

On the Number of Gods

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ABSTRACT: A god is a cosmic designer-creator. Atheism says the number of gods is 0. But it is hard to defeat the minimal thesis that some possible universe is actualized by some possible god. Monotheists say the number of gods is 1. Yet no degree of perfection can be coherently assigned to any unique god. Lewis says the number of gods is at least the second beth number. Yet polytheists cannot defend an arbitrary plural number of gods. An alternative is that, for every ordinal, there is a god whose perfection is proportional to it. The n -th god actualizes the best universe(s) in the n -th level of an axiological hierarchy of possible universes. Despite its unorthodoxy, ordinal polytheism has many metaphysically attractive features and merits more serious study.

1. Gods

Although no definition of the common noun *god* is likely to satisfy everyone, it is plausible to start with the idea that a god is a cosmic designer-creator. One conventional way to refine this initial idea leads to the notion that godliness involves actualizing the best universe (or universes) in some set of possible universes. This is the definition of *god* used here: x is a god iff x actualizes the best universe(s) in some set of possible universes. The Platonic Demiurge and the God of Abraham both satisfy this definition. However, since Zeus is not depicted as a cosmic designer-creator, Zeus is not a god.

On this definition, gods need not be supernatural. Some say our universe was designed and created by an alien civilization that providentially guided the collapse of a black hole for the sake of life (Harrison, 1995; Gardner, 2003). If that is right, that alien civilization is a god. The simulation argument gives a probability that our universe was designed and created by some collective of software engineers (Bostrom, 2003). If there is such a collective, it is a god. Tipler (1995) says the Omega Point is an infinite computer able to generate universes. If there is such an Omega Point, then it is a god. Gods may be rather small and mundane. Humans have programmed computers to use evolutionary algorithms to search through classes of cellular automata to find those that satisfy some criteria of utility (Crutchfield & Mitchell, 1995; Lohn & Reggia, 1997). If cellular automata can be regarded as universes, then those computers can be regarded as cosmic designer-creators.

2. Atheism

Atheists say that the number of gods is 0. On the present definition of godliness, atheists must defeat an enormous army of possible gods. Suppose you agree that atheists have

defeated the God of Abraham (Martin, 1993; Stenger, 2007; Dawkins, 2008). And that they have defeated the God of the Philosophers (Martin & Monnier, 2003). Of course, on the present definition of godliness, many alternative gods remain. Atheists must go on to defeat all the designer-creators considered by Hume's Philo (1779); all universe-evolving computers; all civilizations that guide the collapse of black holes. Probably they don't have to defeat Tarvu or the Flying Spaghetti Monster. But here it is interesting to note that some anti-religious atheists are open to the idea that our universe has a naturalistic designer-creator (Dawkins, 2008: 98-99, 184-189; Harris, 2008: 73).

On the present definition of godliness, atheists must defeat every possible version of the design argument. Suppose you agree that atheists have defeated all the versions of the design argument that require divine involvement in the history of life on earth. You agree that they have obliterated Aquinas's Fifth Way and Paley's Watchmaker Argument. You agree that modern science demonstrates that evolution by entirely natural selection produced all earthly life. Of course, more sophisticated versions of the design argument remain. These include fine-tuning arguments and arguments from the existence of cosmic structure (e.g. the existence of natural laws). Although these arguments are not without their problems, they are not as easy to dismiss. And it is almost certainly impossible to prove that every inference from empirical data to a designer is invalid.

On the present definition of godliness, atheists must defeat every possible version of the cosmological argument. Suppose you agree that atheists have defeated the highly concrete versions of the cosmological argument. You agree that they have demolished Aquinas's First and Second Ways and the Kalam Argument. As expected, more sophisticated versions of the cosmological argument remain. These include versions of Aquinas's Third Way and the Leibnizian Sufficient Reason Argument (1697: 84-85). Despite their faults, these arguments are harder to discredit. And it is almost certainly impossible to show that there is no way to reason from natural sequentiality to divine originality.

Although atheists have made extremely strong cases against the designer-creators of pre-scientific religions, it is fair to say that they have not defeated every possible designer-creator. They have not defeated all versions of the design or the cosmological argument. And to really show that the number of gods is 0, they would have to rule out *Lewisian polytheism*. It is arguable that gods are such that, if they are possible, then they are actual. Lewis says that even though our universe has no god, others do (1983: xi). Maybe resolute atheism is right: the number of gods is 0. However, until this resolute atheism makes its case against every possible god, the alternatives are worth studying.

3. Possible Universes

Since the concept of godliness involves possible universes, the study of possible gods requires the study of possible universes. It can be agreed that possible universes are abstract objects of some sort (they are ersatz universes – perhaps they are abstract states of affairs, perhaps they are cosmic propositions in some logical calculus; perhaps they are

purely mathematical models of maximal physical theories, it matters not). Actual universes are concrete realizations or instantiations of possible universes.

Since many traditional descriptions of gods involve an orderly scale of degrees of perfection (and maximality on that scale), it will be helpful to formalize the concept of order. Ordinal number lines are defined using set theories. Among the various set theories, the standard is known as *ZFC*.¹ *ZFC* is extended by adding special existence axioms, known as *large cardinal axioms* (Drake, 1974). Let *ZFC** be *ZFC* plus all consistent large cardinal axioms. Since *ZFC** includes all consistent large cardinal axioms, any extension of *ZFC** is inconsistent. *ZFC** is the logically maximal set theory. The number line determined by *ZFC** is the logically maximal number line. It is the *Long Line*. It is that number line than which no longer is logically possible. The Long Line does not contain any maximal ordinal number. On the contrary, it is absolutely topless.

An *ordinal stratification* of possible universes is defined by three informal rules. The initial rule says the initial generation $G(0)$ contains some least good universe(s). The successor rule says for every successor ordinal $n+1$ on the Long Line, the generation $G(n+1)$ contains every minimal improvement of every universe in $G(n)$. The definition of the limit generation requires the notion of an *axial progression*. For any limit ordinal L , say P is an axial progression up to L iff P is a series of length L in which every higher universe is minimally better. The limit rule says for every limit ordinal L on the Long Line, the generation $G(L)$ contains every minimal improvement of every axial progression up to L .

Any ordinal stratification defines a cumulative hierarchy of sets of universes. Following Kraay (2010), say that a *world* is a set of universes. The world $W(0)$ is just $G(0)$; for every n greater than 0, $W(n)$ is the union of all $G(m)$ for m less than or equal to n . The proper class of universes W is the union of all $W(n)$ for all n on the Long Line. Worlds are nested: $W(n)$ contains every $W(m)$ for all m less than n . And worlds are axially ordered: $W(n)$ contains better universes than $W(m)$ for all m less than n . The rank of any abstract universe is the least n such that the universe lies in $W(n)$. And the rank of any concrete universe is the rank of the least abstract universe it realizes. Our universe has some rank – and recent physics suggests that this rank is finite (Lloyd, 2002). The series of worlds determines *ranks* for gods: the rank of a god is n iff that god can survey the universes in $W(n)$, find the best universe or universes in $W(n)$, and actualize it or them.

Ordinal axiology is the weak thesis that there is some ordinal stratification of possible universes in which the $G(n)$ is non-empty for every n on the Long Line. Hence the world $W(n)$ is non-empty for every n on the Long Line. Obviously, ordinal axiology is entailed by the stronger thesis that the stratification of possible universes is dense or continuous along the Long Line (e.g. that there are countably or uncountably many generations between any generation and its successor). Obviously again, ordinal axiology is entailed by the stronger thesis that there are many ordinal stratifications of possible universes. Ordinal axiology suffices for all the following arguments about gods. For if a god cannot

handle an ordinal stratification, then it cannot handle dense or continuous stratifications; and if it cannot handle one stratification, then it cannot handle many.

4. Monotheism

Monotheists say the number of gods is 1. Granted that atheism is false, the main way of arguing for the existence of *exactly one* god includes the assumption that to be a god is to be maximally perfect. Thus x is a god iff x is more perfect than (is greater than) every other possible thing.² Monotheism directly follows from the thesis that maximal perfection is uniquely instantiated. For any x and any y , if x is a god and y is a god, then x and y are each greater than every other possible thing. The only way for this to make sense is for x to be identical to y . Hence there is exactly one god and this god is *God*.

A simple argument shows that God cannot have any rank on the Long Line. For every n on the Long Line, if God has rank n , then there exists some greater $n+1$ and some greater possible god of rank $n+1$.³ If there exists some greater possible god of rank $n+1$, then God is not that than which no greater is possible. But God is that than which no greater is possible. Consequently, for every n on the Long Line, God does not have rank n (Oppy, 2006: *xii*). The maximality of God transcends the Long Line.

The thesis that God cannot be on the Long Line was already recognized by Cantor. He distinguished three grades of size: the finite; the increasable infinite; and the absolute infinite (Hallett, 1988: 12, 41). All the ordinals on the Long Line belong to either the finite or the increasable infinite. Hence all the ordinally indexed ranks of gods also belong to either the finite or the increasable infinite. Since God cannot be in any ordinal rank, God must be *absolutely infinite* (Dauben, 1977, 1990; Russell, 2011).

The *Cantorian Thesis* says that maximal perfection is absolutely infinite perfection. To say that God is maximally perfect means that the perfection of God is proportional to the proper class of ordinals Ω . Although Ω is not an ordinal, it has the form of an ordinal; hence there is a figurative sense in which it is greater than every ordinal. One might take this to mean that it somehow *transcends* the Long Line. The figurative transcendence of Ω corresponds to the mystical or ineffable transcendence of God (Russell, 2011: 282). Perhaps this divine transcendence is expressed by reflection principles (Rucker, 1995: 253). If the perfection of God is Ω , then God works in the proper class of all possible universes W . Thus God surveys all the universes in W and actualizes the best universe(s) in W .

The Cantorian Thesis suffers from several fatal problems. The first problem is that it entails that God is incomprehensible. Proper classes are not complete objects – they are essentially indefinite. Hence the Cantorian Thesis has no positive content. On the contrary, it is the statement of a purely negative or mystical theology. But this extreme mysticism arguably leads to *Anselmian atheism* (Maitzen, 2005). The Cantorian Thesis implies that God is beyond being, like the Plotinian Unity. But if there does not exist *any* x such that x is maximally perfect, then there does not exist *exactly one* such x .

The second problem is that the Cantorian Thesis turns proper classes into sets. Augustine says that God knows all the natural numbers (*De Civitate Dei*, Bk. XII, Ch. 19). Aquinas says that God can know any infinite plurality without iteration: God knows it all as a single undivided whole (*Quaestiones Disputatae de Veritate*, Q. 2, Art. 9). If the Cantorian Thesis is correct, then God knows all the ordinals. This suggests that the divine mind has one concept of the ordinals. The divine concept of the proper class of ordinals unifies it and thereby turns it into a set. But the proper class of ordinals is not a set. Analogously, God somehow quantifies over the proper class W . For instance, God compares every possible universe in W to every other. Such quantification seems problematic.

The third problem is that the Cantorian Thesis entails the paradoxes of omnipotence (Cowan, 1965, 1974). The fourth problem is the problem of evil (Drange, 1998). On the Cantorian Thesis, the perfection of God is unsurpassable. It seems reasonable to say that an unsurpassable God must create an unsurpassable universe. And yet our universe, which God is supposed to have created, is surpassable. As a result of its many problems, the Cantorian Thesis fails. This means that God is not absolutely infinitely perfect.

On the one hand, God has no ordinal rank. There is no ordinal n in the Long Line such that the rank of God is n . On the other hand, God does not transcend the Long Line like the proper class Ω transcends the Long Line. God is not absolutely infinitely perfect. Hence the strategy of using ordinal structures (like the great chain of being) to analyze the concept of maximal perfection leads to the conclusion that it is impossible for there to be any maximally perfect being: God does not exist.⁴ And if maximality cannot be analyzed using ordinal structures, then it probably is not intelligible at all. Literally speaking, there is no maximally perfect being. Perhaps there is some way to defend maximal perfect being theology; however, given its problems, the alternatives are worth studying.

One apparently monotheistic alternative is to retreat to the weak position that there exists exactly one god of some ordinal rank n . There are perhaps two ways to defend the choice of n . The first way is to say that the rank of the one god is the rank of our universe.⁵ The second way involves the rejection of ordinal axiology: the rank of the one god is the least n at which the stratification of possible universes ends.⁶ Of course, any retreat to this weak position is a rejection of maximal perfect being theology. And any rejection of that theology seems to defeat the main way of arguing for monotheism. Consequently, the weak position undermines the restriction of the number of gods to 1. If godliness does not include maximal perfection, then why not be a polytheist?

5. The Series of Gods

Atheists say the number of gods is 0; monotheists say the number of gods is 1. The obvious alternative is polytheism: there are many gods. One way to interpret polytheism is to say that the number of gods is k for some cardinal k . Lewis says the number of gods

is at least the second beth number (1983: *xi*). But it is difficult to see any decisive reason to prefer one plural cardinal number of gods to another.

An alternative is that there are as many gods as there are ordinals. This allows gods to be matched with ordinals: for every ordinal n , there is exactly one god $\Delta(n)$. Since gods correspond to ordinals, this is *ordinal polytheism*. Ordinal polytheism posits a proper class of gods. Should this be rejected as extravagant? It is said that that Ockham's razor should be applied to types rather than tokens (e.g. Miller, 2001: sec. 4). If that is right, then positing ordinal-many gods is no worse than positing 1.

Three informal rules define the series of gods. The initial rule says that for the initial ordinal 0, there is an initial god $\Delta(0)$. It is the least perfect. The successor rule says that for every successor ordinal $n+1$ on the Long Line, there is some successor god $\Delta(n+1)$. Every successor is minimally more perfect than its predecessor. The limit rule says that for every limit ordinal L on the Long Line, there is a limit god $\Delta(L)$. The limit god is minimally more perfect than the entire series of gods up to L .⁷ These rules entail that there are infinitely many gods. And the limit rule entails that some of them are infinitely perfect. The use of the Long Line implies that maximal perfection is undefined. Just as there is no biggest number and no all-inclusive set, so there are no maximally perfect gods.

These gods are increasingly perfect. Ordinal polytheism relativizes the Leibnizian creation story to ordinals. By performing an exhaustive comparison (Leibniz, *Theodicy*, sec. 225), each god $\Delta(n)$ knows the best universe or universes in $W(n)$. Following *Monadology* secs. 53-55, each $\Delta(n)$ wants to actualize every best universe in $W(n)$; each $\Delta(n)$ has the power to actualize every best universe in $W(n)$; hence each $\Delta(n)$ does actualize every best universe in $W(n)$. The result is a series of ranks of actual universes. Of course, one of those is our universe. Our universe is created by our local god. According to Hume (1779: Part 5), the perfection of the designer is proportional to the perfection of the designed; since our universe is only finitely perfect, our local god is only finitely perfect.

Ordinal polytheism avoids the problem of evil. For example, the faults of our universe do not refute the existence of our local god; they merely reinforce the fact that our local god is only finitely perfect. More generally, each god does the best it can; hence it cannot be faulted for not having done better. Ordinal polytheism avoids the paradoxes of maximality. There are no paradoxes of omnipotence or omniscience. Each god knows its set of propositions (and greater gods know more). Each god has the power to actualize universes up to some level of complexity (and greater gods have more power).

Ordinal polytheism avoids problems with unintelligibility. The gods can be modeled with mathematical precision: they can be modeled as necessarily existing computers that generate universes.⁸ There are computers of both finite and infinite complexities. Some gods have natures proportional to Classical Turing Machines (Hopcroft, 1984); greater gods have natures proportional to Accelerating Turing Machines (Copeland, 1998).

There are computers with high transfinite complexity (Hamkins, 2002; Koepke, 2006; Koepke & Siders, 2008). Some gods have natures proportional to those computers.

Ordinal polytheism gains justification from recent polytheistic ways of thinking about two classical monotheistic arguments. The classical design argument for God is often said to imply a regress of designers (see Hume, 1779: 72-73; Doore, 1980: 153-155; Dawkins, 2008: 136, 146, 188). But regressions are easily inverted to become progressions. The classical ontological argument for God is often said to justify the existence of a plurality of necessary beings of varying degrees of perfection (see Henle, 1961; Kane, 1984; Leftow, 1988; Harwood, 1999). If ordinal polytheism hopes to be successful, it will have to develop and defend its own polytheistic versions of these arguments in detail.

Notes

¹The acronym ZFC stands for Zermelo-Fraenkel-Choice. For good introductions to ZFC, see Hamilton (1982: ch. 4) and Devlin (1991).

²Augustine says God is “that to which nothing is superior” (1993: 40-64). Anselm says God is “something than which nothing greater can be thought” (*Proslogion*, ch. 2) and God is “also something greater than can be thought” (*Proslogion*, ch. 15). Anselm says God is “whatever it is better to be than to not be” (*Proslogion*, ch. 5). Descartes declares that God is the supremely perfect being (1644: secs. 14-19). Leibniz says God is “an absolutely perfect being” (1686: 3; *Monadology*, secs. 40-41). Monotheists today endorse the thesis that to be God is to be maximally perfect (Morris, 1987).

³If the rank of God is n , then God knows every proposition in some set $K(n)$; given any $K(n)$, it is possible to form a greater set of propositions (Grim, 1988). It is possible for there to be a being that knows all the propositions in that greater set. Hence if the rank of God is n , then a being with greater knowledge is possible. If the rank of God is n , then God is able to build a model of the iterative hierarchy of sets up to some level proportional to n . But every level in the iterative hierarchy is surpassed by a greater level. And it is possible for there to be a being that can build a model of that greater level. Hence if the rank of God is n , then a being with greater power is possible.

⁴A pantheist may say that the fundamental perfection is inclusiveness. Thus maximal perfection is maximal inclusiveness. This entails that the proper class V is maximally perfect. The proper class V may have some divinity; but it is not God.

⁵Kant (1986: 137) and Grover (1988, 2004) worried about the following principles: (1) if it is possible that some universe is better than ours, then it is possible that some god is more perfect than ours; (2) but if it is possible that some god is more perfect than our god, then that more perfect god exists. To avoid an endless progression of ever more perfect gods and their ever better universes, they try to argue for the Leibnizian thesis that our universe is unsurpassable. And surely that is false (see Kraay, 2010).

⁶If ordinal axiology fails, then there is some ordinal n such that $G(m)$ is empty for all m greater than n . The set of all possible universes is $W(n)$.

⁷To say that some limit god $\Delta(L)$ is minimally more perfect than the series of gods up to L means that $\Delta(L)$ is more perfect than every $\Delta(n)$ for n less than L and there is no god that is less perfect than $\Delta(L)$ but more perfect than every $\Delta(n)$ for n less than L .

⁸Leslie (2001: ch. 1, 2; 2007: 3-4, 37, 61-62) seems to treat his divine minds as if they were computers simulating worlds. But perhaps his treatment is merely illustrative.

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