

Aquinas on the Multiverse. An Approach

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Abstract. Gradually, the multiverse hypothesis has been gaining popularity, not only in the scientific and academic sphere, but also in popular culture. This hypothesis, however, is not recent; Thomas Aquinas himself had to respond to a version of it. Although the problem is broad and must be approached in an interdisciplinary dialogue, the Thomistic approach is very interesting, since he accepts the plurality of worlds as something possible but denies that it is a possibility made real. His answer, which is the subject of this article, is an opportunity to think about our representation of God and his causal activity.

Keywords: creation, causality, divine power, order, world.

“If you don’t want God, you’d better have a multiverse.” This statement, attributed to Bernard Carr, summarizes a common approach to the multiverse hypothesis [MH]. In the face of the apparent scientific evidence of fine-tuning that would also speak in favor of design (the values of the constants are not physically necessary, and their probability is extremely small), MH appears a suggestive alternative to avoid a designer. The argumentation is straightforward: if there is infinite or uncountable multitude of universes, it would not be surprising that at least some of them possessed life-enabling constants (Holder 2018; Friederich 2021). To re-

duce, however, the multiverse problem to a simple alternative in the face of fine-tuning entails an impoverishment of the discussion. As some contemporary authors have shown (Rubenstein 2014; Boulding 2022), the metaphysical and theological implications MH may have, represent an opportunity to deepen our image of God and the world and to develop a fruitful dialogue between science and faith.

It is interesting to see, in this sense, the reception MH has had in some current theistic thinkers. A review of the doctrine of ancient authors, however, shows it is not an entirely new problem, even if, obviously, the cosmological representation is different. Although it is well known the case of Giordano Bruno, who was condemned, among other things, for sustaining the infinity of the universe and the existence of multiple worlds (Benavent 2004, 19), there were also theistic and Catholic authors who accepted a similar hypothesis. Thus, for example, Peter of Tarentaise (future Blessed Innocent V, †1276) accepted the *possibility* of an infinite series of diverse worlds, and in a similar manner Augustinus Triumphus (†1328) argued from divine omnipotence that the multiple worlds hypothesis was not intrinsically contradictory (Boulnois 1994). Possibility, however, does not imply its fulfillment. Along these lines, Thomas Aquinas also accepts as possible the plurality of worlds, but denies their actual existence. Although the arguments he presents are not of a strictly necessary character, but of convenience, his approach is an occasion to think about divine action *ad extra* and the causal relationship established between God and his creature.

Before presenting the Thomistic thought on MH (which implies an update of its principles to apply them to a modern problematic), it is nevertheless convenient to specify what we understand by multiverse and to briefly analyze some hypotheses that have been formulated about it. Although the recent literature on the subject is abundant (and growing), we will focus on the position of Tegmark (2014) as it is one of the most successful systematic expositions to date and has become a common reference in the field. After this first approach, we will analyze the problem in a theistic perspective according to the thought of Aquinas. This second part will also consist of two parts: in a first moment we will analyze

why Aquinas considers that MH is possible, to show, in a second moment, why he denies the actual fulfillment of this hypothesis. It should be noted, however, that, Aquinas was unaware of MH as it is currently formulated, and one cannot simply identify this problem with the question of the plurality of worlds. For Aquinas the world (*mundus*) designates the totality of things insofar as it is a whole whose parts are harmoniously ordered. This totality implies that the earth is at the center of the cosmos and is surrounded by nine celestial spheres (planets, fixed stars, and crystalline sphere). In this framework, for example, Aquinas directly answers the question about the plurality of worlds by arguing from the natural movement “toward the center” (vide *In De caelo*, lib. 1, lect. 16, n. 4). However, it seems to me that Aquinas’s metaphysical approach allows us to overcome its cosmological conditionings and to bring the principles to their properly philosophical level.

As a foregone conclusion we can say that for the Dominican friar the present world or our universe is a particular case of what is possible (not the only case), but that it sufficiently realizes the divine agency *ad extra*, so MH appears an unnecessary conceptual proposal.

1. What do we mean by multiverse?

The first difficulty that appears when speaking of MH is its terminological inconsistency. Indeed, if universe means the totality of all that exists, to speak of multiverse is meaningless, for how could there be anything beyond all that exists? But even assuming the legitimacy of the term to express, for example, the possibility of the existence of two causally uncoupled physical systems, or in other words, two physical systems such that there can be no causal relationship between them, there remains the more complex problem of determining the exact meaning of the expression. Since the literature on this subject is abundant, as we indicated previously (Gangui 2020; Friedrich 2021), we will synthetically expose Tegmark’s (2014) hierarchy of multiverses to show the scientific *status quaestionis*.

Although there are four levels that he proposes, there are three ways in which he justifies them (bearing in mind also that MH, strictly speaking, is a prediction of a theory and not a theory). Thus, Level I and II depend on inflationary theory; Level III, on Hugh Everett's interpretation of the wave function in quantum mechanics; and Level IV (a sort of radical Platonism), on this problematic identification: "our external physical reality is a mathematical structure" (Tegmark, 2014, 254). Now, as Tegmark (2007, 100) himself indicates, the important thing is not to determine whether there are multiverses, but how many levels there are, the latter question being closed with Level IV, since by identifying physical reality with a mathematical structure, he concludes that everything that is mathematically possible really exists (Don Page 2007, 423). Let us now look briefly at each of these levels.

Level I [LI] is constituted by all those regions beyond our cosmic horizon. In this first level all regions possess the same physical laws or constants, but they are causally unconnected regions because they could never be reached, even if one were to travel eternally at the speed of light. The reality of these regions depends, in part, on the assumption of a cosmological model where space is infinite. Thus, LI holds that there are infinite realizations or copies of this world, because in an infinite in act all possibilities are realized (Tegmark 2007, 104). Level II [LII] also depends on inflationary theory, but instead of postulating causally unconnected regions within the same infinite space governed by given constants, it holds that inflation would give rise to infinite bubble universes where even the physical constants change. In LII, the fine-tuning problem would therefore be solved, for "[a] theory where the knobs of nature take essentially all possible values somewhere will predict with 100% certainty that a habitable universe like ours exists, and since we can only live in a habitable universe, we shouldn't be surprised to find ourselves in one" (Tegmark 2014, 167).

The third level [LIII] depends on Hugh Everett's interpretation of quantum mechanics. According to this interpretation, the wave function of the universe would never collapse, so that, at each presumed collapse, what actually happens is that the universe splits into distinct quantum

branches in a Hilbert space, even if we never perceive this continuous splitting into parallel versions of our universe (Tegmark 2014, 217). Now, as Tegmark points out, this level “adds nothing new beyond Levels I and II, just more indistinguishable copies of the same universes” (2007, 113). The first two levels assume multiplicity in diverse spaces, while LIII adds that multiplicity *in* the multiverses themselves. In other words, we are not dealing with diverse physical realities, but with a plurality of wave functions of universes.

The controversial Level IV [LIV] differs from the other levels and somehow encompasses them all. It is not properly a cosmological prediction derived from a scientific hypothesis, but a philosophical hypothesis in the strict sense. LIV postulates the identity between physical reality and mathematical structures, such that mathematics not only describes the physical world, but that these structures actually exist. The main argument he gives in favor of this hypothesis is that a complete objective description of reality in mathematical terms must be isomorphic with physical reality, such that “if two entities are isomorphic, then there is no meaningful sense in which they are not the same” (Tegmark 2007, 119). This identification gives rise to an incredible number of multiverses, because the mathematical structures (and therefore also their physical realizations) are innumerable.

Although Tegmark’s hierarchy of multiverses is *one* of the explanations present in contemporary discussion, it seems to me sufficient to approach the idea of multiverse and to fix some key ideas for further development of our argument. Of course, Tegmark’s proposal is rich in its implications, but for the sake of the argument, there are fundamentally two questions that hold my attention. First, MH refers to the existence of spatiotemporally independent physical realities or causally unbound physical systems with similar or different physical properties. In this sense, a constitutive independence or causal disconnection between diverse “universes” would be central to MH, so they can be grouped within the multiverse. Second, even assuming such parallel universes or bubble universes were possible, a fundamental question remains: do they really exist? MH by its very nature cannot answer this question, but (besides

the problem of actual infinity) it assumes as maximally probable everything possible. These are the problems I am interested in addressing now from a Thomistic and theistic perspective, i.e., the possibility of MH and of its realization.

Before proceeding further, I would like to point out two more things: *first*, it is not my intention to engage in a particular dialogue with Tegmark's position; I only bring it up to contextualize the problem in the current literature and to show how a scientific position raises philosophical questions. *Second*, from now on, when speaking of multiverse, we will refer *mainly* to those that Tegmark classifies in the first two levels (LI–LII). Although LIII and LIV also present important philosophical questions, we have chosen to focus the discussion on those hypotheses in which the causal separation between universes is most clearly seen, because, as we shall see, for Aquinas, it is the causal relationship that argues for the existence of a single universe.¹ In this sense, when speaking of multiverse we will always refer to the existence of bubble universes, that is, to worlds or systems of worlds that are complete and *causally separated* from all the others.

2. The multiverse is possible... and necessary?

Suppose the following scenario (A). At this moment (t_1) I am typing on my computer. According to MH, one could postulate another universe (and, therefore, causally disconnected from A) in which an exact copy of A takes place at the same moment; yet a moment later (t_2) the copy follows a different course of action; instead of continuing to write, “my copy” decides to get some coffee and clear his head. We have therefore at t_1 two identical (ontologically diverse) A scenarios, which at t_2 are distinguished by a new factor and so we get A and A'. Here arises the question that interests us: could God cause this physical reality? Or, is there a rea-

¹ I am grateful to an anonymous reviewer who pointed out to me the possibility of seeing, for example, mathematics in LIV as a unifying principle. This unification, however, would entail a different line of argument from the one I have wanted to develop in this paper, although it could prove to be very interesting.

son which renders this hypothesis meaningless? Strictly speaking, it is not necessary to resort to identical scenarios that then branch out by new factors, but the strength of the example serves to represent more graphically the core of the problem.

In speaking about divine omnipotence (Wippel 2007; Leftow 2012; Echavarría 2020), Aquinas recognizes it is not easy to determine its meaning (since in classical theism it is assumed, for example, that God cannot sin or cannot make the past not to have been), but he then adds that, if one considers carefully, by attributing omnipotence to God it is meant that he can do anything possible (ST I, q. 25, a. 3). To grasp the meaning of this affirmation it must be noted that this possibility runs on the part of the object, since on the part of the agent there can be no limitation whatsoever since he is pure act. But what is the possible? Taken absolutely, the possible is everything that does not imply contradiction or, said in positive terms, everything that enters the reason of being (*ratio entis*). In this sense, there are things that God cannot do because such things *cannot be done*. The classic example usually given is that of a square circle: God cannot make such an object because it implies a contradiction in terms. In the same vein, God could not make a man without a rational soul, because it would be contradictory. He could, however, cause a unicorn because it is not contradictory for a horse-like animal to have a horn... after all, we have the example of the platypus.

Let us now return to MH. Can God actualize a multitude of possible worlds, or only create a single universe, i.e., this universe? According to Aquinas' definition of omnipotence, we can say the actual plurality of worlds is possible if no contradiction between them is implied. MH is possible on the part of the object, because even assuming the above example, nothing prevents the coexistence of two identical scenarios in properties and causally independent, which at different times are branched by some new factor. There is no intrinsic reason why an exact copy of a given object cannot be projected to infinity, even though its realization may seem to us maximally improbable. In more general terms, one could accept as possible, therefore, the plurality of universes (even if they were not copies of this one), because uniqueness is not implied in the reason of uni-

verse (not as the totality of what exists, but in the sense assumed by the theory). In this sense, we could have an actual realization of any ontologically possible case. Although it may be counter-intuitive, God could cause the same person to win the lottery in several successive years. That which does not imply contradiction *can be done* and at least in this sense, MH can be thought of as possible and, therefore, be the object of divine causality.

If, however, we consider MH not from the perspective of the object, but from that of the agent (i.e., the first cause), one might even think that this possibility argues for its necessary realization. Almeida, for example, argues that “among the advantages of the theistic multiverse is that it aims to satisfy the principle of plenitude” (2017, 1), according to which every general possibility must at least be realized once (Argüello 2005). Within classical theism, God is an infinite and supremely good being, so it is coherent to think he wants to communicate his perfection as much as possible. Fire, for example, tends to burn everything that is subject to combustion. In the case the communication of its act does not occur, it is due either to a defect of the fire or the resistance of the patient. In the present case, the agent being God, who is perfect and infinite, and the object of his agency being the possible, there is no limitation on the part of either term. In other words, the communicability of the first cause seems to imply that whatever is possible should *in fact* be actualized by God. In the case at hand, the multiverse seems not only possible, but even necessary.

For Aquinas, however, this idea would be supported by two errors concerning divine action. In the first place, God is not a natural agent, since he works according to understanding and will, so that one cannot necessarily conclude from his perfect actuality a determined effect (DP q. 3, a. 16). What is proper to natural agents is the univocal relation between cause and effect: an apple tree will always produce apples (if there is no factor that prevents it) and fire will always communicate itself as fire (if there is no factor that prevents it). What is proper to voluntary causes, however, is the indeterminacy (not indifference) of their causal power with respect to their object. A man is said to be free, for example, when he can choose among multiple options. Similarly, God, as a voluntary agent,

is not determined to a single effect, but can freely determine what he wishes to produce. Therefore, even if it can be said that he is inclined to communicate his actuality, it cannot be concluded that he necessarily produces an effect.

Secondly, the created effect is intrinsically disproportionate with respect to God, so that it is contradictory to suppose that it *drains* divine causality. It is not the case that God having caused something finite can no longer create something else finite. God can create an infinite multitude of objects (Aquinas denies the possibility of an actual material infinity, but we can think of a successive actualization of objects to infinity), but that multitude does not prevent a new finite object from being caused. Assuming a number n of objects created by God, it is always possible for God to cause $n+1$. Even if it is only an imaginative fiction (and as an example it has its clear limitations), let us think of an absolutely unlimited and infinite fire that represents the totality of what exists.² If such a fire wanted something else to exist, it obviously could not cause *another* fire (for we have assumed that fire is all that exists), but it could cause things that limitedly possess that which is the actuality of fire, i.e., an infinite fire could cause hot things. If we apply this analogy to the case of God, we will have to say that being the same subsistent being, as a perfect cause it cannot produce *another* subsistent being (God already drains the totality of being), but it can, nevertheless, produce beings (*entia*) that participate in its infinite actuality in a limited way. Now, the very idea of an effect that participates in a limited way in the infinite, implies an intrinsic disproportion between the effect and the cause, in such a way that never can an effect or the totality of them drain or equal the actuality of the cause. If the created object is defined as that which has being (*habens esse*) because it participates in the pure act, then it makes no sense to think of a communication *ad extra* of God that drains its communicative actuality.

This radical disproportion between the creature and the creator also helps us to understand the freedom of divine agency mentioned in the first place. No object renders necessary the causality of the first agent, so

² I take the example of a lecture and a conversation held with Antonio Amado on the problem of divine causality (creation) and the communicability of the first cause.

that its realization depends on a free determination of the agent's will. This is why Aquinas holds that divine knowledge is the cause of things insofar as it carries with it a determination of his will. Indeed, God knows all things, because knowing himself to be pure act, he also knows the infinite ways in which he can be participated, but such knowledge does not make his communication necessary. In this sense, although it may be too technical, a distinction that Aquinas makes in speaking of divine knowledge (ST I, q. 14, a. 9) is very illuminating. God knows not only all things that have been, are, or will be (science of vision), but also those possible things that will never have actual realization (science of simple intelligence). All possibles exist in the mind of God, but only those are actualized which have a determination of his will attached to them. This brings us to the last problem: God could cause a multiverse, but are there reasons to deny that he did so?

3. Our universe, a work of wisdom and love

To answer this question, it may be useful to recall another distinction present in the work of Aquinas (although it does not occupy the preponderant place it will have in later scholasticism). When speaking of divine omnipotence, he not only says that its object is everything possible, but also that this attribute is identified with the essence and *with the other attributes* that define it (Bonino 2016, 782–88). In this sense, the divine acting cannot be thought apart, for example, from its wisdom and goodness. Supported by this idea, Aquinas, picking up a terminology present in the school, distinguishes between God's absolute power and his ordered power. The former refers to mere possibility as the object of divine power, while the latter adds to this possibility the reason and goodness from which God works. Considering only absolute power, God could create a world where the balance of goods and evils would be tilted in favor of evils, but if we think of God's ordered power, that hypothesis becomes meaningless. Kraay (2018) is right, in this sense, when he responds to Almeida (2017) by pointing out that God does not necessarily actualize all possibles indiscriminately, but that other factors need to be consid-

ered in his operation. God is a rational agent, so it can be expected that his action responds to reasons and is also consistent with his goodness. His power extends to diverse objects but does not necessarily actualize this diversity. There are “reasons” that can justify one actualization instead of another and, although they are not necessary reasons (they cannot be imposed on God externally), it is possible to find some sense in his action *ad extra*.

This idea serves Aquinas to reject MH. To understand it, we can begin by asking ourselves what the end of the divine action is, why it chooses to communicate its actuality. The first thing to discard is the idea of a creation *ex indigentia*, that is, a causality that is ordered to acquire something. God is pure act, so that he can acquire nothing in his action. Therefore, the primary object of the divine will is his own goodness and loving that goodness, he chooses to make the other participate in a limited way in his own perfection. As Aquinas says, “the good is the proper object of the will; therefore, the goodness of God insofar as willed and loved for its own sake is the cause of the creature through the will” (DP q. 3, a. 15, ad 5). By saying, therefore, that he does not create to acquire, but in order to communicate his goodness is meant only that God chooses to constitute his own goodness as an end for other creatures. This is why Aquinas often quotes the expression of Augustinian origin “*quia bonus est, sumus*” (ST I, q. 5, a. 4, ad 3) to signify divine causality from the perspective of the end, that is, to indicate that divine goodness is the end intended in creation (Perrier 2019, 347–51).

It is very eloquent that this manifestation of divine goodness is used by Aquinas, in fact, to justify diversity in creation. Indeed, because of the intrinsic disproportion that exists between the first Cause and the created effect, numerical and specific diversity manifests more perfectly the subsistent goodness of God (ST I, q. 47, a. 1). Divine communication presupposes not only that there are multiple individuals, but also specific diversity among some of them so that what is lacking in each thing is supplied by the perfection of the others. A rock can better signify the divine firmness than honey, which tells us of its sweetness. This positively beloved diversity, however, could argue in favor of MH.

In fact, Boulding uses this idea to show the coherence of this hypothesis within a Thomistic framework. Let us briefly review what this author proposes. From the doctrine of participation, central to the thought of Aquinas, he correctly argues that “diversity is part of the metaphysical structure of the cosmos because of each thing’s diverse participation in being” (Boulding, 2022, 97). Based on this notion of diversity, Boulding seeks to show how it might “be aligned with a multiverse theory in which diversity is paramount, specifically the string theory landscape proposal.” Again, it is not my intention to discuss the scope of the scientific hypothesis (string theory in this case), but to analyze its philosophical foundation and its compatibility with Thomistic thought. The central point in this proposal is that this “tremendous diversity, represents the many ways in which created being might imitate and participate in God” (2022, 100). But does such diversity best represent divine goodness? In a sense, yes, but the problem is somewhat more complex and Aquinas himself responded to this approach. To the objection that “many worlds would be better than one, because many goods are better than few,” he replies:

No agent intends a material plurality as an end, because the material multitude has no certain end, but tends to infinity, and infinity is repugnant to the reason of end. Now when it is said that many worlds are better than one, this is said according to the material multitude. But such a better thing does not belong to the intention of God [as] agent, because for the same reason it could be said that if he made two [worlds], it would be better that he should make three and so to infinity (ST I, q. 47, a. 3 ad 2).

Aquinas’ answer is clear. Diversity is certainly a sign of goodness, but *this goodness* is not enough to justify the actualization of all the possible. Each specific and singular element that composes the multitude represents according to its own degree something of the one divine perfection. Nonetheless something else is needed to justify the presence of that element in such a multitude, that is, to *formally* constitute a multitude. So now we can ask ourselves, what is it that unifies the different parts to constitute a whole, which is equivalent to asking, what is it that God ultimately and formally intends in constituting diverse entities?

Aquinas answers this question by introducing the notion of causal order. Each creature represents the divine goodness by its singularity and by its specificity, but this representation is not exhausted in a purely ontological dimension. Indeed, the creature *also* represents this goodness by its operation insofar as it is the cause of the goodness of other things. It could even be said, within Thomistic thought, that this causal representation is more perfect than the mere entitative representation, since every creature is *propter operationem* and it is in its activity that it unfolds all the richness of its act. St. Thomas indicates in the *Summa theologiae* that the causal agency of creatures is part of the divine government of the world, in such a way that, as God tries to communicate his perfection, he wants creatures to *participate in the communication of this perfection*.

It is in this perspective that Aquinas' worldview begins to appear. Creatures are not solitary and isolated substances but form a causal system in which the actuality of one entity is destined to be communicated to another entity by the agency of the first. More specifically, for Aquinas, this system or order among beings constituted a causal hierarchy, where divine perfection reached the lower entities through the causal mediation of the higher ones (Perpere, 2016).

Here appears the key notion that allows Aquinas to justify the desirability of a single universe: things represent the divine goodness not only by being, but by being causally ordered one to another. Indeed, the cosmos is formally *one* because there is a relation of order among its parts and this order is the causal cooperation that exists among the diverse things so that all achieve their end. For Aquinas the universe is not a disordered set of entities or a simple aggregate of diverse substances, but a hierarchically ordered structure because it is caused to represent the divine good.

This same order existing in the things created by God manifests the unity of the world. Indeed, this world is said to be one because of the unity of order, according as some things are ordered to others, for the things that are [created] by God possess an order among themselves and to God. Therefore, it is necessary that all things belong to one world (ST I, q. 47, a. 3).

It is true that Aquinas' cosmological model was much narrower and, in a way, causal relations could be established and traced in a clearer and more univocal way, but the general principle that governs his thought remains valid: the totality of creation maintains a unity because there are causal relations between entities, without, obviously, all entities possessing all the same causal relations: causal order does not imply a necessary connection between all parts, but at least the possibility of interaction. The universe, in this sense, finds its reason in the interconnection of the parts, because that unity of order is the excellent and first good that God seeks to communicate as it eminently represents his own goodness.

Recapitulating what has been said so far, we could say that MH is a possible proposal within Thomistic thought, but unnecessary. God could indeed cause everything that does not imply contradiction. However, his agency *ad extra* does not spring from a necessary communicability, but from the free choice of his will. For Aquinas, God in creating the world tries to communicate his own goodness, which is achieved when the creature resembles its principle. Now, this resemblance occurs not only at the individual level, but also when creatures establish causal links among themselves by which they become the principle of goodness for other things. It is precisely this order that leads him to deny the plurality of worlds, because an unconnected multitude of creatures would lack the goodness of order that is the ultimate perfection of the universe. Our world is a particular case of the possible, but sufficient to come near the goodness of its principle.

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