The *G* Proof™

Rigorous Mathematical Proof That God Exists

Using First-Order Predicate Logic
And Axioms That No Scientist Can Reasonably Deny

G Theory Version 1

Theory of Phenomena and Causation

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“The superiority of Avicenna’s proof over Aristotles’ lies principally in Avicenna’s use of both composition and causality, by which he appeals to the obvious potency principle [Axiom A4 in The *G* Proof] in place of Aristotle’s appeal to the doubtful/controversial infinite regression principle. Indeed, Avicenna’s methods anticipate by a thousand years the development of the modern logic of relations.”

— William S. Hatcher, 1935–2005 [4 at p. 107]

Contents

Abstract

A formal mathematical Theory of Phenomena and Causation is presented based on First Order Predicate Logic, as expressed in the extraordinarily elegant notation of Donald Kalish (1919-2000) and Richard Montague (1930-1971), revised (and hopefully made even more elegant) by Mark Emerson, who was a student of Kalish.

We take the following three terms as undefined: (a) phenomenon, (b) "is a part of" and (c) "causes." Phenomena are the nouns of our theory, and every variable represents a phenomenon. A phenomenon is understood, without definition, to mean anything that exists or happens. "Is a part of" is a two-place predicate that means a first phenomenon *is a part of* a second phenomenon. "Causes" is a two-place predicate that means a first phenomenon *causes* a second phenomenon.

We make several definitions, the most important of which is *omnipotence* — an omnipotent phenomenon *causes all phenomena*.

Five Axioms, A1-A5, are taken. A1 states that every phenomenon has a cause. A2 states that causation is transitive. A3 states that causation is not circular except for self-causation. A4 says that causation is complete, in that if a first phenomenon causes a second phenomenon, where the latter contains phenomena that are its parts, then the first phenomenon also causes all those parts. A5 states that there exists a phenomenon that includes, as its parts, all phenomena that cause anything. Each axiom is justified in the light of science as it is understood today. Axioms A1-A5 are shown to be consistent, because a simple model comprised of just two phenomena satisfies each Axiom.

We prove that there exists a unique, self-causing, omnipotent phenomenon. This can only be "God" as that word is commonly understood. God is formally defined by a proper description to be this unique phenomenon.

Lastly, crossing the bridge from pure mathematics into science, we theorize scientifically that science as a whole provides a vast, complex interpretation for the three undefined terms, albeit an incomplete and continually evolving interpretation, which satisfies all five Axioms. This means that, according to science, God exists as formally defined.

Rules of Logic

G Theory and the proof that God exists rest on First Order Predicate Logic, where the notation (except for some symbols) and method of proof are taken from Kalish and Montague [5], with some modifications to improve presentation and clarity.

Lower case letters are variables. Capital letters, with certain exceptions such as G and H, are predicates. Also, certain symbols, including the equals sign, are predicates. As explained inVideos 3, 4 and 5 [2], the following symbols are used, and with the following meanings:

$\neg$ means NOT

$\wedge$ means AND

$\vee$ means OR

$\Rightarrow$ means IF...THEN (IMPLIES)

$\Leftrightarrow$ means IF AND ONLY IF

$\forall$ means FOR EVERY

$\exists$ means THERE EXISTS

$\exists!$ means THERE EXISTS EXACTLY ONE

ι means THE

The rules of logic used in this paper are presented and explained in Videos 3, 4 and 5 [2], and are listed without explanation below. (Several rules of sentential logic are omitted here and in the Videos for brevity, because they are not needed in the Version 1 proof, including inference rules for negation and disjunction, and the rule of indirect proof — however, those rules *are* used in the Version 2 Technical Paper).

Inference Rules

R: Repitition (Video 3)

MP: Modus Ponens (Video 3)

Simp: Simplification (Video 3)

Adj: Adjunction (Video 3)

BC: Biconditional to Conditional (Video 3)

CB: Conditional to Biconditional (Video 3)

UI: Universal Instantiation (Video 4)

EG: Existential Generalization (Video 4)

EI: Existential Instantiation (Video 4)

SE: Substitution of Equals (Video 4)

RE: Reflexivity of Equals (Video 5)

MUFS: Medium Uniqueness Formula to Short (Video 5)

SUFM : Short Uniqueness Formula to Medium (Video 5)

Proof Starting and Ending Rules

Claim (Video 3)

DP: Direct Proof (Video 3)

(A)CP: (Assumption for) Conditional Proof (Video 3)

UP: Universal Proof (Video 4)

G Theory

We distinguish two Versions of *G* Theory. This paper presents Version 1, and Version 2 is presented in a separate Technical Paper by this author's son, Jonathan Emerson [1]. This paper here, in its entirety, reflects material presented in *The G Proof, Videos 3-9* by this author [2].

Origin of *G* Theory from Hatcher and Its Divergence from Hatcher

The original concept for *G* Theory is due to the astonishing, ingenious, groundbreaking work of the great mathematician William S. Hatcher (1935-2005) [3 and 4], including two of the three undefined terms, the concept for the third undefined term, a portion of the axiomatization, and the essential idea of the Version 1 proof that God exists.

However, several modifications have been made to Hatcher's axiomatization so as to greatly improve the clarity and simplicity of the theory. For example, with enormous respect to Hatcher, his rather confusing distinctions of "element," "composite," "entity" and "part" are eliminated in favor of the single, undefined term "part." Also, we have omitted one of Hatcher's axioms (called "p.3" by him), which he used to prove that God is "indivisible."

In Version 2, the axiomatization is substantially different from Hatcher's, and it is expressly shown that all absolute phenomena *other* than God are *parts* of God, contrary to Hatcher's "indivisibility" of God. In Version 1, we do not prove "indivisibility," because doing so would be inconsistent with this result in Version 2.

The variable *h* and the constant *H* used here, in the Videos and in the Version 2 Technical Paper, are in honor of Hatcher.

Undefined Terms (*i.e.* Language)

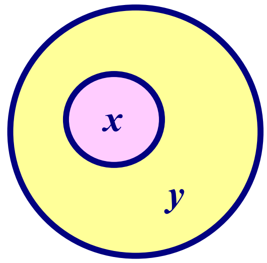
We take the following three terms as undefined: (a) phenomenon, (b) "is a part of" and (c) "causes."

<u>First Undefined Term: Phenomenon</u>

Phenomena are the nouns of our theory, and every variable represents a phenomenon. A phenomenon is understood, without definition, to mean anything that exists or happens. A variety of example phenomena are discussed at some length in Video 6 [2].

Second Undefined Term: "Is a part of"

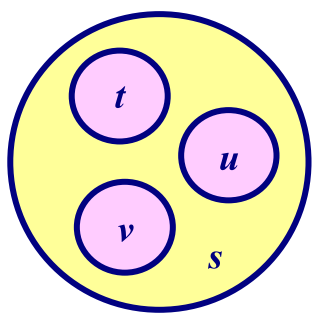
"Is a part of" is a two-place predicate, symbolized by the special symbol $\sqsubset$. The sentence $x \sqsubset y$ means "phenomenon *x* is a part of phenomenon *y*," which can be abstractly represented in the following diagram:



A variety of examples of the "is a part of" predicate are discussed in Video 6 [2]. The "is a part of" predicate means "part" in the strong sense of a necessary part, without which the surrounding whole would not be complete and therefore would not exist.

- (the number 5) $\sqsubset$ (the odd integers)
- (an engine) $\sqsubset$ (a drivable car)

Remove 5 from the odd integers, and what remains is *not* the odd integers. Remove the engine from a drivable car, and what remains is *not* a drivable car. More abstractly:



As the diagram clearly shows:

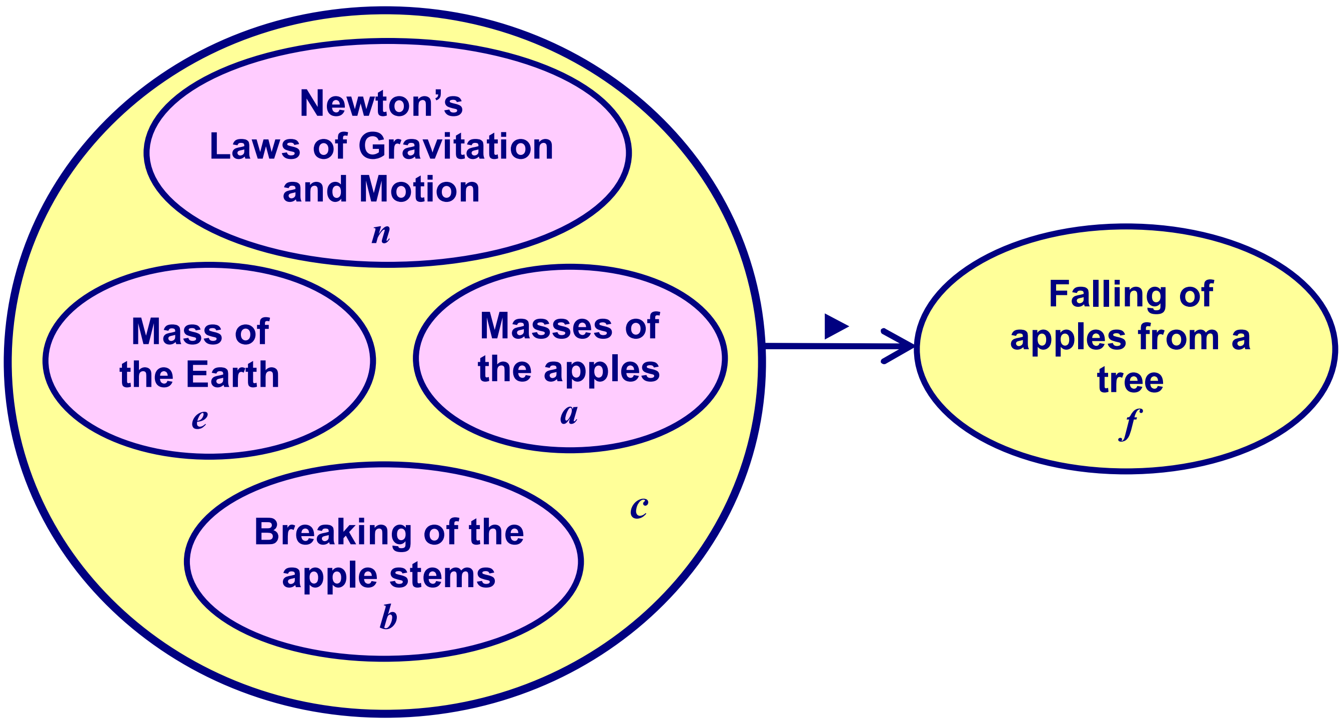
- $t \sqsubset s$
- $u \sqsubset s$
- $v \sqsubset s$

This means, that without one or more of *t*, *u* or *v*, *s* would not be *s*. In other words, a phenomenon does not exist unless all its parts also exist. We call this the No Donut Hole Principle, because removing any of *t*, *u* or *v* leaves a "donut hole" in *s*.

Third Undefined Term: "Causes"

"Causes" is another two-place predicate, symbolized by another special symbol ‣ . The sentence *x* ‣ *y* means "phenomenon *x* causes phenomenon *y*," which can be abstractly represented in the following diagram:

A variety of examples of the "causes" predicate are discussed in Video 6 [2]. The "causes" predicate means sufficient cause. For example, gravity alone is not sufficient to "cause" apples to fall from a tree. Here is a phenomenon, *c*, that might be sufficient:



Causation answers the question "Why?" When we ask why something exists, we want to know what caused it. Why did she get pregnant? Because she had sex with her boyfriend. Having sex caused her to get pregnant. Suppose *a* ‣ *b*, and we ask, "Why *b*?" The answer is: "Because of *a*."

We often answer "Why" questions by starting with the word "Because," which reverses the "cause" predicate. "Be-cause..." "It be the cause that..."

- Having sex caused her to get pregnant.

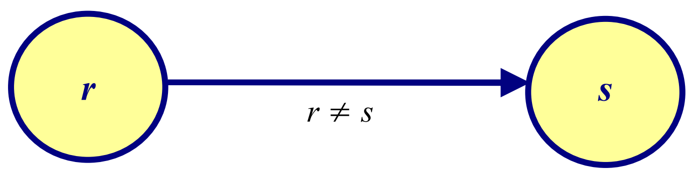
- She got pregnant because she had sex.

Traditionally, causation is based on *time*. The cause happens before the effect. The fact that the student learned the material for the class caused her to get an "A" in the class. Her learning was before her "A."

But what causes time? Why does time exist? This question makes no sense if causation is required to be based on time. We are taking a broader view of causation, beyond time. Our causation is entirely abstract, but it includes traditional time-based causation.

Relative vs. Absolute Phenomena

A phenomenon is either relative or absolute. A relative phenomenon is caused by a different phenomenon. Thus, s is a relative phenomenon if and only if $r \blacktriangleright s$ and $r \neq s$. We say that because s's existence is *relative to* the existence of r, which causes it to exist.



As explained above, our causation is sufficient causation, which means all of the following:

- s exists by virtue of r existing.
- r must exist before s exists, either:
  - in time, or
  - in logic (or both).
- r contains everything needed to create s.
- r creates s, either
  - directly, or
  - indirectly by creating an intermediary that creates s.

If a phenomenon is *not* a relative phenomenon, then it is an absolute phenomenon, which is *not* caused by a different phenomenon. If x is an absolute phenomenon, then there are two possibilities, x either causes itself, *i.e.* $x \blacktriangleright x$, or *nothing* causes x, *i.e.* $\neg\exists\, t\, (t \blacktriangleright x)$.

Several possible absolute phenomena are discussed in Video 6 [2]. One is the concept of identity, $a = a$. Another is logical tautologies, such as $Q \Rightarrow Q$. Another is energy, with its mass equivalent (via $E = mc^2$). Yet another is the notion of "absolute truth," which appears to exist because, if it does not exist, then the *absence* of any "absolute truth" is an absolute truth.

It might be impossible to know whether an absolute phenomenon is self-caused or causeless, but in this author's opinion, it probably doesn't matter. In this Version 1, we assume that all absolute phenomena are self-caused, and our Axiom A1, presented below, eliminates the possibility of causeless phenomena. In our Version 2 Technical Paper, this assumption is dropped, Axiom A1 is dropped, and absolute phenomena are permitted to be either self-caused or causeless.

Our result in Version 1 is that God is an absolute phenomenon that is, by the said assumption, self-caused. It is easily proven from our result in Version 1, that God is the *only* absolute phenomenon. In contrast, in Version 2, multiple distinct absolute phenomena can exist (such as tautologies), but are proven to all be *parts* of God [1].

First Three Definitions

Definition D1

We define the one-place predicate, S, to mean "is self-caused" as follows:

$$\forall r\ (Sr \Leftrightarrow (r \blacktriangleright r))$$

Thus, Sr means r is self-caused.

Definition D2

We define the one-place predicate, C, to mean "causes something" as follows:

$$\forall r\ (Cr \Leftrightarrow \exists s\ (r \blacktriangleright s))$$

Thus, Cr means r causes something.

Definition D3

We define the one-place predicate, O, to mean "is omnipotent" which we hold as having the same meaning as "causes everything," as follows:

$$\forall q\ (Oq \Leftrightarrow \forall t\ (q \blacktriangleright t))$$

Thus, Oq means q is omnipotent — q causes everything.

Axioms and Their Justifications

We take five Axioms, labeled A1 through A5.

Axiom A1 (Sufficient Reason Axiom)

$\forall r \, \exists v \, (v \blacktriangleright r)$

This Axiom says that every phenomenon has a cause. In other words, every phenomenon has a sufficient reason to exist. This means the question "Why?" is always meaningful.

Axiom A1 is justified because one of the fundamental quests of science is to answer the question "Why?" Even if we never find the answer, Axiom A1 says the answer does exist. Indeed, scientific scrutiny is based on asking "Why?" Why do apples fall from trees? Why do planets sometimes go retrograde? To deny Axiom A1 is to affirm the existence of some phenomenon (call it *h*) that has NO cause. *This puts h beyond the reach of scientific scrutiny*! It declares that there are some questions that science will never answer. This defies the history of science.

For example, what causes a particular atom that is an unstable isotope to radioactively decay at a particular time? This question has not been answered by science. But that does *not* mean it will *never* be answered! Einstein famously stated "God doesn't play dice with the world." The entire history of science demonstrates ever increasing progress looking deeper and deeper into causation, and answering chains of "Why?" questions.

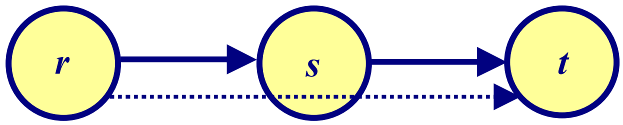
Looking back in scientific history, in the 1700s, much was learned about chemical reactions, but most people thought matter was continuous — *i.e.* without atoms. In the 1800s, the existence of atoms and molecules was confirmed, but their tiny size could not be accurately measured. In the early 1900s, Avogadro's number was accurately measured, subatomic particles were discovered, and atomic power was realized. By the late 1900s, we could actually see individual atoms with super-microscopes. Today, nano-technology is used to manufacture substances by building them up from individual atoms — like building a house from individual bricks. How can anyone be so certain that we will *never* know what causes a particular atom (of an unstable isotope) to decay at a particular time? Perhaps a century from now scientists will have a much deeper understanding of radioactive decay, including what triggers a particular atom to decay at a particular time. Perhaps this would make it possible to accurately predict that time.

A1 is a simplification of Hatcher's axiom p.1 [3 at p. 73; 4 at 99], which attempts to deal with the difficult question of whether absolute phenomena are self-caused or uncaused. A1 makes the express assumption that absolute phenomena are *self*-caused. Version 2 drops that assumption and does *not* include A1 in its axiomatization [1].

Axiom A2 (Transitivity Axiom)

$\forall r \forall s \forall t\ ([(r \blacktriangleright s) \wedge (s \blacktriangleright t)] \Rightarrow (r \blacktriangleright t))$

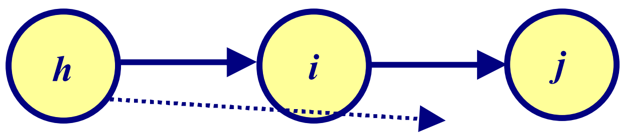
This says causation can happen in a chain. For any three phenomena, *r*, *s* and *t*, IF *r* causes *s* AND *s* causes *t*, THEN *r* causes *t*.



This means *r* causes *t* by way of causing *s*. A classic (albeit loose) example of this is a domino chain. The fall of the first domino causes the fall of the last domino.

Axiom A2 also means "Why?" questions can chain backwards to reach a deeper reason. Why *t*? Because *s*. But really... Why *t*? Ah yes, because *r*, which causes *s*.

Axiom A2 is justified because otherwise there would exist three phenomena (call them *h*, *i* and *j*), where *h* causes *i*, and *i* causes *j*, but *h* does NOT cause *j*.



However, *h* is sufficient cause for *i*, including all that *i* does, such as causing *j*. *h* is therefore sufficient cause for *j*.

To deny Axiom A2 is to deny the general existence of causal chains. For dominos in a sequence where each causes the fall of the next, somehow the fall of the first domino does NOT cause the fall of the last domino. This is absurd.

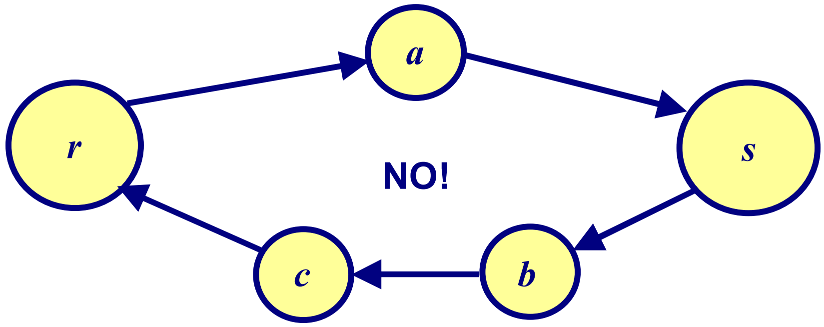
Axiom A3 (Non-Circularity Axiom)

$\forall r \forall s\ ([(r \blacktriangleright s) \wedge (s \blacktriangleright r)] \Rightarrow (r = s))$

This Axiom prohibits two-way causation loops.

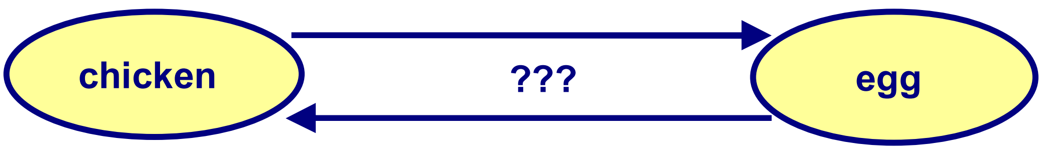
A3 says that IF *r* causes *s*, AND *s* causes *r*, THEN *r* and *s* cannot be different phenomena, rather *r* and *s* must be one and the same, *i.e.* $r = s$. Thus A3 prohibits circular causation except in the case of self-causation.

When combined with the Transitivity Axiom, A2, it is easy to prove that longer loops are also prohibited:

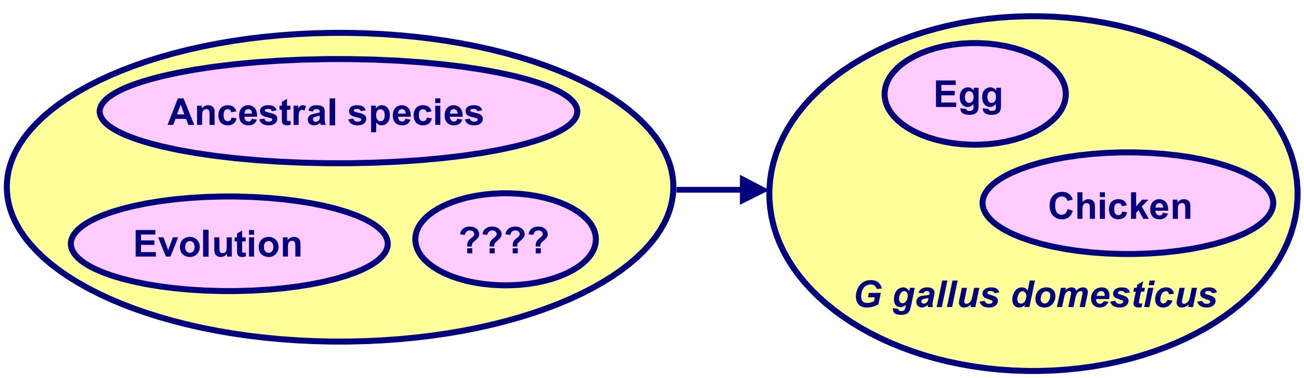


Axiom A3 is justified because, to deny it, is to affirm the validity of circular reasoning in answer to the "Why?" question. Why *r*? Because *s*. Why *s*? Because *r*. This is a logical fallacy. Circular reasoning creates an infinite loop that never lands on any firm answer. It fails to answer the question! It fails to tell us the cause of *r*, or of *s*. It undermines the entire notion of causation, rendering it meaningless.

But what about the chicken and the egg? Does the chicken cause the egg and the egg cause the chicken, thereby violating Axiom A3?



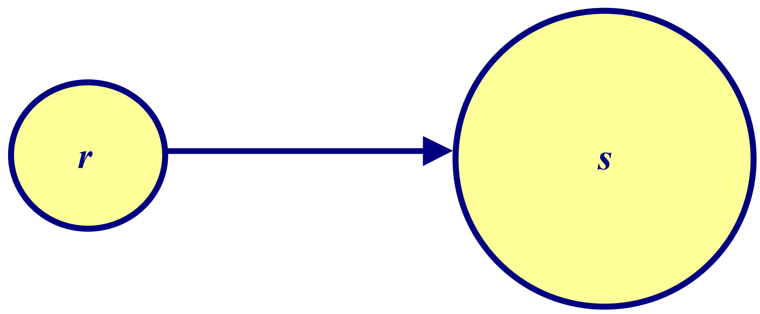
We must distinguish between (a) real, physical chickens and eggs, and (b) the abstract concept of the chicken and egg. As for physical chickens and eggs, egg 1 causes (by hatching) chicken 1, and chicken 1 causes (by laying) egg 2, which in turn causes (by hatching) chicken 2. There is no circularity. As for the abstract concept, the abstraction of the egg does <u>not</u> "hatch" into the abstraction of the chicken! Nor does the abstraction of the chicken "lay" any egg. Rather, the abstraction is of a <u>single subspecies</u>, *Gallus gallus domesticus*, with two phases — egg and chicken, possibly caused as follows:



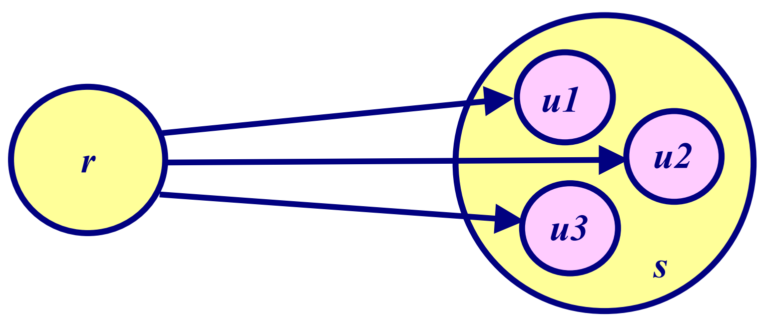
Axiom A4 (Complete Causation Axiom)

$$\forall r \forall s\ ((r \blacktriangleright s) \Rightarrow \forall u\ [(u \sqsubset s) \Rightarrow (r \blacktriangleright u)])$$

This says that anything that causes something must completely cause that thing, including causing all its parts. Thus, IF phenomenon *r* causes phenomenon *s*:



THEN *r* also causes every phenomenon that is a part of *s*, including *u1*, *u2* and *u3*:

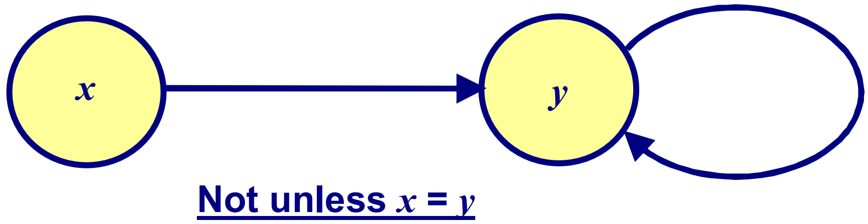


Axiom A4 is justified by the No Donut Holes Principle discussed above, which states that a phenomenon does not exist unless all its parts also exist. Thus, if *r* causes *s* without also causing all its parts, *u1*, *u2* and *u3*, then *r* is causing *s* with "donut holes" in it, which, in fact, means it is not causing *s*. This would be like building a car without installing an engine, and then driving the car away. Did the engine appear by magic? Or other supernatural means?

Axiom A4 is based on, and is functionally identical to, Hatcher's axiom p.2 [3 at p. 73; 4 at p. 99], but A4 is more simply stated because Hatcher's (perhaps superfluous) distinctions between "element," "composite," "entity" and "part" are respectfully omitted.

However, a seemingly legitimate objection can be raised to Axiom A4, and also to Hatcher's axiom p.2, that, if any of *u1*, *u2* or *u3* is an absolute phenomenon, then that *u* will exist without *r* causing it, and hence there will be *no* donut hole.

To address this potential objection, we momentarily digress to state another principle. A self-caused phenomenon cannot also be caused by a different phenomenon. We call this the Self-Causation Exclusion Principle.

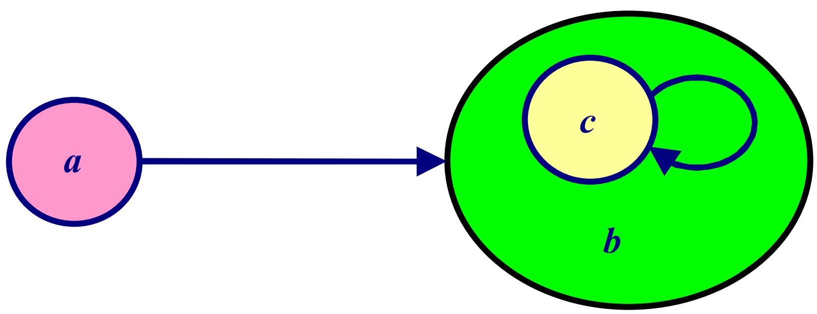


Stated formally:

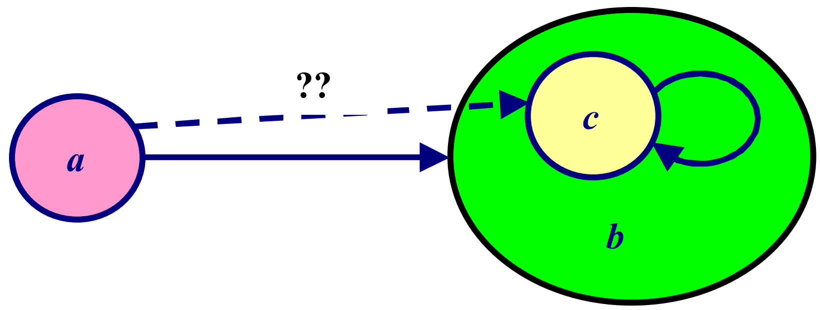
$$\forall y\, \forall x\, ([Sy \wedge (x \blacktriangleright y)] \Rightarrow (x = y))$$

This makes sense, because if a phenomenon *y* is self-caused, *Sy*, there is no conceivable reason for some other phenomenon *x* to also cause it! In other words, *a phenomenon cannot be both relative and absolute*. And, as indicated above, in Version 1 we are taking all absolute phenomena as self-caused (rather than uncaused).

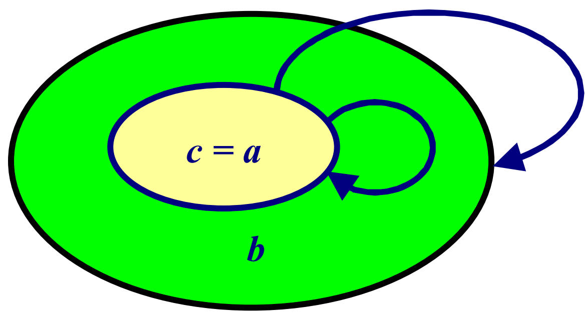
Now, suppose a self-caused phenomenon, *c*, is a part of another phenomenon, *b*, and that phenomenon *a* causes *b*:



Axiom A4 says that if *a* causes *b*, then *a* causes every part of *b*, including *c*, which appears to be objectionable because *c* exists on its own and hence cannot create a "donut hole" in *b* if not caused by *a*. In order for *a* to cause *b*, why does *a* also need to cause *c*, if *c* already exists on its own?



This objection is resolved in Version 1 (and in Hatcher) by the Self-Causation Exclusion Principle, which says that, in this instance, $c = a$. This means that a is actually <u>inside</u> of b, and a does indeed cause c, because it causes itself!



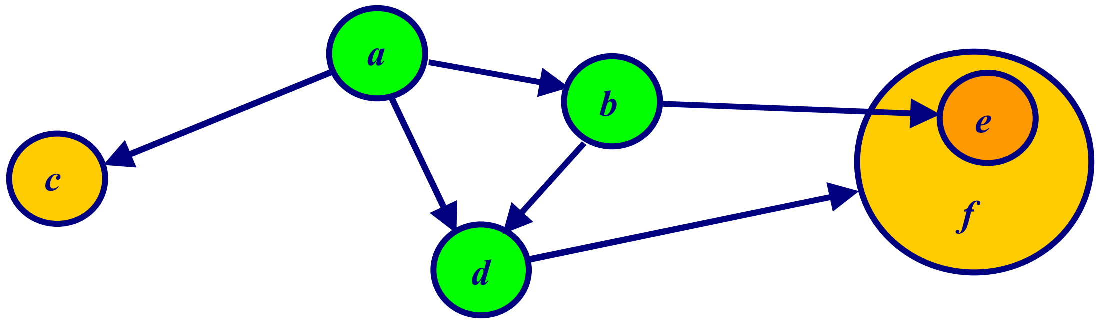
In Version 2, the objection is resolved by weakening Axiom A4.

<u>Axiom A5 (Causal Extension Axiom)</u>

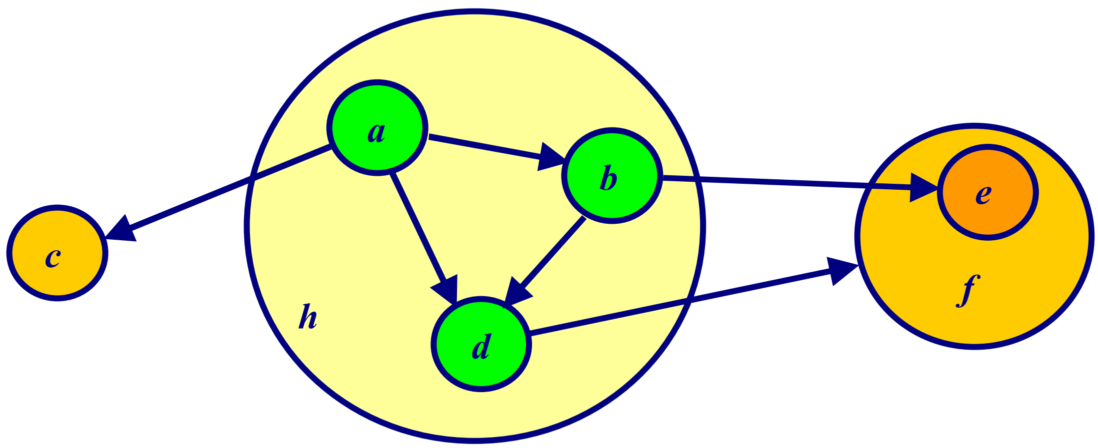
$$\exists r \forall z\, (Cz \Rightarrow (z \sqsubset r))$$

We can divide all phenomena into two classes: Class A phenomena, which cause something (*i.e.* Cz is true), and Class B phenomena, which do not cause anything (*i.e.* Cz is false). Axiom A5 says that THERE EXISTS a phenomenon, r, such that FOR ANY phenomenon, z, IF Cz, THEN z is part of r. In other words, THERE EXISTS a phenomenon, whose parts include all the phenomena in Class A.

To illustrate this, suppose we have six phenomena — a, b, c, d, e and f — whose causal relationships are shown in the following diagram:



The Class A phenomena are: *a*, *b* and *d*, which are shown in green. The Class B phenomena are: *c*, *e* and *f*, which are shown in orange. Now, Axiom A5 says another phenomenon exists in addition to *a*, *b*, *c*, *d*, *e* and *f*, which we will call *h* (in honor of Hatcher) — and its parts are the Class A phenomena: *a*, *b* and *d*:



A5 is our only Axiom that declares any phenomenon to actually exist. Since *h* contains as its parts all the phenomena that cause anything, Axiom A5 says, *in a limited way*, that causation exists. *h* represents, *in a limited sense*, causation as itself a phenomenon.

Axiom A5 is justified as follows. On a very large scale, the universe can reasonably be conceived of as a phenomenon, whose parts are all other phenomena. Narrowing this down, it is easy to conceive of a star, like the Sun, as a phenomenon. It is likewise easy to conceive of another astronomical phenomenon whose parts are all the stars in the universe — call it "All Stars" (referring neither to breakfast cereal nor to baseball) — which excludes planets, cosmic dust, etc.

In this same way, it is easy to conceive of a phenomenon — call it *h* — whose parts include, at a minimum, all the Class A phenomena. There is no reasonable basis to deny the existence of *h*, which is precisely what Axiom A5 says exists. To deny Axiom A5 is similar to denying that the "All Stars" phenomenon exists, which is to deny the foundation of astronomy.

A5 is a modification of Hatcher's axiom p.0 [4 at pp. 88 and 99; 3 at pp. 30-33, 85], which assumes the existence of *V*, representing the entire universe including all phenomena, and he applies axiom p.1 to *V*. Our A5 eliminates the need to consider the universe as a whole, thereby avoiding the potential objection that the universe as a whole does not need to be caused.

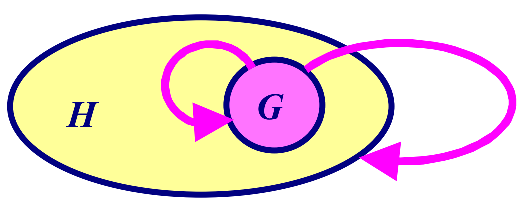
Consistency of Axioms A1—A5

If it is possible to use a set of given statements to prove a contradiction, then those givens, as a set, are *inconsistent*.

First Order Predicate Logic is *sound*, which means that, in any proof that relies on givens (*i.e.* the proof of any statement other than a tautology), any interpretation of the undefined terms (sometimes called a model) that makes the givens all true will also make the proven statement true.

The axioms of a mathematical theory serve as givens to all proofs within that theory. Because of soundness, if any model of the undefined terms of such a theory makes all the axioms true, it will be impossible for the givens to prove a contradiction. Thus, the existence of any such model, however simple, establishes that the axioms are consistent. This method of establishing consistency is explained in much greater detail in Video 7 [2].

Here is just such a model of our three undefined terms, which is succinctly represented in the diagram and is set forth in detail below:



Phenomena (just 2):

G

H (in honor of Hatcher)

Every possible truth value for "part of":

G ⊏ H	true
G ⊏ G	false
H ⊏ G	false
H ⊏ H	false

Every possible truth value for "causes":

G ▸ H	true
G ▸ G	true
H ▸ G	false
H ▸ H	false

Axiom A1 is true in this model.

$$\forall r\, \exists v\, (v \blacktriangleright r)$$

The cause of *G* is *G*.

$$G \blacktriangleright G$$

The cause of *H* is *G*.

$$G \blacktriangleright H$$

Axiom A2 is true in this model.

$$\forall r \forall s \forall t\, ([(r \blacktriangleright s) \wedge (s \blacktriangleright t)] \Rightarrow (r \blacktriangleright t))$$

The only phenomenon that causes anything is *G*, hence only *G* can be in the position of *r* or *s*. Thus, there are only two ways to make the left side of the conditional true, and in each the right side of the conditional also comes out true:

$$[(G \blacktriangleright G) \wedge (G \blacktriangleright H)] \Rightarrow (G \blacktriangleright H)$$

$$[(G \blacktriangleright G) \wedge (G \blacktriangleright G)] \Rightarrow (G \blacktriangleright G)$$

Axiom A3 is true in this model.

$$\forall r \forall s\, ([(r \blacktriangleright s) \wedge (s \blacktriangleright r)] \Rightarrow (r = s))$$

Again, the only phenomenon that causes anything is *G*, hence only *G* can be in the position of *r* or *s*. Thus, there is only one way to make the left side of the conditional true, and in that case the conditional also comes out true:

$$[(G \blacktriangleright G) \wedge (G \blacktriangleright G)] \Rightarrow (G = G)$$

Axiom A4 is true in this model.

$\forall r \forall s\, ((r \blacktriangleright s) \Rightarrow \forall u\, ((u \sqsubset s) \Rightarrow (r \blacktriangleright u)))$

Yet again, the only phenomenon that causes anything is *G*, hence only *G* can be in the position of *r*. Thus, there are only two ways to make the left side of the outer conditional true, and in each the right side of the outer conditional also comes out true:

When the left side is $G \blacktriangleright H$, the right side says that *G* also causes all the parts of *H*. But *H* has only one part, which is *G*, and $G \blacktriangleright G$, hence the right side of the outer conditional is true.

When the left side is $G \blacktriangleright G$, the right side says that *G* also causes all the parts of *G*. But *G* has no parts, making the left side of the inner conditional always false, and hence the right side of the outer conditional is true.

Axiom A5 is true in this model.

$\exists r \forall z\, (Cz \Rightarrow (z \sqsubset r))$

This says there exists a phenomenon, whose parts are all phenomena that cause anything. That is *H*.

The only thing in our model that causes anything is *G*, and $G \sqsubset H$.

Therefore, since our little model satisfies our five Axioms, A1-A5, our Axioms are consistent.

Proof That God Exists.

We now prove that a unique, self-causing, omnipotent phenomenon exists:

$\exists! g\, (Sg \wedge Og)$

The phenomenon that we prove to exist can only be what is commonly known as "God."

The proof here is identical to the proof presented in Video 8 [2], which is split there into a series of three theorems so that each proof will fit on the screen. (Although there is more room on these pages than in the Videos, and the end result could be proven in fewer lines without splitting it up, we do so anyway to make it identical with Video 8).

We proceed in a sequence of three theorems:

Theorem T1 — An Omnipotent Phenomenon Exists.

$\exists x\,(Ox)$

Theorem T2 — A Self-Causing, Omnipotent Phenomenon Exists.

$\exists y\,(Sy \wedge Oy)$

Theorem T3 — The *G* Theorem — A Unique, Self-Causing, Omnipotent Phenomenon Exists.

$\exists! g\,(Sg \wedge Og)$

The proofs of T1, T2 and T3 appear, respectively, on the next three pages.

Theorem T1. $\exists x(Ox)$

Ln	Statement	From	By
1	~~*Prove*~~ $\exists x(Ox)$	—	Claim
2	$\exists r \forall z(Cz \Longrightarrow (z \sqsubset r))$	A5	R
3	$\forall z(Cz \Longrightarrow (z \sqsubset h))$	2	EI
4	$\exists v(v \blacktriangleright h)$	A1	UI
5	$a \blacktriangleright h$	4	EI
6	$\forall t(a \blacktriangleright t) \Longrightarrow Oa$	D3	UI, BC
7	~~*Prove*~~ $\forall t(a \blacktriangleright t)$	—	Claim
8	$\exists v(v \blacktriangleright t)$	A1	UI
9	$b \blacktriangleright t$	8	EI
10	$\exists s(b \blacktriangleright s)$	9	EG
11	$\exists s(b \blacktriangleright s) \Longrightarrow Cb$	D2	UI, BC
12	Cb	10, 11	MP
13	$Cb \Longrightarrow (b \sqsubset h)$	3	UI
14	$b \sqsubset h$	12, 13	MP
15	$(a \blacktriangleright h) \Longrightarrow \forall u[(u \sqsubset h) \Longrightarrow (a \blacktriangleright u)]$	A4	UI, UI
16	$\forall u[(u \sqsubset h) \Longrightarrow (a \blacktriangleright u)]$	5, 15	MP
17	$(b \sqsubset h) \Longrightarrow (a \blacktriangleright b)$	16	UI
18	$a \blacktriangleright b$	14, 17	MP
19	$[(a \blacktriangleright b) \wedge (b \blacktriangleright t)] \Longrightarrow (a \blacktriangleright t)$	A2	UI,UI,UI
20	$(a \blacktriangleright b) \wedge (b \blacktriangleright t)$	9, 18	Adj
21	$a \blacktriangleright t$	19, 20	MP
22	*done*	21	UP
23	Oa	6, 7	MP
24	$\exists x(Ox)$	23	EG
25	*done*	24	DP

Theorem T2. $\exists y(Sy \wedge Oy)$

Ln	Statement	From	By
1	~~*Prove*~~ $\exists y(Sy \wedge Oy)$	—	Claim
2	$\exists x(Ox)$	T1	R
3	Oc	2	EI
4	$Oc \Longrightarrow \forall t(c \blacktriangleright t)$	D3	UI, BC
5	$\forall t(c \blacktriangleright t)$	3, 4	MP
6	$c \blacktriangleright c$	5	UI
7	$c \blacktriangleright c \Longrightarrow Sc$	D1	UI, BC
8	Sc	6, 7	MP
9	$Sc \wedge Oc$	3, 8	Adj
10	$\exists y(Sy \wedge Oy)$	9	EG
11	*done*	10	DP

Theorem T3. $\exists! g(Sg \wedge Og)$

Ln	Statement	From	By
1	~~Prove~~ $\exists! g(Sg \wedge Og)$	—	Claim
2	$\exists y(Sy \wedge Oy)$	T2	R
3	$Sd \wedge Od$	2	EI
4	Od	3	Simp
5	$Od \Longrightarrow \forall t(d \blacktriangleright t)$	D3	UI, BC
6	$\forall t(d \blacktriangleright t)$	4, 5	MP
7	~~Prove~~ $\forall e([Se \wedge Oe] \Longleftrightarrow (e = d))$	—	Claim
8	~~Prove~~ $[Se \wedge Oe] \Longrightarrow (e = d)$	—	Claim
9	$Se \wedge Oe$	—	ACP
10	Oe	9	Simp
11	$Oe \Longrightarrow \forall t(e \blacktriangleright t)$	D3	UI, BC
12	$\forall t(e \blacktriangleright t)$	10, 11	MP
13	$e \blacktriangleright d$	12	UI
14	$d \blacktriangleright e$	6	UI
15	$(e \blacktriangleright d) \wedge (d \blacktriangleright e)$	13, 14	Adj
16	$[(e \blacktriangleright d) \wedge (d \blacktriangleright e)] \Longrightarrow (e = d)$	A3	UI, UI
17	$e = d$	15, 16	MP
18	*done*	17	CP
19	~~Prove~~ $(e = d) \Longrightarrow [Se \wedge Oe]$	—	Claim
20	$e = d$	—	ACP
21	$Se \wedge Oe$	3, 20	SE
22	*done*	21	CP
23	$[Se \wedge Oe] \Longleftrightarrow (e = d)$	8, 19	CB
24	*done*	23	UP
25	$\exists f \forall e([Se \wedge Oe] \Longleftrightarrow (e = f))$	7	EG
26	$\exists! g(Sg \wedge Og)$	25	MUFS
27	*done*	26	DP

Formally Defining God

We have proven Theorem T3 — that a Unique, Self-Causing, Omnipotent Phenomenon Exists:

$$\exists! g\ (Sg \wedge Og)$$

This means we can formally define "God" by means of a *proper* definite description:

<u>Definition D4 — God</u>

$$\text{God} = \iota g\ (Sg \wedge Og)$$

God Exists Under the Interpretation Given by Science

An interpretation of our undefined terms must answer these three questions:

- What are the phenomena?
- Which phenomenon is a part of which?
- Which phenomenon causes which?

Crossing the bridge from pure mathematics into science, we now *scientifically* theorize that <u>the whole of science</u> answers these three questions, thereby providing a vast, exceedingly complex interpretation for our three undefined terms. However, the interpretation is incomplete and continually evolving, because science is incomplete and continually evolving:

- Phenomena are all observations admitted by science.
- Credible scientific theories that withstand the test of validation by such observations, together with the universal constants referenced by such theories (e.g. the speed of light, the proton mass, etc.), explain both (a) how phenomena are structured, *i.e.* which phenomenon is part of which, and (b) what the laws of causation are, *i.e.* which phenomenon causes which.

To this author's knowledge, the Axioms of both Version 1 and of Version 2 [1] are all satisfied under the interpretation currently provided by science. We theorize (a) that this is so, and (b) our axioms will likewise be satisfied by future scientific observations, validated scientific theories and physical constants. Therefore, based on soundness, the *G* Theorem (T3 in Version 1 and T8 in Version 2) is true under the interpretation provided by science. Hence, **<u>according to science, God exists as formally defined.</u>**

This Scientific *G* Theory is falsifiable by a wide variety of conceivable, practical means. All one must do to falsify the theory is to observe any new facts, and/or create any credible new scientific theory, where any of the Axioms comes out false. For example, a way might be discovered to set up three dominoes so the first knocks down the second, and the second knocks down the third, but the first does not cause the third to fall, thereby violating Axiom A2.

By letting all of science provide the interpretation for our Axioms, *G* Theory provides a new cosmology for understanding science. *G* Theory shows that, based on existing science, a unique, absolute, omnipotent phenomenon does exist, which underlies all of science and is the cause of all relative phenomena.

Conclusion

We have used First Order Predicate Logic, three undefined terms about phenomena and causation, and five Axioms that are simple, sensible, reasonable and reflect observable reality. We have shown the Axioms are consistent. And we have proven that there exists a unique, self-causing, omnipotent phenomenon, that can only be what is commonly known as "God." We have formally defined "God" to be that unique phenomenon. Lastly, we have scientifically theorized that, according to the interpretation given by science, God exists as formally defined.

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