defined above: *universe* represents all space, time (or space-time), matter, and material objects; and a universe "without a beginning" is a universe in which the temporal regress of events is beginningless and actually infinite. An "impossibility" denotes a state of affairs that is impossible because it involves contradiction. For example, the state of affairs in which Jones is a married bachelor represents an impossibility, for it involves Jones being both *married* and *unmarried*. Finally, for any two objects or state of affairs x and y, to state that "x leads to y" is to say that, if the existence of x is possible, then the existence of y is possible. The phrase *is possible* is important because we are not asserting that, if x were actualised, then y *will be* actualised but that, if it were possible for x to be actualised, then it would be possible for y to be actualised. Let us now defend the two key premises (D1) and (D2).

5.3.1 First Premise

(D1) states that whatever leads to impossibilities is itself impossible. This premise resembles the law of contrapositive (or *modus tollens*) because, according to the premise, if the possibility of P implies the possibility of Q and, if Q is impossible, then P is impossible. Thus, because (D1) is an uncontroversial and basic rule of logic, we should regard (D1) to be true.

5.3.2 Second Premise

According to the second premise (D2), a universe without a beginning leads to impossibilities. In other words, if the temporal regress of events is beginningless, several impossible situations may result. I shall offer two thought experiments, which I shall call the "bell paradox" and the "persistent liar paradox", to illustrate the impossible situations that would result from a beginningless past. Let us begin with the bell paradox.

5.3.2.1 The Bell Paradox

The bell paradox is based on José Benardete's (1964:259) gong peal thought experiment, which I have adjusted to involve a beginningless past.[4] The paradox is as follows. Suppose that the universe had no beginning. Suppose further that Jones, who is immortal and has lived through the entire past, rings a church bell every day at noon (which he has always been doing). Furthermore, suppose that the bell is so loud that anyone who rings the bell is struck deaf permanently upon hearing the bell if and only if that person was not previously deafened by the bell. This implies that Jones can become deaf only by hearing the bell.

Now, for any past day D, Jones must already be deaf prior to ringing

[4] Laureano Luna (2009a:304) offers a variant of Benardete's gong peal thought experiment and which is similar to mine.

the bell on *D*. Why? Because Jones' act of ringing the bell on the day immediately prior to *D* ensures that Jones would be deaf on *D* (if Jones was not deaf before ringing the bell on the previous day, he would have become deaf upon hearing the bell that day). Therefore, Jones has been deaf throughout the entire past. However, if Jones is deaf before he rings the bell on any past day, no day exists on which he became deaf by hearing the bell. But Jones can only become deaf by hearing the bell. We are thus led to the following three inconsistent states:

(E1) Jones is deaf.

(E2) Jones can become deaf only by hearing the church bell.

(E3) Jones has never heard the church bell.

In view of the fact that these three states are inconsistent, the entire situation is impossible. Notice, however, that each state is, by itself, possible. It is not logically or metaphysically impossible for Jones to be deaf, or to become deaf only upon hearing the bell, or to never hear the bell. So the entire situation is not impossible because either (E1), (E2), or (E3) is impossible but, rather, the situation is impossible because these three states are logically inconsistent, i.e. they cannot all be true.

What produced this entire situation? The answer is the *beginningless-ness* of the universe. If the universe had a beginning, the contradiction vanishes

because Jones would become deaf on the first day. Therefore, a universe without a beginning leads to this impossible situation.

5.3.2.2 The Persistent Liar Paradox

The persistent liar paradox is my version of Yablo's paradox. More precisely, the paradox is founded on Luna's (2009b:91-92) Yabloesque thinkers paradox, which is based on Roy A. Sorensen's (1998b) queue paradox that is, in turn, a version of Stephen Yablo's (1993) liar-like paradox. However, unlike Yablo's paradox, the persistent liar paradox is formulated in temporal terms in order to illustrate a consequence of beginningless time. The persistent liar paradox is as follows.

Suppose that the universe had no beginning. Suppose further that every minute Jones, who is immortal and has lived through the entire past, declares the following:

> F "None of the previous statements that I, Jones, have made, if any, are true."

This is the only statement Jones makes and, when he makes it, he is evaluating all his *previous statements* only, and not his current statement. This last point is important because it implies that the regress of Jones' statements is not circular (i.e. it does not involve self-reference), but comprises an infinite

number of distinct statements at distinct times.

Furthermore, F must express an objective truth. In view of the fact that the past has occurred, the law of the excluded middle applies to F. In other words, since F concerns the objective past, each time Jones declares F, he is expressing a proposition that is either objectively true or objectively false (F does not express a subjective proposition, such as "I like ice-cream"). Therefore, at any past minute m, Jones is making an objective statement that is either true or false.

Now, is Jones' statement at m true or false? His statement is neither true nor false. Consider, for example, the two minutes, m_1 and m_2, where m_2 is the minute immediately prior to m_1. If Jones' statement at m_1 is true, then his statement at m_2 is false, which entails, in turn, that at least one of his statements prior to m_2 is true, which entails that his statement at m_1 is false (Figure 1.4). Thus, if Jones' statement at m_1 is true, this statement is false!

Minute	**Statement**	**Truth-value**
m_1	All previous statements are false	true
m_2	All previous statements are false	false
⋮	⋮	⋮
m_n	All previous statements are false	true
⋮	⋮	⋮

Figure 1.4 The statement at m_1 is inconsistent with the statement at m_n. The * indicates a contradiction.

Similarly, if Jones' statement at m_1 is false, then, for some $k > 1$, m_k is true, which entails, as noted above, that m_k is false, which entails that m_1 is false (Figure 1.5). Thus, if Jones' statement at m_1 is false, this statement is true!

Minute	**Statement**	**Truth-value**
m_1	All previous statements are false	false
⋮	⋮	⋮
m_n	All previous statements are false	true
m_{n+1}	All previous statements are false	false
⋮	⋮	⋮
m_{n+k}	All previous statements are false	true
⋮	⋮	⋮

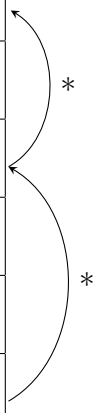

Figure 1.5 The statement at m_{n+k} is inconsistent with the statement at m_n and, therefore, the statement at m_n must be false and this is inconsistent with the statement at m_1. The * indicates a contradiction.

However, if none of Jones' statements are true or false, then none of his statements express objective truths about the past. This, in turn, leads to the following contradiction:

(G1) For any past minute m, Jones' statement at m *expresses* an objective proposition that has a distinct truth-value.

(G2) For any past minute m, Jones' statement at m *does not express* an objective proposition that has a distinct truth-value.

As noted above, (G1) is true because any well-defined statement about the past has a distinct truth-value and "None of the previous statements that Jones has made, if any, are true" is a well-defined statement. Furthermore, if the universe (and the series of past events) is beginningless, then, as we have seen, logic requires (G2) to be true. However, (G1) and (G2) contradict one another, so the entire situation is impossible. It is important to note that the entire situation results from a *beginningless universe*. If the universe had a beginning, Jones' first statement would be true and all his later statements would be false and, hence, the contradiction disappears! Therefore, the bell paradox and the persistent liar paradox show (D2) to be true – a universe without a beginning leads to impossibilities.

5.3.2.3 Objections

Since (D2) is the crucial premise in the argument, I shall now respond to three objections raised against my defence of (D2). The first objection that someone may raise is that the above thought experiments (i.e. the bell paradox and the persistent liar paradox) are too implausible. For example, per-

haps it is impossible for Jones (the character in the thought experiments) to exist through an eternal past because no human being is immortal. Or, given human imperfection, one may object that it is impossible for Jones to perform an infinitely repetitive task. A sickness, for example, may render Jones out of action for several days or else ringing a church bell repetitively may render Jones emotionally unstable and unable to finish the infinite task. Thus, the objection is that the thought experiments are overly far-fetched.

However, this objection fails to appreciate the nature of a thought experiment. A thought experiment is an imaginary scenario that is used to test which of a few supposedly possible propositions are, in fact, possible. The "possibility" in mind is not merely a practical possibility, but a logical or metaphysical possibility. Sorensen remarks,

> 'Impossible' has to be relativized to the proper background constraints. It is a practical impossibility for all the oxygen molecules to segregate to one corner of the room, thereby suffocating me. But it is physically possible. An attack on a thought experiment that shows the supposition to be logically impossible is sure to be successful. But the choice of a weaker impossibility courts the danger of too weak a response (Sorensen, 1998a:278).

As Sorensen notes, it is not sufficient for the critic to assert that the thought

experiment is too far-fetched but, he/she must show that the practical impossibilities are also logically impossible. Thus, it may be *practically* impossible for Jones to be immortal or to perform an infinitely repetitive task, but it is not *logically* or *metaphysically* impossible. As long as it is logically or metaphysically possible for Jones to be immortal or to perform an infinitely repetitive task, our thought experiments achieve their goal.

The second objection stems from Yablo (2000), who voices an unusual criticism of Benardete's God-wall paradox (Benardete, 1964:259-260), which is similar to the bell paradox. According to Yablo, denying an infinite regress is not the only solution to these Benardete-type paradoxes. Another way out of these paradoxes, claims Yablo, is to argue that logic prevents one of the seemingly possible situations in the thought experiment from happening. Adapted for the bell paradox, this objection rests on the following proposition:

> (Y) Although Jones intends to ring the church bell every day at noon, logic prevents him from doing this an actually infinite number of times.

If (Y) is correct, then logic permits Jones to ring the bell a *finite* number of times only, thereby causing Jones to become deaf by hearing the bell during his first ring. The solution to the paradox, then, is to affirm (Y) while

affirming a past-eternal universe.

This solution raises two problems. Firstly, it treats logic as a causal force. However, as Luna (2009b:95) points out, "logic is no causal force that could intervene as an overall ontological factor to stop [Jones from ringing the bell]". Indeed, if logic could stop Jones from ringing the bell, on which days would it stop him? There is simply no logical necessity that Jones cannot ring the bell on certain days.

The second problem with the solution is that we are offered no sound reasons to accept (Y). It may be that (Y) is correct because, if Jones could ring the bell an actually infinite number of times, a contradiction would result. However, the problem is that, if the universe had no beginning, then Jones is able to perform this infinite task. Thus, either this infinite task is possible or the universe had a beginning. However, this infinite task is impossible and, therefore, the universe had a beginning.

The third objection raised against my defence of (D2) stems from Oppy's (2006b:81-83) criticism of Benardete's (1964:259) original gong peal thought experiment. Oppy argues that, although an individual peal (or bell ring) does not cause deafness, the infinite series of peals (or bell rings) as a whole causes the deafness. Oppy writes,

> While there is no particular peal that is responsible for the deaf-

> ness, the collective effect of the infinitely many peals is to bring about deafness. While this is odd, it doesn't seem to be so intolerably odd that one cannot reasonably believe that it is broadly logically possible (Oppy, 2006b:83).

This response, however, fails to recognise the logical inconsistency that is illustrated in the bell paradox. The bell paradox demonstrates that an infinite past may lead to the situation in which (E1) Jones is deaf, (E2) Jones can become deaf only by hearing the church bell, and (E3) Jones has never heard the church bell. This situation is not merely odd but it is also logically impossible because (E1), (E2), and (E3) are logically inconsistent. Furthermore, (E2) rules out the possibility that an infinite series of bell rings causes Jones' deafness because Jones may become deaf only by hearing a particular bell ring, whether he has rung the bell a finite or infinite number of times. Therefore, the bell paradox and the persistent liar paradox show that a universe without a beginning leads to impossibilities.

5.3.3 Conclusion

I have argued that both (D1) and (D2) are true. Since (D3) logically follows from the previous premises, a universe without a beginning is impossible. However, because our universe exists, (D3) implies (D4) – the universe had

a beginning.

As with the first philosophical argument, this second argument does not deny the actual infinite. The argument is, therefore, compatible with both Platonism and the standard definition of omniscience. However, unlike the first argument, the second argument does not rely on the A-theory of time. If the B-theory of time is correct and events do not "come into being," then the bell paradox and persistent liar paradox could still result if the temporal continuum is infinitely extended because these paradoxes do not require past events to come into being one after another. Therefore, regardless of which theory of time is correct, we have a powerful argument against a past-eternal universe.

5.4 Cosmology and the Beginning of the Universe

The critic may appeal to the modern scientific theories that describe an eternal universe in order to try refute our two philosophical arguments in favour of an absolute beginning. Accordingly, I will close this chapter with a section on the relationship between modern science – or more precisely, cosmology – and the origin of the universe. Cosmology is the scientific study

of the origin, evolution, and physical structure of the universe. Although a comprehensive survey of cosmological theories is important for an evaluation of the KCA, I will not, for two reasons, present such a survey here. Firstly, a thorough assessment of the wide scope of cosmological theories would be of considerable length and this is beyond the scope of this chapter. Secondly, because this is a *philosophical* study, and not a *natural scientific* study, it seems inappropriate to engage with those scientific theories in the body of the study.

Therefore, in this section I will focus exclusively on the following question: Suppose the above two philosophical arguments in favour of an absolute beginning have convinced you that the universe began to exist (in the remainder of this section I shall use the term "the philosophical arguments" to denote "the above two philosophical arguments in favour of an absolute beginning"). Assume that you see no sound objections to these arguments. Hence, you believe, on the basis of the philosophical arguments, that the universe began to exist. Now, suppose that there exist several *eternal cosmological theories* (I use the term "eternal cosmological theory" to mean a "cosmological theory that entails a past eternal universe"), what would you think about the apparent conflict between the philosophical arguments and the eternal cosmological theories? Does modern cosmology – cosmology as it is currently practised – provide you with grounds to doubt the soundness of the philo-

sophical arguments? Or suppose you are well versed in eternal cosmological theories, but only faintly aware of the philosophical arguments. Now, if you believe, solely on the grounds of some eternal cosmological theory, that the universe has always existed, is your belief justified? More precisely: Can an eternal cosmological theory, by itself, justify belief in a past eternal universe?

This question is often overlooked and yet it is important. If an eternal cosmological theory cannot, by itself, justify belief in a past eternal universe, then (a) one is justified in believing that the philosophical arguments successfully establish an absolute beginning, and (b) critics are not able to claim that modern cosmology successfully establishes, by itself, that the universe is past eternal. However, if the opposite is true, then the fact that several cosmological theories include a past eternal universe poses a serious threat to both the philosophical arguments and one's belief in an absolute beginning. I shall argue that the former is true, namely, that an eternal cosmological theory cannot, by itself, justify belief in a past eternal universe and, thus, modern cosmology does not threaten our two philosophical arguments. My argument may be formulated as follows:

(H1) If (i) eternal cosmological theories are shaped by methodological naturalism, (ii) philosophy is a reliable means to truth, and (iii) strong philosophical arguments against a past eternal universe

exist, then no eternal cosmological theory may, by itself, justify belief in a past eternal universe.

(H2) Eternal cosmological theories are shaped by methodological naturalism.

(H3) Philosophy is a reliable means to truth.

(H4) Strong philosophical arguments against a past eternal universe exist.

(H5) Therefore, no eternal cosmological theory may, by itself, justify belief in a past eternal universe.

The rest of this section proceeds as follows. Firstly, I defend (H2) by defining methodological naturalism and arguing that this methodology dominates cosmology. I then justify (H3) by arguing that philosophy is one of the several reliable methods of obtaining truth. Next, I show that (H4) is true and that there exist strong philosophical arguments against a past eternal universe. Finally, I defend (H1) and conclude that (H5) is true: an eternal cosmological theory cannot, by itself, justify one's belief in a past eternal universe.

5.4.1 Methodological Naturalism

The first claim to defend is the following: Eternal cosmological theories are shaped by *methodological naturalism* (MN). MN is the predominant scientific attitude that states that science should restrict itself to the natural realm and proceed as if no supernatural realm exists. According to Victor J. Stenger (2012:26): "The scientific community in general goes along with the notion that science has nothing to say about the supernatural because the methods of science as they are currently practiced exclude supernatural causes." Likewise, Eugenie C. Scott (2009:56), the Executive Director of the National Center for Science Education, remarks, "Twentieth- and twenty-first-century scientists limit themselves to explaining natural phenomena using only natural causes ... [and so] scientists do not consider supernatural explanations scientific." This "rule of science", states Scott, distinguishes MN.

MN should not be confused with *philosophical naturalism* (PN), which denies the existence of a supernatural realm. PN entails atheism whereas MN does not. Thus, one may be a *methodological* naturalist without being a *philosophical* naturalist. Although MN does not presuppose PN, science directed by MN is identical to science directed by PN. Del Ratzsch makes this point well:

> It is evident that whether or not there is a nonnatural realm,

> the methods science would employ and the results science would obtain presupposing philosophical naturalism would be *identical* to those it would obtain employing methodological naturalism of this sort. There is thus no *scientific* reason for insisting on philosophical as opposed to this methodological naturalism – whatever the *philosophical* rewards might be (Ratzsch, 2010:73 [original emphasis]).

As Ratzsch notes, any scientific theory produced through MN will be consistent with atheism.

It is, thus, clear that MN is characterised by the following three important features. Firstly, it places constraints on the pool of explanatory options for any scientific explanation or theory. The *pool of explanatory options* is the set of explanations from which the scientist chooses the best explanation for some phenomenon. If science proceeds in accordance with MN, then the pool of options includes explanations in terms of natural laws or causes only. For example, suppose I have a headache and I wish to know its cause. According to MN, I must choose the best explanation from a pool of natural explanations, such as lack of sleep, stress, poor posture, etc. Any supernatural explanation is *not* an option. I cannot, for example, state that my headache is caused by some demon trying to make my life difficult. Hence,

any scientific theory is based on a pool of explanatory options that excludes supernatural explanations.

Secondly, if a scientific theory is refuted, then MN insists that the theory be replaced by some other *natural* theory only (Ratzsch, 2010:73). Supernatural theories, no matter how powerful they may be in the explanatory sense, are dismissed from the beginning. If I initially thought my headache was caused by poor posture but later discovered that I have perfect posture, I cannot replace my initial theory with the demon theory and I must consider alternative natural theories only.

Finally, if a specific event cannot be explained by known natural laws or causes, MN concludes that, for the time being, the event is unexplainable but non-supernatural. Loren Haarsma (2010:161) notes that a scientist, whether he/she adheres to MN, will reach one of at least five different conclusions when confronted with a scientifically unexplainable event:

(I1) An unknown natural law is responsible.

(I2) A supernatural event occurred.

(I3) Natural but super-human intellect or technology is responsible.

(I4) An improbable event simply occurred.

(I5) In view of the fact that many universes exist, it is unsurprising that the event occurred in our universe.

The second of these five is the only conclusion that invokes the supernatural and, thus, the scientist who is directed by MN will avoid (I2) and conclude that some natural explanation, such as (I1), (I3), (I4), or (I5), exists. Therefore, according to MN, there is some natural explanation for events that currently cannot be explained by science and the reason why these events are "unexplainable" is that there is a gap in our scientific knowledge.

In view of the fact that cosmology is a science, cosmology is predominated and directed by MN. The comments of several important physicists confirm this. For example, Arthur S. Eddington (1931:450), the prominent British physicist, declares, "Philosophically, the notion of a beginning of the present order of Nature is repugnant to me". Likewise, Fred Hoyle, the famous astronomer who coined the term "Big Bang", states: "[I]t is against the spirit of scientific enquiry to regard observable effects as arising from 'causes unknown to science', and this in principle is what creation-in-the-past implies" (Hoyle, 1948:372). Similarly, Walther Nernst, the German physicist, claims, "To deny the infinite duration of time would be to betray the very foundations of science" (Nernst cited by Vilenkin, 2006:177). Alexander Vilenkin notes that, because it would appear that an absolute beginning demands a Creator, "the natural instinct of most scientists has been to reject the idea of a cosmic beginning" (Vilenkin, 2006:177). There is little doubt, therefore, that the eternal cosmological theories produced by modern cosmology have

been shaped by MN. Thus, our second premise (H2) is true.

5.4.2 Scientism and Philosophy

According to our third premise (H3), philosophy is a reliable means to truth. In other words, sound philosophical arguments may reveal true propositions about reality. This appears obvious because philosophy (especially as practised in the analytic tradition) is based on logical reasoning, which is itself a reliable means to truth. For example, the deductive argument: "All non-divine human beings are mortal; Socrates is a non-divine human being; therefore, Socrates is mortal", is a philosophical argument that tells us about the true nature of Socrates. Clearly, any philosophical argument that is logically valid and has true premises is a reliable means to truth.

However, many scientists dismiss philosophical arguments as useless speculation. These scientists believe that philosophy cannot lead us to truth because science is the only or best way to reach a true understanding of reality. No philosophical argument can tell us whether the universe *really* had a beginning. As Joseph Silk (2001:5), the notable physicist from the University of Oxford, remarks: "[M]ost physicists ... [believe] that the ultimate questions about the origin of the universe must be answerable by physics rather than by philosophy". The stock example of this attitude is displayed by Stephen

Hawking and Leonard Mlodinow:

> What is the nature of reality? Where did all this come from? Did the universe need a creator? ... Traditionally these are questions for philosophy, but philosophy is dead. Philosophy has not kept up with modern developments in science, particularly physics. Scientists have become the bearers of the torch of discovery in our quest for knowledge (2010:13).

Hawking and Mlodinow appear to be endorsing *scientism*, which is the popular ideology that views science as the foremost means with which to reach reliable truth. Scientism comes in two forms, namely, strong scientism and weak scientism. The former maintains that no non-scientific discipline (such as philosophy or theology) is able to uncover valid truths about reality and that science alone is the paradigm of truth and rationality. According to the latter, although non-scientific disciplines may lead to truth, science is the most reliable means to, and final arbiter of, truth. Both forms of scientism stipulate that any philosophical argument that conflicts with science must be written off as unsound. Thus, if scientism (in either form) is true, then philosophy is not a reliable means to truth.

Is scientism plausible? The answer is no. Firstly, strong scientism is self-refuting because it is itself a philosophical belief that cannot be determined

to be true by science (Polkinghorne, 2011:23; Moreland & Craig, 2003:347-348). The proposition that *only scientific propositions are true* is not a scientific proposition (i.e. a proposition that has been well-established by scientific methods) and, thus, this proposition falsifies itself. Accordingly, strong scientism fails to meet its own requirements.

Secondly, many true beliefs are produced through non-scientific methods (Moreland & Craig, 2003:349-350). For example, the propositions that *the external world is real*, that *murder is wrong*, and that *I am busy thinking about scientism* are not scientific propositions and yet one is rationally justified in believing them to be true. The domain of science does not deal with logical truths, ethical truths, aesthetic truths, or self-evident truths. Furthermore, one may believe certain non-scientific propositions (such as those just cited) with greater certainty than one believes other scientific propositions (e.g., *The universe underwent a period of rapid expansion (or inflation) during its primordial evolution*). Although many scientific beliefs will probably be renounced or revised in the next century this is not the case with the non-scientific beliefs just cited. Therefore, the existence of true, non-scientific beliefs undermines scientism (in either form).

Thirdly, science requires philosophy to be successful. Science makes several philosophical presumptions without which it cannot proceed. For example, science presupposes the existence and orderly nature of the external

world, the existence of truth, the laws of logic, and the reliability of our cognitive faculties (Moreland & Craig, 2003:348). Moreover, George Ellis (2007:1234) correctly perceives that the criteria for a good scientific theory (e.g., internal consistency, simplicity, explanatory power, testability, etc.) are philosophical in nature and cannot be shown to be true by science. Furthermore, as Tim Maudlin argues, science requires philosophical clarity on foundational issues to explain the world. Maudlin pulls no punches:

> Unfortunately, physics has become infected with very low standards of clarity and precision on foundational questions, and physicists have become accustomed (and even encouraged) to just "shut up and calculate," to consciously refrain from asking for a clear understanding of the ontological import of their theories. This attitude has prevailed for so long that we can easily lose sight of what a clear and precise account of physical reality even looks like. ... Physicists and philosophers must demand such clarity if we are to ever understand the universe we inhabit (Maudlin, 2012:xiv).

Therefore, without its philosophical presumptions and philosophical clarity, science has little hope of success.

In light of these three reasons, scientism is an implausible ideology. Thus,

our third premise (H3) remains true, namely, philosophy is a reliable means to truth.

5.4.3 Philosophical Arguments for a Beginning

Premise (H4) claims that strong philosophical arguments against a past eternal universe exist. As shown above, there exist at least two strong philosophical arguments in favour of a beginning of the universe:

1. If the universe had no beginning, the present event could not occur; the present event is occurring; therefore, the universe had a beginning.
2. Whatever leads to impossibilities is itself impossible; a universe without a beginning leads to impossibilities; therefore, a universe without a beginning is impossible.

I have argued above that each of the premises of these arguments are true and, thus, we have two sound arguments against the view that the universe is past eternal. Accordingly, (H4) is true.

5.4.4 Scientific Justification for an Eternal Universe

Now coming back to our initial question: *Can an eternal cosmological theory, by itself, justify belief in a past eternal universe?* The phrase "theory x can

justify, by itself, belief in y" may be described as follows. For any person S, scientific theory T, and proposition P, T can justify, by itself, S's belief in P if and only if the following four conditions are met:

i T entails P because, if T is a true description of reality, then P must be true.

ii T satisfies the requirements for a good scientific theory, such as internal consistency, simplicity, explanatory power, testability, etc.

iii The methodology behind T does not presuppose P.

iv S has responsibly searched for important theories or arguments in favour of not-P, but found none.[5]

Our question, then, is as follows: Can an eternal cosmological theory justify, by itself and in the sense just described, a person's belief in a past eternal universe? The answer is no, at least not while (a) MN is the predominant scientific attitude, (b) philosophy is a reliable means to truth, and (c) there exist strong philosophical arguments against a past eternal universe.

Firstly, MN's influence on cosmology means that condition (iii) cannot be satisfied. If the universe had an absolute beginning, then no natural ex-

[5] Such a search forms part of the justification for belief in P. Hence, to state that T may justify "by itself" belief in P is not to say that T is the only justification for belief in P but, rather, it means that T is the only theory or argument that forms *part* of the justification for belief in P.

planation for its beginning exists because the universe (as we are using the term) *is* all natural reality. Thus, the beginning of the universe has either a transcendent cause or no cause whatsoever. However, this conclusion does not accord well with MN. According to MN, any event may be explained by a prior natural event or physical state and this, in turn, implies that the temporal regress of natural events or states is infinite. Therefore, cosmologists directed by MN will try their best to avoid theories that entail an absolute beginning *ex nihilo*. Indeed, even if all the current scientific evidence pointed towards an absolute beginning, we should expect the majority of scientists to assume that an unknown natural law is responsible for this "unexplainable" event. Therefore, the methodology behind any eternal cosmological theory presupposes that the universe is eternal.

There is, however, nothing wrong with the methodology of a theory presupposing certain beliefs. However, if this is the case, then the theory does not support the presupposed belief. For example, my belief that God exists cannot be supported by Trinity Monotheism, which is a theological theory of the Trinity. The reason for this is because the methodology underpinning Trinity Monotheism prepossesses the existence of God. Trinity Monotheism may support my belief that, *if God exists*, He exists as one tri-personal being, but the theory cannot support my belief that *God exists*. Similarly, because MN, the methodology underlying cosmological theories, presupposes

an eternal universe, it is difficult to understand how an eternal cosmological theory may support one's belief in an eternal universe.

Secondly, because (a) strong philosophical arguments against a past eternal universe exist and (b) philosophy is a reliable means to truth, condition (iv) cannot be satisfied. Nobody can responsibly search for important theories or arguments in favour of a cosmic beginning and find none. A quick search through the literature on arguments in favour of an absolute beginning reveals a vast amount of important books and articles written on the topic. Indeed, most of the arguments used by the proponents of the cosmological argument are accessible to the public through the internet.[6] Therefore, anyone who has the means to study modern cosmological theories will, through a responsible search, find several important philosophical arguments against an eternal universe.

But why does this matter? Why must an individual search for important reasons in favour of an absolute beginning before an eternal cosmological theory can justify, by itself, his/her belief in an eternal universe? The reason is that one has an intellectual duty to evaluate the most important evidence for and against some proposition P before one believes P. If one finds evidence in favour of P and finds no evidence against P, then the justification for

[6] See for example `http://www.reasonablefaith.org` and `http://en.wikipedia.org/wiki/Cosmological_argument`

belief in P increases. However, if one finds important evidence both for and against P, then, to increase the justification for one's belief in P, one must show why the evidence against P is unsuccessful. For example, suppose that, after reading McTaggart's article, *The Unreality of Time* (1908), I form the belief that time is not real. Suppose that I have examined no argument in favour of the view that time is real. Is my belief in the unreality of time justified? Clearly not, because there are numerous arguments in favour of time's reality. My belief is justified only once I have shown that the most important of these arguments are unsuccessful. Similarly, because strong and important arguments against a past eternal universe exist, it is essential that one shows why these arguments fail before an eternal cosmological theory may justify one's belief in an eternal universe.

Therefore, our first premise (H1) is true: If (i) eternal cosmological theories are shaped by methodological naturalism, (ii) philosophy is a reliable means to truth, and (iii) strong philosophical arguments against a past eternal universe exist, then no eternal cosmological theory can, by itself, justify belief in a past eternal universe. It follows from (H2), (H3), and (H4) that no eternal cosmological theory can, by itself, justify belief in a past eternal universe. This conclusion implies that one cannot justify one's belief that *the universe is or might be eternal* solely on the basis that several eternal cosmological theories exist. Therefore, one cannot dismiss the above

two philosophical arguments against an eternal universe as unsuccessful on the grounds of several (tentative) scientific theories.

5.5 Summary and Concluding Remarks

This chapter addressed the following question: Without denying the actual infinite, how may the proponents of the KCA show that the universe began to exist? My response was that the proponents of the KCA should use the following two arguments:

1. If the universe had no beginning, the present event could not occur; the present event is occurring; therefore, the universe had a beginning.
2. Whatever leads to impossibilities is itself impossible; a universe without a beginning leads to impossibilities; therefore, a universe without a beginning is impossible.

These two arguments do not deny the possibility of an actual infinite and, thus, they do not rule out either Platonism or the standard definition of omniscience. Therefore, one may endorse these arguments while affirming that an actually infinite number of abstract objects exist and that God knows an actually infinite number of propositions.

Furthermore, I argued that science (or any cosmological theory that entails an eternal universe) cannot, by itself, justify belief in a past eternal universe. Thus, many scientists are mistaken in thinking that the existence of promising scientific theories alone justifies their belief that the universe is or may be eternal. I argued as follows: If (i) eternal cosmological theories are shaped by methodological naturalism, (ii) philosophy is a reliable means to truth, and (iii) strong philosophical arguments against a past eternal universe exist, then no eternal cosmological theory can, by itself, justify belief in a past eternal universe. Propositions (i), (ii), and (iii) are true. Therefore, no eternal cosmological theory may, by itself, justify belief in a past eternal universe. This argument reinforces the two philosophical arguments in favour of an absolute beginning.

Thus, this chapter has presented a model for defending the KCA while permitting the actual infinite. If the proponents of the KCA adopt this model, then, I believe, they will have in their possession a more persuasive argument than may otherwise have been the case.

Chapter 6

Conclusion: Permitting the Actual Infinite

6.1 Summary of Research

In this study I have argued that the *kalām* cosmological argument (KCA) is an important theistic argument that *can* and *should* be revised into a more persuasive argument that permits the actual infinite.

This conclusion was reached in four steps. Firstly, I have shown that the proponents of the KCA should seek a more persuasive KCA. By "a more persuasive KCA" I mean a *stronger*, *more convincing*, and *less controversial* version of the KCA than the versions offered so far. Although critics object that the KCA fails to conclude to a particular theistic God, the KCA remains

an extremely important and valuable argument that is worthy of serious academic reflection. The reason for this is that theists may offer the KCA in support of the doctrine of *creatio ex nihilo*. *Creatio ex nihilo* is a coherent theistic doctrine that comprises the following six aspects or implications: (1) Everything apart from God depends on God for its existence, (2) Everything apart from God is created by God, (3) Time had an absolute beginning, (4) Matter had an absolute beginning, (5) God transcends His creation, and (6) Creation is an act of God's free will. This doctrine is a significant theistic belief because (i) it is entailed by Holy Scripture and (ii) most of the prominent theists endorse *creatio ex nihilo*. Therefore, because the KCA supports *creatio ex nihilo*, the KCA is an important theistic argument.

I have argued, furthermore, that the KCA offers three additional benefits for scholars, namely, (a) it provides common ground for interfaith dialogue, (b) it promotes dialogue between philosophers and scientists, and (c) it adds to the discussion about divine attributes. For these reasons, the KCA is sufficiently important for theists to seek a more persuasive KCA.

Secondly, by means of a historical survey of the KCA, I have shown that three of the most important proponents of the KCA, namely, John Philoponus, al-Ghazālī, and William Lane Craig, argue against the possibility of the actual infinite to show that the universe began to exist. Not one of their versions of the KCA permits the actual infinite. Indeed, the argument based

on the impossibility of an actual infinite is the most prominent philosophical argument in favour of an absolute beginning and which is used by advocates of the KCA. This point is illustrated by the fact that the KCA is sometimes identified as the cosmological argument that *denies the actual infinite* (Rowe, 2007:33; Reichenbach, 2013).

Thirdly, I have argued that the proponents of the KCA should not deny the actual infinite but that they should argue against the equi-successive infinite only while permitting the actual infinite. Modern set theory enables one to distinguish between the potential infinite and the actual infinite. The *potential infinite* is a dynamic collection or series that increases endlessly towards infinity as a limit but never becomes actually infinite and never completes. The *actual infinite*, however, is a completed set of infinitely many distinct elements that may be placed in a one-to-one correspondence with a proper part of itself. The actual infinite may be divided into the simultaneous infinite and the successive infinite. The elements of the former all exist simultaneously while the elements of the latter have each come into existence one after another in time. A successive infinite may be further subdivided into a supertask and an equi-successive infinite. A supertask denotes an actually infinite series of progressively shorter operations accomplished in a finite duration of time, whereas an equi-successive infinite denotes an actually infinite series whose elements have each come into existence over an equal

duration, such as an endless series of past years.

Using this distinction, I have shown that the versions of the KCA that argue against the actual infinite, which I refer to as the KCA_1, are incompatible with Platonism (or realism). Platonism is the view that abstract objects exist, such as numbers and propositions. An abstract objects is best defined as an object that is not a person, place, space itself, a time, nor time itself; that is space-less and timeless; and that cannot bring something into existence. However, because Platonism implies that several abstract objects, such as numbers, exist necessarily, Platonism implies the existence of an actual infinite (such as the series of natural numbers).

I have also argued that the KCA_1 is incompatible with the standard definition of omniscience. This definition states that, for any person S, S is omniscient if, for every proposition p, if p is true, then S knows p. Theists have traditionally affirmed that the future is endless and that God knows the entire future. However, an endless series that may be grasped as a completed totality is, by definition, actually infinite. Accordingly, if God's knowledge encompasses an endless series of future events entirely and all at once, then God knows an actually infinite number of things. Moreover, the standard definition of omniscience implies that God knows an endless series of mathematical truths (such as $1 + 2 = 3$, $2 + 3 = 5$, $3 + 4 = 7$, ...) all at once and this, in turn, means that God's knowledge is actually infinite. Therefore, the

proponents of the KCA_1 must either deny an actual infinite or affirm God's omniscience as they cannot do both. My conclusion is that a version of the KCA that permits the actual infinite is compatible with both Platonism and the standard definition of omniscience and, therefore, such a version is more persuasive than the KCA_1.

Finally, after arguing that advocates of the KCA *should* revise the KCA into a more persuasive argument that permits the actual infinite, I have shown *how* this may be done. I have defended the following two arguments in favour of an absolute beginning:

1. If the universe had no beginning, the present event could not occur; the present event is occurring; therefore, the universe had a beginning.
2. Whatever leads to impossibilities is itself impossible; a universe without a beginning leads to impossibilities; therefore, a universe without a beginning is impossible.

Because these two arguments do not deny the actual infinite, they are compatible with both Platonism and the standard definition of omniscience. A theist may endorse these arguments and affirm (i) that an actually infinite number of abstract objects exist and (ii) that God knows an actually infinite number of propositions.

Furthermore, I have supplemented these two philosophical arguments with a third philosophical argument to support the view that science cannot, by itself, justify belief in a past eternal universe. My argument may be represented as follows: If (i) eternal cosmological theories are shaped by methodological naturalism, (ii) philosophy is a reliable means to truth, and (iii) strong philosophical arguments against a past eternal universe exist, then no eternal cosmological theory can, by itself, justify belief in a past eternal universe; propositions (i), (ii), and (iii) are true; therefore, no eternal cosmological theory can, by itself, justify belief in a past eternal universe. This argument shows that many scientists are mistaken in thinking that the existence of promising scientific theories alone justifies their belief that *the universe is or might be eternal*. I believe that, if advocates of the KCA abandon the argument against the actual infinite and use these three arguments to support the premise that the universe began to exist, they will have in their possession a more persuasive theistic argument than would otherwise be the case.

6.2 Suggestions for Further Research

This study has focused exclusively on the second premise of the KCA, namely, that the universe began to exist. A comprehensive analysis of the argument's

first premise, i.e. that if the universe began to exist, it has a cause of its existence, remains to be written. Such a study could investigate, for example, whether the causal principle that *whatever begins to exist has a cause* is tenable, or if denying this causal principle would be problematic for atheism. Questions such as "Is the causal principle a natural law or metaphysical principle?" or "If an atheist denies the causal principle, can he/she defend atheism, given the belief that a deity/deities could have spontaneously popped into existence?" should be explored. Thus, there remains much work to be done by philosophers of religion on the topic of the *kalām* cosmological argument.

6.3 Conclusion

For the past several years, Christian philosophy has been enjoying something of a renaissance. There is a renewed interest in philosophical arguments in favour of theism and Christianity. James F. Sennett and Douglas Groothuis remark,

> The last forty years have brought a marvelous resurgence in academic philosophical research and publication among Christian scholars. ... Hundreds of Christian philosophers have undertaken to apply the very best tools of contemporary philosophy to the

> questions surrounding the claims of traditional Christianity. Very large research programs in religious epistemology, the coherence and implication of the divine attributes, the evidences for the resurrection of Jesus, the relationship between theology and science, and many other areas are currently being developed with impressive and exciting results (Sennett & Groothuis, 2005:10-11).

Thus, this study has promoted this revived interest in Christian philosophy. The overall conclusion of this study is that the KCA is an important theistic argument that *can* and *should* be revised into a more persuasive argument that permits the actual infinite.[1] Furthermore, this study has shown how the proponents of the KCA can permit the actual infinite. Therefore, by defending a traditional theistic argument, this study has contributed to the exciting renaissance that is taking place in Christian philosophy.

[1] I therefore agree with Garrett J. DeWeese and Joshua Rasmussen (2005:149) when they declare that "the KCA is indeed a viable piece of natural theology".

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