

The cosmological argument: A Newtonian challenge to Hume

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Abstract

David Hume's arguments against the cosmological argument have, in the past century, often been highly praised by commentators such as H.D. Aiken and E.C. Mossner. While Hume's argument often receives strong philosophical support, the four major objections raised against the cosmological argument in book IX of his *Dialogues Concerning Natural Religion* hinge upon a misunderstanding of Newtonian natural philosophy. Hence, when the proper historical context is considered, Hume's objections are weak at best, for they assume an understanding of matter and physical necessity that is inconsistent with Newtonian natural philosophy. This paper outlines Hume's objections and explores how the formulation of the cosmological argument put forth by the English philosopher Samuel Clarke was reliant upon the best available scientific evidence, i.e. Newtonian philosophy. Consequently, any contemporary supporter of Hume who believes that his argument was successful in quenching the Enlightenment's reiteration of the cosmological argument does so anachronistically.

Keywords

Cosmological argument, Isaac Newton, Samuel Clarke, David Hume

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Resumo

As críticas de David Hume ao argumento cosmológico foram e muito elogiadas, no século passado, por comentaristas com H.D. Aiken e E.C. Mossner. Enquanto a argumentação de Hume tem forte fundamentação filosófica, as quatro objeções principais ao argumento cosmológico no livro IX do seu *Diálogos sobre a Religião Natural* derivam de uma compreensão equívoca da filosofia natural newtoniana. Assim, ao se levar em consideração o contexto histórico adequado, as objeções de Hume são fracas no melhor dos casos, porque assumem uma compreensão da necessidade material e física que é inconsistente com a filosofia natural newtoniana. O presente artigo descreve brevemente as objeções de Hume e explora o embasamento do argumento cosmológico formulado pelo filósofo inglês Samuel Clarke na melhor evidência científica disponível na época, a saber, a filosofia newtoniana. Consequentemente, toda crença contemporânea no sucesso do argumento de Hume para extinguir a reiteração do argumento cosmológico na Ilustração é anacrônica.

Palavras-chave

Argumento cosmológico; Isaac Newton; Samuel Clarke; David Hume

The cosmological argument is an argument form that is almost as old as philosophy itself. The soundness of contemporary formulations is often dependent upon two criteria: first, the logical structure of the argument itself and whether or not this structure holds up to philosophical scrutiny, and second, how well the physical claims of the argument cohere with the preponderance of scientific evidence. However, the second criterion is often ignored when examining historical arguments, especially the version expressed by the English philosopher Samuel Clarke (1675-1729). Clarke's version of the cosmological argument is typically assessed by how well it weathers the philosophical storm of David Hume's (1711-1776) critique found in his *Dialogues Concerning Natural Religion* (1779).

Hume's arguments against the cosmological argument have, in the past century, often been highly praised by commentators such as H.D. Aiken and E.C. Mossner. Regarding Hume's objections to the argument *a priori*, Demea Mosser comments, "the *a priori* proof of the being of a God is refuted by an unimpeachable demonstration"¹. While Hume's argument often receives strong philosophical support, the four major objections raised against the cosmological argument in book IX of his *Dialogues* hinge upon a misunderstanding of Newtonian natural philosophy. Hence, when the proper historical context is considered, Hume's objections are weak at best, for they assume an understanding of matter and physical necessity that are inconsistent with Newtonian natural philosophy. This paper will outline Hume's objections and explore how the formulation of the cosmological argument put forth by the English philosopher Samuel Clarke was reliant upon the best available scientific evidence, i.e. Newtonian philosophy. Consequently, any contemporary supporter of Hume who believes that his argument was successful in quenching the enlightenment era reiteration of the cosmological argument does so anachronistically.

Samuel Clarke was an English philosopher who, in 1704, published *A Demonstration of the Being and Attributes of God*, which arose out of his Boyle lectures.² In *Demonstration*, Clarke presents what he considers a single cohesive cosmological argument for God's existence. Clarke's argument is historically significant due to the fact that it is his version of the cosmological argument that Hume scrutinizes in his *Dialogues* published posthumously in 1779. Hume is reported to have claimed later in life that "[...] he never had entertained any belief in religion since he began to read Locke and Clarke"³. Hume's objection to Clarke, which appears primarily in part IX of the *Dialogues*, will be examined and compared to Clarke's argument. After Hume's arguments have been analyzed, a justification of Clarke's position will be exposed focusing primarily upon his reliance on Isaac Newton (1643-1727) and the philosophical suppositions he draws thereon.

Hume's *Dialogues* center on the conversations of three major characters, Philo, Cleanthes and Demea, as well as the minor character Pamphilus, who operates as a narrator. Each of the characters has traditionally been viewed as representing three distinct schools of philosophical thought. Cleanthes is said to represent the empirical theist, or the scientific theist, whose beliefs about God's nature and existence are based on empirical evidence. One

¹ D.C. Stove, "Part IX of Hume's Dialogues," *The Philosophical Quarterly* 28, no. 113 (1978): 300-9, on 303.

² For a biographical and philosophical sketch of Clarke's life, see James P. Ferguson, *An Eighteenth Century Heretic: Dr. Samuel Clarke* (Kington: The Roundwood Press, 1976).

³ David O'Conner, *Hume on Religion* (New York: Routledge, 2001), 2.

figure that Hume undoubtedly had in mind when drafting Cleanthes argument is Isaac Newton. The reason for this is that Newton essentially redrafted the design argument into modern scientific terms. By the time Hume began work on the *Dialogues*, the argument from design was widely accepted amongst scientists and theologians, thanks in large part to the writings of Newton. A majority of the *Dialogues* is devoted to an examination of the design argument presented by Cleanthes. While all three characters claim to believe in God, Philo represents the skeptic of the group, and often pushes the dialogues forward through his questioning and critiques. Demea is often said to represent the 'orthodox Christian', and at one point in the *Dialogues* he offers an *a priori* proof for the existence of God. Demea's proof, found in part IX of the dialogues, exhibits a strong correlation with the argument that Clarke presents in *Demonstration*. Given the resemblance between the structure and content of the argument, as well as Hume's familiarity with the works of Clarke and an explicit reference made to Clarke in this section of the *Dialogues*,⁴ one may safely assume that part IX of the *Dialogues* represents a critique of Clarke's cosmological argument.

As a result of being unsatisfied with the previous *a posteriori* argument offered by Cleanthes, Demea begins part IX of Hume's *Dialogues* with what he refers to as "[...] that simple and sublime argument *a priori*..."⁵. Here, Hume is borrowing Clarke's terminology when Demea refers to what is essentially an *a posteriori* argument as an *a priori* argument. Clarke considered his own argument '*a priori*' insofar as it concluded with the existence of a necessary being, and Demea does the same. David O'Conner notes that there are two distinct aspects of part IX of the *Dialogues* that separate it from the rest of the work. The first distinctive aspect is that Demea's argument concerns itself with the issue of logical necessity, and also the argument itself is intended to be deductive. Demea's argument stands in contrast with the argument from design, presented previously by Cleanthes which reaches its conclusion by inductive reasoning. O'Conner also notes that the second distinctive aspect of part IX is that the "subject of skepticism does not come up in it at all"⁶. Demea's argument can be most accurately formulated as follows:

1. It is impossible for anything to be self-created, or to be the cause of its own existence.
 - 1A. Thus, whatever exists must have a cause for its existence.
2. It is obvious that something now exists (implicit premises).
3. Either there has been an infinite succession of events, without a cause, or there is one ultimate cause that is necessarily existent.
 - 3A. In a chain of events, each effect is determined or produced by its preceding cause.
 - 3B. An infinite succession of events does not have a cause or reason for its existence.
 - C1. It is not possible that there has been an infinite secession of events.
 - C2. There must be a 'recourse to a necessarily existing Being who carries the reason for his existence in himself; and who cannot be supposed not to exist'.

⁴ David Hume, *Dialogues Concerning Natural Religion*, ed. Richard H. Popkin, 2nd edition (Indianapolis: Hackett Publishing Company, 1998), 56.

⁵ Hume, *Dialogues*, 54.

⁶ O'Conner, 148.

Clarke's argument is presented in the first chapter of *Demonstration* as follows:⁷

1. Something has existed from all eternity, as is evident from the fact that something now exists.
2. Whatever exists has a reason, or cause, for its existence.
3. A thing exists, either out of the necessity of its own nature or its existence is caused by some other entity.
 - 3A. Either there must exist some necessary being who exists necessarily by its own nature, or there has existed an endless secession of contingent beings with no cause at all.
 - 3B. It is impossible that there is an endless secession of contingent beings, for this would mean that their existence was uncaused (which is a contradiction).
4. Therefore, there must exist some necessary being who is the cause of its own nature.

At first glance, with the exception of the arrangement of the premises and the arbitrary difference in words, Demea's argument seems to be a fair representation of Clarke's cosmological argument. There are, however, some notable exceptions. First, Demea does not begin with the premise that 'something has existed from all eternity', or even with the premise that 'something now exists'. Rather, the premise that 'something now exists' must be inferred from Demea's argument, "In mounting up, therefore, from effects to causes"⁸. In other words, Demea begins with observable effects, which obviously exist. Yet, the omission of the premise from Demea's argument is ultimately inconsequential to the argument as a whole. The reasoning behind Clarke's explicate statement of his first premise is, more than likely, primarily due to scientific rather than logical concerns. The second notable difference between Demea and Clarke's argument is Demea's omission of the second half of Clarke's cosmological argument, what has often been called Clarke's ontological argument.⁹ Nevertheless, in the opening paragraph of part IX, Demea alludes to such an argument when he claims, "By this argument, too, we may prove the *Infinity* of the Divine Attributes, which, I am afraid, can never be ascertained with certainty from any other topic"¹⁰. While Demea does not lay out the actual argument, he does suggest that such an argument is possible. As Edward Khamara states, "This suggests that the argument which he summarizes later *can be* extended by *further* steps to deduce both the uniqueness of God and such 'infinite attributes' [...]"¹¹.

Demea's argument, like Clarke's, hinges upon the idea of the principle of sufficient reason (PSR), "Whatever exists has a cause or reason of its existence, it being absolutely impossible for anything to produce itself or be the cause of its own existence"¹². Demea uses a strong form of the PSR, similar to the one found in Clarke's argument when he claims that, "Whatever exists has a cause, a reason, a ground of its existence, a foundation upon which

⁷ Samuel Clarke, *A Demonstration of the Being and Attributes of God*, ed. Ezio Vailati (Cambridge: Cambridge University Press).

⁸ Hume, *Dialogue*, 54.

⁹ Clarke, 10.

¹⁰ Hume, *Dialogues*, 54.

¹¹ Edward Khamara, "Hume versus Clarke on the Cosmological Argument," *The Philosophical Quarterly* 42, no. 166 (1992): 34-55, on 45.

¹² Hume, *Dialogues*, 54.

its existence relies, a ground or reason why it does exist rather than not exist"¹³. It is important to note that Demea believes that *all* beings have a cause for their existence, not only contingent beings. Hence, even the necessary being that Demea purports to demonstrate the existence of must have a cause. Demea notes that this being "carries the reason for his existence in himself"¹⁴.

The fact that even a necessary being must have a cause for its existence, and that this cause may be found within the nature of the necessary being, is also a premise that is explicitly stated in Clarke's argument. However, there is one essential difference between Demea and Clarke's use of the PSR, namely, Demea's statement "does not merely assert the causal principle as a premise, but incorporates a proof of it which is not in Clarke"¹⁵. On closer examination, Demea's statement represents an abbreviated form of an argument in support of the PSR that is presented, and then heavily criticized by Hume, in *A Treatise of Human Nature* (1738). In the latter, Hume claims that "Clarke and others" have presented the following argument in favor of the PSR: "Everything, it is said, must have a cause; for if anything wanted a cause, it would produce itself, that is, exist before it existed, which is impossible"¹⁶.

When comparing Hume's *Dialogue* with his *Treatise*, one may begin to see that the proof offered in the *Treatise* is also present in *Dialogues*. Demea begins his argument by stating that whatever begins to exist must have a cause for its existence, because it is "...absolutely impossible for anything to produce itself or be the cause of its own existence"¹⁷. Hume's presentation of the PSR is problematic, as he himself observes, because if it were true it would be *necessarily* true. The denial of the PSR in Hume's *Treatise* expresses a contradiction. It is unclear, however, why Hume attributes this proof for the PSR to Clarke. Clarke accepts the PSR *prima facie*, and as such offers no proof for the principle.¹⁸ Furthermore, as will become clear when Clarke's views are discussed, Clarke's notion of a necessary being is predicated upon his understanding of Newtonianism, and as such requires no philosophical justification.

While there may be some discrepancies, the connection between Demea and Clarke's argument is undeniable. Thus, the criticisms leveled against Demea's argument by Cleanthes and Philo may also be interpreted as criticisms against the version of the cosmological argument presented by Clarke. Hume raises five objections to Demea's argument. The first objection, and perhaps the most important of the five, is raised by Cleanthes: "I shall begin with observing that there is an evident absurdity in pretending to demonstrate a matter of fact, or to prove it by any argument *a priori*"¹⁹.

There are two aspects to Hume's first objection. The first aspect revolves around Hume's notion of a 'demonstrable argument'. According to D.C. Strove, Hume holds

¹³ Clarke, 8.

¹⁴ Hume, *Dialogues*, 55.

¹⁵ Khamara, 46.

¹⁶ David Hume, *A Treatise of Human Nature* (Indianapolis: Hackett Publishing Company, 1998), 126

¹⁷ Hume, *Dialogue*, 54.

¹⁸ Clarke, 8.

¹⁹ Hume, *Dialogues*, 55.

demonstrable arguments to be “valid arguments from necessarily true premises”²⁰. A conclusion is said to be demonstrable if its content can be deduced from necessarily true premises. Demea, based on his view of the PSR as a necessary truth, is attempting to construct such an argument. Yet, Cleanthes objects, “Nothing is demonstrable unless the contrary implies a contradiction. Nothing that is distinctly conceivable implies a contradiction. There is no being, therefore, whose non-existence implies a contradiction”²¹.

The second aspect, as seen in Cleanthes’ objection is that ‘matters of facts’ are propositions whose truth values are *contingent*. By definition, matters of fact deal with propositions that concern themselves with contingent entities. Any being which may be described in a matter of fact proposition may also be described as not existing; this does not provoke a contradiction. Thus, Cleanthes concludes it is impossible to demonstrate the existence of a necessary being. A demonstrable argument concerns itself with necessary truths, but the existence of any being is not necessary; rather, it is a matter of fact. Any proposition that is a matter of fact is contingent. Any being whose existence can be conceived is also a being whose nonexistence can also be conceived. It follows, therefore, that not only it is impossible to demonstrate the existence of a necessary being, but Cleanthes also makes the even stronger claim that the very idea of a necessary being is fundamentally unintelligible. Any being may be thought to not exist, even a so-called ‘necessary’ being. Cleanthes considers this argument eminent, and states that he is “willing to rest the whole controversy upon it”²².

Hume’s second objection, as presented by Cleanthes, states that it is plausible to assume that the universe itself is necessary, and that the universe may not need a cause for its existence. Cleanthes raises the following question: “why may not the material universe be the necessary existent Being, according to this pretended explication of necessity?”²³. If the universe has always existed, then the universe itself may be a necessary being insofar as it may need no causal explanation for its existence. Cleanthes notes that the only objection to this position is the argument given by Clarke in *Demonstration*, under proposition III. As will be outlined below, Clarke defends the Newtonian position that vacuums do exist, and as a result Clarke is committed to the position that matter is contingent. While Clarke holds that space and time have always existed, matter has not, and therefore the physical universe cannot be conceived of as a necessarily existing being. Cleanthes suggests that Clarke is not being thorough in his reasoning and is holding his own notion of a necessary being to a double standard. Cleanthes reasons that the “same argument extends equally to the Deity, so far as we have any conception of him; and that the mind can at least imagine him to be non-existent”²⁴. According to Cleanthes, the same argument that Clarke uses to show that matter is not necessary may be used to show that God is not necessary. While Clarke may object that God’s nonexistence is inconceivable due to some unknown property within God, Cleanthes notes that a similar argument may be made with regard to matter.

²⁰ Strove, 303.

²¹ Hume, *Dialogues*, 55.

²² *Ibid.*

²³ *Ibid.*, 56.

²⁴ *Ibid.*

The third objection, presented by Cleanthes, focuses on a shift in Demea's and Clarke's argument when moving from particular contingent beings to the whole of what is. Demea claims that every being requires a cause or reason for its existence. Furthermore, contingent beings are beings who depend upon other beings for their existence. Demea reasons that if the universe consists of nothing but contingent beings, then there must also be a reason for the *whole* of contingent beings. Cleanthes objects, "the uniting of these parts into a whole, like the uniting of several distinct countries into one kingdom, or several distinct members into one body, is performed merely by an arbitrary act of the mind, and has no influence on the nature of things"²⁵.

Cleanthes' objection is a subtle, yet powerful one. Both Demea and Clarke claim that either the universe is an infinite chain of contingent beings, or that the universe is the result of a necessary being; and, nothing that is contingent can exist unless caused. If the whole of what is consists in nothing but contingent beings, then the whole must be caused by something. Cleanthes' objection is that "if a changing universe has always existed and what exists at any given time is caused by what previously existed, then it is a mistake to ask for a cause of the existence of the whole enduring process which extends infinitely into the past"²⁶. The mistake occurs, according to Cleanthes, when one demands a cause outside the whole of what is. For example, take the concept of a 'nation'. A nation consists of several individual states. Now suppose one were to ask how a particular nation came to be. If one were to explain the cause and origin of each individual state, most people would consider this a satisfactory answer. His point is that it would certainly be strange, or even unreasonable, if after having heard the explanation the individual turned around and asked for the origin of the nation as a whole. In other words, one may sufficiently explain a 'set' by explaining the members of a 'set'. The term 'set' is a linguistic construct arbitrarily applied to individual things, and as such requires no explanation for its existence. Likewise, an infinite series of contingent beings "is sufficiently explained in explaining the cause of the parts"²⁷. One needs not give a reason for the contingent 'whole', for the act of designating that a group of individual beings represent a 'whole' is in and of itself an arbitrary act. The 'whole' that one is designating has no real existence outside of the individual parts.

The last objection to Demea's argument is raised by Philo. Philo's fourth objection is similar to the second objection raised by Cleanthes. Philo claims that the universe may exhibit its features out of its own necessity. In order to explain his point Philo uses the notion of a product from mathematics. A product is the number that is obtained by multiplying numbers together. Philo observes that if the characters of a product of 9 are added together they always equal 9 or another product of 9. An example of a product of 9 would include 18 ($1 + 8 = 9$), 45 ($4 + 5 = 9$) or even 486 ($4 + 8 + 6 = 18$, $8 + 1 = 9$). The fact that the products of 9 exhibit such order is recognized by an algebraist to "be the work of necessity, and demonstrate that it must forever result from the nature of the numbers"²⁸. Philo's objection is that the universe may be the result of some similar necessity, perhaps arising out of some unobservable aspect of matter that science has not discovered yet.

²⁵ Ibid.

²⁶ James Cain, "The Hume-Edwards Principle," *Religious Studies* 31, no. 3 (1995): 323-8, on 323.

²⁷ Hume, *Dialogues*, 56.

²⁸ Ibid., 57.

Before continuing to examine Clarke's possible responses, it will first be necessary to examine what appears to be an inconsistency in Cleanthes and Philo's objections. The first objection raised by Cleanthes, and the one which he claims he is "willing to rest the whole controversy upon,"²⁹ states that the words "necessary existence" has "[...] no meaning; or, which is the same thing, none that is consistent."³⁰ If the first objection raised by Cleanthes was the only one, there would not be a problem. However, the second objection raised by Cleanthes, and Philo's objection, both make use of the concept of a necessarily existing being. Cleanthes' second objection states that if there is anything that is actually necessarily existing, then there is no reason not to believe that it could be the material universe. Here, Cleanthes seems to be maintaining the "conditional thesis: that if 'necessary existence' is meaningful and consistent, then it is possible the material universe exists necessarily"³¹. This interpretation of Cleanthes is supported by his adopting of the "[...] pretended explication of necessity"³². Accordingly, Cleanthes seems to adopt a hypothetical understanding of necessary existence in order to demonstrate the fact that, based on Demea's argument, there would be no way to distinguish exactly what it means to necessarily exist. In making such an argument, O'Conner notes, "Cleanthes does not in fact think that the material universe exists necessarily"³³. This interpretation of Cleanthes' argument is, nonetheless, complicated by Cleanthes' closing remarks of his second objection.

In responding to Clarke's argument that matter is contingent, Cleanthes claims that, since it is possible to think of God as nonexistent, there must be some special quality within God that makes such a thought impossible. Yet, if one maintains this position, as Cleanthes believes that Clarke must, then what is to prevent one from holding the same belief about matter. Cleanthes reasons, "no reason can be assigned why these qualities may not belong to matter"³⁴. Cleanthes is essentially asking Demea, Clarke, and the reader, to consider the possibility that matter contains some hitherto unknown property that makes its existence necessary. Cleanthes' claim that matter may possess some unknown quality that makes its existence necessary is hard to reconcile with the objection in his first argument, that necessary existence is a meaningless concept. Nevertheless, the last section of the second objection may still be regarded as part of Cleanthes' beginning thought experiment, even if it does involve taking the fact that the material universe may be a necessarily existing thing seriously.

While the inconsistency in Cleanthes' argument may be pardoned due to the hypothetical nature of the objection, it is even more difficult to reconcile Cleanthes' first objection with Philo's position. Philo takes a slightly different approach, and argues that just as a form of necessity exists in mathematical equations, it is possible "that the whole economy of the universe is conducted by a like necessity"³⁵. In other words, it is possible that instead of being the result of cause, or chance, the universe may exhibit its properties due to some sort of necessity. The necessity that Philo is suggesting seems to be the result of

²⁹ Ibid., 55.

³⁰ Ibid., 56.

³¹ Stove, 305.

³² Hume, 56.

³³ O'Conner, 156.

³⁴ Hume, *Dialogues*, 56.

³⁵ Ibid. 57.

the some internal property of physical objects or the natural laws that govern nature. Philo is suggesting that, “the basic laws of physics reflect the way things have to be, given certain initial conditions”³⁶. Moreover, this is not the only instance that Philo mentions such a possibility. For example, in section VII, Philo presents a cosmology in which the continuous motion of matter “must produce this economy or order, when once established, supports itself for many ages if not to eternity”³⁷. It is conceivable or even probable then, according to Philo, that the universe must necessarily be the way that it is due to some physical process. Kemp Smith has suggested that Philo’s conception of the necessary existence of the material world is something which his arguments throughout the *Dialogues* are intended to support, and is something which is of “central importance [...] in Philo’s teaching”³⁸. Given that this is the case, it is hard to imagine why Hume has Philo agree with, or at the very least acknowledge as correct, Cleanthes’ first objection. Philo states that, “Through the reasoning which you have urged, Cleanthes, may well excuse me, said Philo, from stating any further difficulties”³⁹. This seems to suggest that Philo accepted Cleanthes’ objections.

Traditional interpretations of Hume and Clarke’s argument are unsatisfactory due to the fact that the argument is often interpreted without historical context. Clarke himself is partly to blame for this error, for while he clearly espouses his version of the argument in the first few chapters of his *Demonstration*, he fails to mention that his premises are primarily based upon scientific, rather than philosophical, evidence. Given the aforementioned fact, aspects of Cleanthes’ and Philo’s objections seem inapplicable to Clarke’s argument due to his devotedness to Newtonian natural philosophy. When one considers specific elements of Newton’s thought, such as his understanding of matter, space, and time, it becomes evident that Clarke’s notion of necessity takes on a larger meaning than the one present in Hume.

Newton’s understanding of matter developed out of a rejection of Cartesianism. By linking arithmetic and algebra with geometry, René Descartes (1596-1650) was able to formulate a mathematical way of describing space. To use the words of E. A. Burt, “He perceived that the very nature of space or extension was such that its relations, however complicated, must always be expressible in algebraic formulae”⁴⁰. Extension, according to Descartes, is the fundamental aspect of matter, and is also a characteristic of space. Furthermore, extension is something which an individual naturally intuits from sense perception. To say that a particular object is extended requires no explanation; hence, it is intuited from the natural light of reason. Yet, Descartes is quick to note that when he says that ‘a body is extended’, he is not implying that ‘extension’ and ‘body’ are referring to two different things. Rather, to be a body is to be extended in space. Additionally, Descartes ascribes three characteristics to extension: dimension, unity and shape. Dimension simply refers to the measurable aspects of extension, such as weight and motion. Descartes defines

³⁶ O’Conner, 162.

³⁷ Hume, *Dialogues*, 50.

³⁸ Stove, “307.

³⁹ Hume, *Dialogues*, 59.

⁴⁰ Edwin A. Burt, *The Metaphysical Foundations of Modern Science* (Mineola: Dover Publications INC, 2003), 106.

unity as “[...] the common nature which, we have said above, all the things which we are comparing must participate in equally”⁴¹.

Descartes’ speculations concerning the nature of matter and extension led him to posit his famous vortex theory. Concerning motion, Descartes believed that God was the primary cause, or reason, that things are now in motion. Descartes states that, “In the beginning <in his omnipotence> he created matter, along with its motion and rest; and now, merely by his regular concurrence, he preserves the same amount of motion and rest in the material universe as he put in there in the beginning”⁴². The implication of Descartes’ statement is that motion, and rest, are inherent qualities of matter itself. An object moves because God has created that object to move. This statement also excludes the existence of a vacuum. Space consists of a fine matter that Descartes refers to as ‘ether’. The universe is essentially ‘full’ of matter, and an object moving through space is communicating this property of motion through the impact of the object against other matter.

Regarding material things, Descartes claims that they are qualities which we clearly perceive, such as size, shape, motion, position and duration. Likewise, there are also qualities that our senses project onto material objects. Unlike the qualities that we clearly perceive, these qualities are not in the objects themselves. Examples of the second type of qualities include color, pain, smell and taste. However, the most basic characteristic of all ‘material things’ is extension. Even the other attributes of matter that are clearly perceived, such as size, shape and motion, are simply aspects of extension. Descartes’ inclusion of motion as an aspect of extension leads to a unique view of causation. The metaphysical picture that Descartes paints is one in which “bodies are characterized solely by size, shape, and motion, and all changes they undergo are the result of impacts among them on their parts”⁴³. The implications of Descartes’ claim become evident when one examines a particular phenomenon. For example, why does a raindrop fall to the ground? Under Descartes’ physical system, one is unable to explain why a raindrop falls in terms of water particles accumulating mass; Descartes does not consider weight a primary quality. Instead, the falling raindrop must be explained in terms of other bodies that impact the raindrop, causing it to fall. Descartes rejects any notion of a vacuum, and instead posits that the universe is ‘full’ of matter. Hence, all physical phenomena in the universe are explained by the impact of one piece of matter on another. During Clarke’s lifetime, Descartes’ natural philosophy led some Cartesians to posit that matter is eternal, and therefore necessary. Hence, Hume likely had a Cartesian understanding of the universe in mind when he speculated that the universe might be a necessarily thing. However, Newtonianism operates under a contrasting set of suppositions.

In Newtonian natural philosophy, there are four fundamental concepts: force, mass, space, and time. Force, according to Newton, is that which acts upon bodies which are then “either mutually impelled towards each other, and cohere in regular figures, or are repelled

⁴¹ René Descartes, “Rules for the Direction of the Mind,” in *The Philosophical Writings of Descartes*, transl. J. Cottingham, R. Stoothoof, & D. Murdoch (Cambridge: Cambridge University Press, 1985), I: 63.

⁴² René Descartes, “Principles of Philosophy,” in *The Philosophical Writings of Descartes*, transl. J. Cottingham, R. Stoothoof, & D. Murdoch (Cambridge: Cambridge University Press, 1985), I: 240.

⁴³ Andrew Janiak, *Newton as Philosopher* (New York: Cambridge University Press, 2008) 102.

and recede from each other"⁴⁴. The central force with which Newton becomes concerned with is that of gravity. Concerning mass, Newton acknowledged the view of Galileo Galilei (1564-1642) that mass was the most fundamental aspect of matter, a point which Descartes seems to have not considered. When dealing with space and time, Newton makes the distinction between absolute and relative. Absolute space always maintains the same proportions and is always immovable. Contrariwise, relative space "is some movable dimension or measure of the absolute spaces, which our senses determine by its position to bodies"⁴⁵. Absolute space, due to its nature, is indistinguishable to our senses, due to the fact that space cannot be divided or separated in any way. Max Jammer explains the distinction by stating that, "Since space is homogeneous and undifferentiated, its parts are imperceptible and indistinguishable to our senses, so that sensible measures have to be substituted for them"⁴⁶. In order to perform mathematical calculations one must place some sort of sensible points by which to measure space. These 'coordinate systems' constitute what Newton intends by his term relative space. Newton proceeds to make the same distinction regarding time, dividing it between absolute and relative time. Absolute time, like absolute space, is that which continues without relation to any particular body. In order to measure time one must segment it and make arbitrary distinctions in its duration, and this denotes the meaning of relative time for Newton. One of the paramount implications of positing the existence of absolute time and space is that the universe is infinite in duration and extension. In this regard then, the universe may be said to *necessarily* exist, but only in a qualified sense.

So, if relative time and space is all that is needed for calculations, why did Newton posit the existence of absolute time and space? The answer lies in Newton's conception of motion. Newton's first law of motion states that, "Every body of motion perseveres in its state of rest, or of uniform motion in a right line, unless it is compelled to change that state by forces impressed thereon"⁴⁷. To say that a body will move in uniform motion in a right line requires a reference system in which coordinates are not arbitrarily defined. The implication of the first law is that there is an absolute reference system, namely, absolute space. Furthermore, not only does rectangular motion presuppose absolute space, but also the idea that a body can be in a state of rest presupposes absolute space.⁴⁸ Newton gives the example of a ship at sea. The relative position of the ship is a position on the ship that moves along with the ship. On the other hand, absolute rest "is the continuance of a body in the same part of that immovable space, in which the ship itself, its cavity, and all that it contains, is moved"⁴⁹.

While Newton's mathematical calculations were widely successful, the *cause* motion eluded him. In his perplexity, Newton speculated on the role that God played in his newly formulated universe. One such speculation is found in Query 31 of Newton's *Opticks*, in which Newton speculates on the nature of gravity. Newton begins the query with a

⁴⁴ Isaac Newton, *The Principia* (New York: Prometheus Books, 1995), Preface.

⁴⁵ *Ibid.*, 244.

⁴⁶ Max Jammer, *Conceptions of Space: The History of Space in Physics* (Cambridge: Harvard University Press, 1969), 100.

⁴⁷ Newton, *Principia*, 29.

⁴⁸ Jammer, 102.

⁴⁹ Newton, *Principia*, 14.

discussion of the active powers in nature and the manner in which those powers interact with each other: "Have not the small Particles of Bodies certain Powers, Virtues or Forces, by which they act at a distance [...] produc[ed] a great part of the phenomena of Nature?"⁵⁰. The question inevitably leads Newton to a discussion of gravity and the conceivable causes of motion. Newton presents a view of the world in which bodies move through space and time in accordance with the laws of motion, previously demonstrated as absolute concepts in his *Principia*.

Newton observes that on a smaller scale, bodies in general "seem to be composed of hard Particles," which Newton identifies as atoms. These hard impenetrable atoms "may be reckon'd the Property of all uncompounded Matter".⁵¹ All matter, from planets to human beings, is composed of atoms. According to Newton, these atoms are: solid, weighty and by definition, impenetrable. Furthermore, all occurrences in nature are the result of the interaction, disjoining, and motion of these atoms. Yet, matter in and of itself "is dead, inert, passive; and therefore it must be given its original impetus and order by some active agent"⁵². The active agent that Newton has in mind is undoubtedly God, who not only gave the initial motion to the atoms, but also put matter in order: "For it became him who created them to set them in order"⁵³.

Clarke employs his knowledge of Newtonian natural philosophy in his critiques of the Cartesians. Again, while Descartes conceives of the world as a gigantic machine, Clarke claims that matter was incorrectly categorized as a necessary being. Descartes divides everything that is into two categories: the first group he calls "thinking things," which are those things which pertain to the mind, and the second category is "material things," which are those things "which pertain to extended substance or body".⁵⁴

Clarke, in his *Demonstration*, explicitly rejects the notion that motion is an inherent property of matter and by extension, that the material universe is eternal.⁵⁵ Clarke was reacting to the writing of John Toland (1670-1722), an English philosopher, who professed that motion is an essential quality of matter, and as such is a part of the physical make-up of matter. Toland himself claims, "motion is always succeeded by another motion, and never by absolute rest, no more than any parcel of matter the ceasing of one figure is the ceasing of all, which is impossible"⁵⁶. Toland's description of motion is indistinguishable from Descartes': the space through which an object moves is filled with blocks of matter that, upon collision with the object, transfer motion to the moving object. Toland interpreted the predisposition of matter to move as a sign that matter was innately endowed with motion. Much to the chagrin to Clarke, he even quotes Newton's definition of the *vis inertiae*, or the resistance that an object exhibits while maintaining its current state of motion or rest. Toland presents the principle of the *vis inertiae* in such a way that emphasizes his own notions of

⁵⁰ Isaac Newton, *The Optics*, transl. Andrew Motte (New York: Prometheus Books, 1995).

⁵¹ *Ibid.*, 364.

⁵² Robert Hurlbutt, *Hume, Newton, and the Design Argument* (Lincoln: University of Nebraska, 1985), 21.

⁵³ Newton, *Optics*, 378.

⁵⁴ René Descartes, "Principles of Philosophy," 208.

⁵⁵ Clarke, 19.

⁵⁶ Larry Stewart, "Samuel Clarke, Newtonianism, and the Factions of Post-Revolutionary England," *Journal of the History of Ideas* 42, no. 1 (1981): 53-72, on 54.

motion and rest, while additionally ignoring Newton's insistence that matter is fundamentally passive. According to Toland, the belief in the passivity of matter leads directly to belief in 'empty space', or a void, which Toland rejected unequivocally.

Clarke responds to Toland's critique of Newtonianism in two ways. First, Clarke affirms the complete passivity of matter, and secondly argues for the existence of a void. Adherents to a strict mechanist's position (and perhaps Hume in his *Dialogues*) account for motion by pointing to the interaction between material objects. Newton, on the other hand, claimed that matter was inert and that motion was the result of different forces acting upon a body which subsequently cause it to move. While it is still a matter of scholarly contention what Newton intended by 'force', one may nevertheless state that "Forces are not obviously properties of material objects, nor are they obviously objects in their own right"⁵⁷. In his *Principia*, Newton focuses on the mathematical treatment of forces which are measurable due to the effects on other objects. While the nature of 'forces' within Newtonian thought may be disputed, one may say with certainty that a force is not an inherent quality of matter, but rather something which acts upon matter. With Newton's notion of force in mind, Clarke objects that motion cannot be intrinsic to every particle of matter. Clarke argues that if matter is innately endowed with motion then this motion must "be either a tendency to move some one determined way at once, or to move every way at once"⁵⁸.

Either option leads to complications. The first choice, that matter is endowed with motion and is determined to move in a certain direction, begs the question, determined by what? As mentioned above, Newton speculates that the material cause of gravity may be the result of God endowing atoms with motion which causes them to move. Clarke concludes that the only possibility is that a tendency to move "in some one determined way cannot be essential to any particle of matter, but must arise from some external cause"⁵⁹. Furthermore, Clarke claims that the second alternative produces an absolute contradiction, for it is evident that objects move in an ordered and predictable fashion. For every particle of matter to move in every direction would produce chaos.

Clarke's second objection focuses on Toland's rejection of a vacuum. Clarke begins with an examination of the *vis inertiae* from Newton's *Principia*. Crucial to Newton's understanding of the *vis inertiae* is his attribution of mass as the primary quality of matter. As mentioned above, Descartes argued that extension is the primary quality of matter. Even though they differ on the primary attribute of matter, Descartes was nonetheless able to formulate a precursor to Newton's first law of motion, that objects will continue in their current state as long as possible. In light of Newton's discoveries, the problem with Descartes' theory of motion is twofold. First, Descartes was unable to reduce motion to a calculable level. The second problem is "the fact that two bodies geometrically equivalent may move differently when placed in identical relations with the same other bodies"⁶⁰. Newton, on the other hand posited the crucial definitions required to reduce motion to a quantifiable level. He was especially successful in accounting for the variations in bodies that were geometrically similar by explaining that the variations in motion is the result of

⁵⁷ Janiak, 59.

⁵⁸ Clarke, 19.

⁵⁹ Ibid.

⁶⁰ Burt, 240.

varying mass, or weight. In his third definition Newton explains that the inner force of an object, the *vis inertiae*, “is ever proportional to the body whose force it is; and differs nothing from the inactivity of the mass”⁶¹. It is clear, in the previous passage, that Newton equates the inner force of an object with that object’s mass.

Newton’s notion of *vis inertiae* is precisely what Clarke has in mind when he states that “Tangibility or resistance [...] is essential to matter, otherwise the word matter will have no determinate significance”⁶². Since all matter contains some element of tangibility, and considering that each particle of matter is respectfully composed of the same elements, then it would seem to follow that if the universe is full of matter then the amount of resistance in fluid or air would be equal. Even though a space may appear empty, Clarke claims that anyone proposing that the universe is a plenum must still hold that the apparently ‘empty’ space still contains matter. So, an object moving through outer space must encounter the same amount of resistance from the surrounding space at each point in its journey. Clarke objects that common experience shows that resistance in space is not equal, and that “[...] there being large spaces in which no sensible resistance at all is made to the swiftest and most lasting motion of the most solid of bodies”⁶³. Newton’s law of gravitation, in conjunction with Johannes Kepler’s (1571-1630) laws of planetary motion, revealed that the weight and speed of an object differs depending upon its relation to a center of gravity. Thus, the resistance that an object encounters when traveling through space does change, and therefore space cannot be filled with matter.

To gather additional support for the existence of vacuums, Clarke draws heavily from Newton’s *Principia*, proposition VI, corollary III, book III. In this corollary, Newton made a similar argument to the one given by Clarke. In this proposition, Newton gives the results of pendulum experiments he conducted. Newton filled separate wooden boxes with various materials, including gold, silver, lead, glass, etc. Once the box was filled with a single substance he attached it to the pendulum using an 11-foot thread and released the box from a set height. Using the pendulum, Newton was able to measure that the force that acted upon each box filled with different material was the same. The oscillation of the pendulum was equal despite the different material placed in the box. Newton deduced from this simple experiment that “all spaces are not equally full”⁶⁴. This is, of course, in direct opposition to Descartes, who defined matter as extension, and as a result “each body of a given volume has the same extension and therefore the same *quantitas materiae*”⁶⁵. Newton notes, however, that if the universe were full of matter, then the different weights of the materials used in the pendulum experiment would cause the pendulum to move at different speeds and distances depending upon the weight of the material. The more weight an object has, the more gravity that object exerts. Therefore, it is feasible to hypothesize that a ‘thicker’ medium results in greater resistance. Clarke explains, “For if in the pendulum there were

⁶¹ Newton, *Principia*, 9.

⁶² Clarke, 19.

⁶³ *Ibid.*, 20.

⁶⁴ Newton, *Principia*, 332.

⁶⁵ Janiak, 103.

any matter that did not gravitate proportionally to its quality, the *vis inertiae* of that matter would retard the motion of the rest"⁶⁶.

To better understand Clarke's point, let us suppose that one drops a rock and a ball of paper from an equal height into a pool of water. The rock, upon impact, would penetrate the surface of the water and sink to the bottom. Contrariwise, the ball of paper would hit the water, perhaps penetrate the surface a bit and float to the top. Newton reasons that if the universe were full of matter, then one might observe a similar phenomenon as objects move through space. The heavier an object is, the faster it ought to move through the medium. But Newton's pendulum experiment demonstrates that objects move at the same speed. Thus, the universe is not equally filled with matter, and it is possible for a vacuum to exist. The upshot of the existence of vacuums, according to Clarke, is that it is possible for matter not to be; therefore, matter cannot be a necessary being.

While both Newton and Clarke espouse the existence of vacuums, they nevertheless hold the seemingly contradictory position that it is absurd to believe that any part of absolute time or space can be removed. Clarke elaborates on Newton's proposal and states that neither the primary attributes of absolute time and space, immensity and eternity, can be removed. Absolute space is not distinguishable by our senses; rather, what an individual perceives when he or she examines space, is actually relative space. Relative space is the space "which our senses determine by its position to bodies"⁶⁷. In other words, an individual's perception of space will always be relative, and Newton makes similar remarks regarding the nature of time. Newton proposed that space and time are absolute due to certain mathematical demands regarding motion, but Clarke and others also picked up on theological considerations for such a position.

However, while absolute time and space may not be observable, absolute motion can be inferred by certain properties of relative motion. Newton reasons that if absolute motion can be demonstrated, then its existence alone implies the existence of absolute time and space. Newton gives two arguments to justify his proposition: "for we have some arguments to guide us, partly from the apparent motions, which are the differences of the true motions; partly from the forces, which are the causes and effects of true motions"⁶⁸. The first argument that Newton gives, and perhaps the most obscure for the contemporary reader, is that absolute motion is produced by the application of 'force'. In his first argument Newton states that the "causes by which true and relative motions are distinguished one from the other, are the forces impressed upon bodies to generate motion"⁶⁹. Absolute motion is caused, in this instance, by forces acting upon an object. By adopting such a perspective, Newton must admit that the discussion of ontology can no longer be avoided. Newton explicitly states that force determines absolute motion. While Newton makes no conjecture as to what this force is, he assumes its existence because it is measurable, and thereby the existence of absolute motion as well.

⁶⁶ Clarke, 20.

⁶⁷ Newton, *Principia*, 13.

⁶⁸ *Ibid.*, 18.

⁶⁹ *Ibid.*, 17.

The second argument Newton gives for the existence of absolute motion proceeds not from the cause of motion as the first argument demonstrated, but rather from the effects that force produces, namely centrifugal force. Centrifugal force is demonstrated in Newton's writing by his pail experiment. The experiment can be replicated by attaching a pail filled with water to a long rope and attaching the rope to a supporting structure, so that the pail is suspended. The pail is then twisted tightly. When one releases the pail, it begins to spin rapidly. The surface of the water will, at first, remain calm, but after a few moments the water within the pail will begin to revolve. The water will revolve ever so slightly from the center to the sides of the pail, forming a vortex in the water. This will continue, as Newton observed, even after the pail has stopped spinning. Newton states that the "ascent of the water shows its endeavor to recede from the axis of its motion; and the true and absolute circular motion of the water, which is here directly contrary to the relative, discovers itself, and may be measured by this endeavor"⁷⁰. With this simple experiment Newton believed that he had shown a way to measure absolute motion. Newton assumes that the quantifiability of absolute motion is sufficient justification for assenting to its existence.

Clarke accepted the fact that Newton had succeeded in demonstrating the existence of absolute time and space, and that the notions of infinity and eternity cannot be removed from the universe without evoking a contradiction. Absolute space implies infinite space and likewise absolute time implies eternity. Due to the fact that eternity and infinity are aspects of space and time, Clarke adopts the controversial idea that space and time are attributes or modes of God. Regarding this point, Clarke is careful to separate himself from pantheistic thinkers by saying that "All other substances are *in* space and *penetrated* by it, but the self-existent substance is *not in space nor penetrated* by it, but is itself the *substratum* of space, the ground of the existence of space and duration itself"⁷¹. Since space is infinite in extension and time is eternal in duration, then it becomes necessary for Clarke to make them both attributes of God. Both space and time are not God in and of themselves, but exist because God exists. In other words, if God did not exist, then neither would space and time.

Given what Newton and Clarke posited about the nature of reality, it becomes clear that there are some issues with Hume's objections to the cosmological argument. First, God is considered a necessary being not just due to philosophical reasons, but principally because of Newtonian science. Both space and time are necessary aspects of the Newtonian universe, and as such they cannot be thought of as not existing. Furthermore, Newton sees no problem with arguing up from observations about relative motion to the existence of absolute time and space. Clarke, since his earliest days as a philosopher, believed that space and time represented a fundamental, indeed necessary, aspect of physical reality. Perhaps more controversially, Clarke considered space and time aspects of the divine, and therefore by extension God must be considered necessary. The most important point to consider in relation to Hume's first objection is that under the Newtonian paradigm, there are, in fact, necessarily existing aspects of the physical universe, i.e. absolute space and time. According to Clarke, since both space and time are necessarily existent, then it is reasonable to conclude that God too must be necessarily existent.

⁷⁰ Ibid., 17.

⁷¹ Clarke, 105.

The second point to consider relates to Hume's second, third and fourth objections, all of which center around the claim that either the universe itself carries the cause of its own existence, or that a set of contingent things does not need an explanation. Both of these objections assume an understanding of matter that is Cartesian in nature and not Newtonian. While space and time may be necessary, matter is not. Clarke believed, along with Newton, that matter is fundamentally inert. Clarke affirms the complete passivity of matter and additionally argues for the existence of a void. Newton claimed that matter was inert and that motion was the result of different forces acting upon a body which subsequently cause it to move. In his *Principia*, Newton focused on the mathematical treatment of force which is measurable due to its effects on other objects. What is clear, however, is that a force is not an inherent quality of matter, but rather something which acts upon matter. Since matter is inert, and since it is possible that matter could not exist, as is evident from the existence of voids, then it is not possible that the material universe be a necessarily existing thing. Clarke's reasons for rejecting the necessary existence of the material universe are primarily based on scientific grounds, a point which neither Cleanthes nor Philo address. Furthermore, since matter is contingent, and since force is not an inherent property of matter it does make sense, within a Newtonian framework, to demand a reason for the contingent set of matter we observe in the universe. In a Cartesian universe that is full of matter, force may be transferred continually through all of physical reality, but this is simply not the case for Newton's universe.

When considered within its historical context, Hume's argument leaves much to be desired. Perhaps most importantly, what is missing is any engagement whatsoever with the scientific aspects of Clarke's argument and a reliance upon what can only be assumed to be a Cartesian understanding of the universe. This is, of course, problematic due to the fact that the Newtonian philosophy had completely eclipsed the Cartesian philosophy by the time of Hume's writing. While Hume may have adequately addressed certain philosophical problems associated with Clarke's cosmological argument, the scientific basis of the argument goes largely unchallenged. In fact, no substantial or sustained objection to any of Clarke's Newtonian assumptions is presented by Hume in his *Dialogues*. While this fact certainly does not legitimate the argument in its own right, it does directly challenge the commonly held assumption that Hume somehow dealt the deathblow to the cosmological argument.