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Infinite Causal Regress and the *Secunda Via* in the Thought of Thomas Aquinas

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Thomas Aquinas often wielded the idea of an infinite regress in his theological and philosophical treatises. In the famous *Five Ways*, the notion of the impossibility of a regress of events or operations plays a key role in each of the first three proofs for God's existence. In a similar fashion, Aquinas incorporates this idea in his *Summa Contra Gentiles* in the section on the existence of God.^[1] In this later work, it becomes eminently clear that Aquinas derives the idea of the impossibility of an infinite regress 'among movers and things moved' directly from the work of Aristotle. According to the opening words of the First Way, Aquinas believed that the argument *ex motu* was the most evident way to prove God's existence. It should not surprise us, then, that there is a certain amount of capital appearing in the proof *ex causalitate* that is borrowed from the proof *ex motu*.

It is true, though, that there are certain cosmological arguments that are based on the idea of an infinite regress of events in time that Aquinas did not accept. Various arguments of this sort, called today the *kalam cosmological arguments*, were spawned first in the works of John Philoponus in the sixth century^[2], and then developed by the Arabic schools of philosophy during the next five centuries. The Western world during these centuries had more or less lost contact with Aristotle's philosophy; however, the Arabic school both preserved and developed Aristotle's thought. At issue in the *kalam* argument is whether reason can tell us that the world has a beginning in time. That is, the *kalam* brand of the cosmological argument was thought to prove that the world, *contra* Aristotle and the Greeks, was in fact not eternal, but had instead a beginning in time, was 'created', if you will.

Aquinas has proposed in his *Summa Theologiae*^[3] that there are two types of truths: truths of reason and truths of faith. And he makes it manifestly clear that he accepts the biblical doctrine of creation as a truth of faith, not reason. Aquinas holds that reason cannot prove that the world had a beginning in time. For all he knows and can demonstrate, the world may be 'created from eternity' by God: not only dependent on God for its existence, but *eternally* dependent on God.^[4]

So, there are times in his work in which Aquinas invokes the idea of the impossibility of an infinite regress with sheer finesse; however, in other (though similar) contexts, Aquinas refuses to invoke it due to some epistemic untidiness that he perceives in the reasoning at hand. In the *kalam* argument, Aquinas perceived that one could use an infinite regress argument to prove *both* that the world has a beginning and does not have a beginning in time.^[5] So, he was satisfied to accept by faith that the world had a beginning in time, according to Genesis 1:1.

In this paper, then, I shall investigate the use of the 'infinite regress' argument in Aquinas' Second Way. What does Aquinas find in the argument from motion and efficient cause that is not at issue in the *kalam* cosmological arguments of Philoponus and the Arabic scholars like al-Ghazali? In order to answer this question, I shall investigate Aquinas' use of the principle of

infinite regress, especially as he receives this doctrine from Aristotle. Some interpreters, among them Patterson Brown and Richard Sorabji, have attempted to explain the impossibility of a causal regress in terms of *legal responsibility*. I believe that the idea of a kinematic cause and that of legal responsibility are at work in the Second Way. In fact, by attempting to allocate responsibility to an initial cause, interpreters have been able largely to avoid the issue of Aquinas' outdated scientific views. In the end, to attribute legal responsibility to a cause seems to rest on the principle of sufficient reason, itself not possibly able to be proved or disproved. So, in this paper I would like to discuss Aquinas' general tack in the Second Way. I shall answer the question: *If Aquinas has a 'vertical' series of causes in view, and if such a series is impossible, what has he proved?* To answer this question, in section I, I introduce some necessary distinctions that Aquinas makes in several texts of his work. In section II I attempt to reconstruct the Thomistic cosmological argument, showing the relevance of Thomas' notion of an essentially ordered series. And, in section III, I make some concluding remarks.

I. SOME DEFINITIONS AND DISTINCTIONS

For Aristotle, to cause something to change and to cause something to be are very related ideas. Thus, there are many similarities between Thomas' First Way, based on motion and change, and his Second Way, based on efficient cause. In the First Way, Aquinas invokes the somewhat mysterious infinite regress move in key positions of his arguments.

It is impossible that in the same respect and in the same manner anything should be both mover and moved, or that it should move itself. So whatever is in motion must be moved by something else. Moreover, this something else, if it too is in motion, must itself be moved by something else, and that in turn by yet another thing. But this cannot go on forever.

Why can't it go on forever? Because

if it did there would be no first mover, and consequently no other mover at all, since second movers do not move except when moved by a first mover, just as a stick does not move anything except when moved by a hand. And so we must reach a first mover which is not moved by anything: and this all men think of as God. (ST, Ia,2,3)^[6]

In SCG Thomas extends his argument for God's existence from motion, and argues in a similar fashion. However, in SCG Aquinas offers explicit arguments for the impossibility of an infinite regress of causes, taken directly from Aristotle's *Physics*.^[7] We'll come to this argumentation below. For now, notice the similarities and differences in the argument in ST and that below from SCG.

Everything that is moved is moved by another... Therefore, it is moved by something else that moves it. This mover is itself either moved or not moved... if it is moved, it is moved by another mover. We must, consequently, either proceed to infinity, or we must arrive at some unmoved mover. Now, it is not possible to proceed to infinity. Hence, we must posit some prime unmoved mover. (SCG I.13.3)^[8]

Of great import, as Antony Kenny points out, is the verbal idea of *movetur*, that can mean 'either "is being moved" or "is (at some time or other) moved'.'^[9] There is an ambiguity here between the interpretation; it is unclear whether the direction of movement is regressing temporally or ascending causally. How does Thomas intend us to understand his use of *movetur*, 'it is moved'? Are we to understand 'it is moved' by

(1) a series of simultaneous movers,

or,

(2) a series of movers stretching back into time.

The interpretation that one settles on is important, for it will decide what one takes Aquinas to mean by the impossibility of an infinite *regress*. But we must ask, as this notion has already been presented in the quotes above: is the regress to which Thomas alludes simultaneous or temporally regressive?

The decision about the term *movetur* in the First Way will also reflect the meaning of 'series of efficient causes' in the Second Way, on account of the example given at the end of the First Way (more on this below). It seems reasonable that Aquinas should draw upon the example cases of motion and causality in the First Way to express the kind of relations he has in view in the Second Way, given that he does not provide any examples in the text of the Second Way (in ST).

To support this view, one must examine his other texts to see if there is a manifest relationship between the hand-stick-stone example of the First Way and the interpretation of the 'order of efficient causes' of the Second Way. Here I will introduce a distinction that seems extremely important for Thomas to make in his discussion of the cosmological argument. That is the distinction between an *accidentally* ordered causal series and an *essentially* ordered causal series. There are, to my knowledge, at least two different locations in which Aquinas explicitly names and describes the difference between these two types of causal series. The first passage is within the Treatise on Creation, in discussing the eternity of the world, ST, q. 46, a. 2, reply obj. 7.

In efficient causes it is impossible to proceed to infinity *per se*--thus, there cannot be an infinite number of causes that are *per se* required for a certain effect; for instance, that a stone be moved by a stick, the stick by the hand, and so on to infinity. But it is not impossible to proceed to infinity accidentally as regards efficient causes; for instance, if all the causes thus infinitely multiplied should have the order of only one cause, their multiplication being accidental; as an artificer acts by means of many hammers accidentally, because one after the other is broken. It is accidental, therefore, that one particular hammer acts after the action of another, and likewise it is accidental to this particular man as generator to be generated by another man; for he generates as a man, and not as the son of another man. For all men generating hold one grade in efficient causes--namely, the grade of a particular generator. Hence, it is not impossible for a man to be generated by man to infinity; but such a thing would be impossible if the generation of this man depended upon this man, and on an elementary body, and on the sun, and so on to infinity.^[10]

There are a number of interesting comments to be made about this distinction. If this distinction is so crucial, why did not Thomas incorporate it in the Second Way early in ST? Three responses might be made.^[11] First, the ST is after all a *summary* of theology, so intricate distinctions were probably often left unsaid.

Second, due to the wide-spread interest in the newly translated texts of Aristotle, Alexander of Aphrodisias, Simplicius, John Philoponus, and Themistius, the two types of causal series had received a fair share of attention in academic circles. The distinction was made in Aristotle's *Physics* 8.5, and developed by Simplicius, Maimonides, and Avicenna, among others.^[12] In fact, Aristotle (in *Physics*) employs the example to which Aquinas evidently alludes in the First Way: a hand moving a stick that in turn moves a stone. And it is here that Aristotle actually makes the distinction between these two types of causal series, naming one of them 'an accidental causal chain'. It also becomes clear in *Physics* 8.5 that Aristotle is speaking of one type of causal series (that Aquinas names an 'essentially ordered series') that is a *simultaneous* series of causes. According to Sorabji,

His ultimate interest [in *Physics* 8.5] is in explaining the motion which in *Physics* 8.1 he has argued to have no beginning. If it has no beginning, its cause will not exist *before* it.^[13]

Third, we should notice the distinctions between the hand-stick-stone example and its artificer-hammer counterpart. In the hand-stick-stone series, that is, the *essentially* ordered series, the causes and effects are simultaneous, and the relationships between causes are *transitive*. Letting 'C' mean 'causes' and x,y, and z be individual causes, it is the case that if xCy and yCz, then xCz. If the hand moves the stick (at time t) and the stick moves the stone (at time t), then one can properly say, in an essentially ordered series, that the hand moves the stone (at time t). On the other hand, an accidentally ordered series, such as the artificer-hammer example, is neither simultaneous nor transitive. Aquinas recognizes that the example of *generation* is even clearer than that of the artificer-hammer. He has in mind here the non-transitivity of generators. Let A=Abraham, I=Isaac, and J=Jacob, and 'b' be the causal relationship of 'begets'. It is not the case, as in the essentially ordered series, that if AbI and IbJ then AbJ. As Aquinas says, 'for he generates as a man, and not as the son of another man.' (*supra*) It is necessary for a number of years to elapse until A's son, I, is able to beget J. So, it is clear from this example that an accidentally ordered series is neither *transitive* nor *simultaneous*. So, in summary, we might define the two types of series as follows:

Accidentally ordered series: a series in which each member that has a predecessor depends upon its predecessor for something other than its very act of causing its successor.

Essentially ordered series: a series of causes in which each member depends upon its predecessor for its very act of causing its successor.^[14]

Another place at which Thomas makes this distinction appears in Book 2 of SCG. Here Thomas provides an extended argument for and against the eternity of the world. At 2.38.6, among the arguments he adduces that represent those philosophers who attempt to demonstrate the non-eternity of the world, Aquinas includes one that is based upon the notion of efficient causality.

Then, too, it follows that it is possible to proceed to infinity in the line of efficient causes, if the engendering of things has gone on perpetually--and this in turn follows necessarily on the hypothesis that the world always existed; the father is the cause of the son, and another person the cause of that father, and so on endlessly.

At 2.38.13, Aquinas refutes the above argumentation by way of the distinction between types of causal series.

Nor does the objection to the theory of the world's eternity that is raised in the *fifth argument* [as above] have compelling force. For, according to the philosophers, it is impossible to proceed to infinity in the order of efficient causes which act together at the same time, because in that case the effect would have to depend on an infinite number of actions simultaneously existing. And such causes are essentially infinite, because their infinity is required for the effect caused by them. On the other hand, in the sphere of non-simultaneously acting causes, it is not, according to the partisans of the perpetual generation theory, impossible to proceed to infinity. And the infinity here is accidental to the causes; thus, it is accidental to Socrates' father that he is another man's son or not. But it is not accidental to the stick, in moving the stone, that it be moved by the hand; for the stick moves just so far as it is moved.

Notice once again the hand-stick-stone example; in all probability an allusion to Aristotle's *Physics*. Here Aquinas refers to 'the philosophers'. To which philosophers does Aquinas refer here? Most likely it is to a group of Arabic philosophers. For in ST, Q. 7, art. 4, Thomas attempts to answer whether an infinite multitude of things can exist. In the *respondeo*, Aquinas attributes a similar distinction among infinities to the Arabic school of philosophy.

Some, as Avicenna and Algazel, said that "it is impossible for an actually infinite multitude to exist absolutely, but an accidentally infinite multitude is not impossible. A multitude is said to be infinite absolutely when an infinite multitude is necessary that something may exist".

Aquinas' response to this point is interesting, and supplies another instance in which he refers to the two types of series (though here not *causal series per se*). Here, while he uses the term 'accidental' and 'absolute', he is talking about whether an actual infinite of entities can exist.

Now this is impossible, because it would entail something dependent on an infinity for its existence, and hence its generation could never come to be, because it is impossible to pass through an infinite medium.

Getting back to an earlier question, we now can look more closely at the question of the Latin verb *movetur*. Aquinas, I submit, is using *movetur* in the First Way as a series of simultaneous movers. At the end of the First Way he alludes to Aristotle's hand-stick-stone example. This would have been enough given his audience, who was very familiar with the example, to establish the type of causal relation that he had a vested interest to discuss. According to his description in SCG 2.38.13, it seems reasonable to conclude that Aquinas intends his readers of the Second Way to imagine the causal series spoken of to be a simultaneous relationship. Further evidence can be gathered from the fact that in both passages in which Aquinas makes this important distinction between types of causal series, he says of the

essentially related series that they are in 'order'. However, the strongest evidence for the question at hand is the explanation of SCG 2.38.13, as above.^[15]

II. EXPOSITION OF THE SECOND WAY

Aquinas' Second Way consists of four basic premises, and rests on a number of causal principles. Each of these four premises must be evaluated separately to ensure the cogency of the argument. I shall introduce Aquinas' causal principles in the text as needed.

- (1) In sensible things we find an order of efficient causes.
- (2) It is impossible for this order of causes to proceed to infinity.
- (3) There must be a first efficient cause.
- (4) This first cause is God.

I have argued above that we are to interpret (1) as a series of essentially ordered causes. That is, a series of causes that is simultaneously transitive, from earlier causes to the latest cause. In using the terms 'first cause', intermediate causes', and 'ultimate cause', one may think that Thomas is guilty of question-begging in using these terms. For to posit a first, intermediate, and last cause seems at once to assume the conclusion that there *is* a first cause of each essentially ordered series to which we can refer. However, I do not think Thomas is guilty in this way. If he is successful, he will have shown that the number of intermediate causes is indeed finite. If he is not successful, there is simply an infinity of causes through which the 'moving cause' causally moves or is transferred to arrive at the ultimate cause. After all, it is the ultimate cause that we 'see'; we can only 'sense' some intermediate causes. For example, in the hand-stick-stone case, we can sense that the stick is transferring a kinetic causal force from the hand to the stone, on account of seeing the stone being moved as it is. Is this always the case that some causes we see and others we only 'sense'? Perhaps. In the case of the wind causing the windmill to turn, we do sense that there is something that accounts for the windmill turning as it presently is. Thus the principle that Thomas evokes in the Second Way:

- (c1) It is not possible that a thing be the cause of itself.

This principle is to causality what the principle that 'whatever is in motion, must be moved by something else' is to motion. (c1) is the causal relative of this principle that Thomas utilizes in the First Way. It hinges on the Aristotelian notion of potentiality and actuality. For Aquinas says in the First Way that it is impossible that anything should be both mover and moved '*in the same respect and in the same manner*'. (*supra*) While I shall not attempt to establish the principle of motion here, I shall work with the Second Way in a manner that is indifferent to the Aristotelian principle of motion. However, I shall continue to show similarities and relations between the First and Second Ways, for there are many relations that do not explicitly involve these similar underlying principles. This will become clear as we look more closely at the Second Way. It seems that in a simultaneous series of causes, it is never the case that any link c(n) in the chain of causes is a being that *comes to be* on account of its predecessor c(n-1). That

is, the intermediates of which Aquinas speaks are already existing substances, either material or immaterial. For Aquinas says in SCG that

in things made by way of motion, *to be made* and *to be* are not simultaneous, because the production of such things involves succession. (2.37.6)

So, to be an intermediate cause means to transfer a cause that is possibly transferable and intrinsically transitive. The cause that is transferred must be transitive. This is only one of the ways in which the First and Second Ways are related: *motion* is one type of transitive causal relationship. As we have seen from other contexts, *begetting* is not considered to be a transitive causal relationship. Modern science has shown that the idea of *simultaneous* transitive causal relationships is questionable. Imagine a train, presently at rest, consisting of a locomotive and 10 boxcars all linked together. A moment later, at t_1 , the locomotive starts in motion. While its motion is distributed transitively to the rest of the cars, there is likely at least a moment at which the engine's motion precedes that of the cars behind it. Because of the elasticity of the couple that links the cars together, the transferred cause can be sensed to be present sooner in those cars that are nearer to the engine.¹¹⁶ Even so, the motion is transitive, in that the car before the caboose can be said to move the caboose, even as the engine can be said to move the caboose. In this case, the pre-caboose car is an instrumental cause of the caboose's forward motion, while the engine is the primary or first cause.

Step (2) of the Second Way was stated as: It is impossible for this order of causes to proceed to infinity. Aquinas' argument for this is explicit and initially compelling. Is it not evident by now that there are different types of efficient causes at work here? Some are transferring causes, some ultimate, and some primary. And it appears that while they all fall under the category of 'efficient causes', that they serve diverse functions. Aquinas states that in efficient causes it is impossible to proceed to infinity because

in all efficient causes following an order, the first is the cause of the intermediate cause, and the intermediate is the cause of the ultimate cause, whether the intermediate cause be several, or one only.

Immediately we encounter a problem of possible inconsistency with Aristotle. For the Philosopher had written that

Clearly there is a beginning, and the causes of things are not infinite, either as a series or in a kind. For neither can one thing come from something else as from matter ad infinitum (for example, flesh from earth, earth from water, water from fire, and so on without end), nor can the source which begins motion (for example, a man is moved by air, air by the sun, the sun by *Strife*, and so on without limit) be such. ...And the case of the essence is similar. For of the intermediates, of which there is a last and also a prior, the prior must be the cause of the posterior. For if we had to say which of the three is the cause, we should say the first; certainly not the last, for this is the cause of none, not yet the middle, for it is the cause of only one (*and it makes no difference whether it is one or many, or whether infinite or finite in number*). But of things which are infinite in this manner (and of the infinite in general) all the parts are alike intermediate, except the last; so that if there is no first, there is no cause at all.¹¹⁷

This seems to contradict the Thomistic account of intermediary causes. Thomas argues that the series of intermediate causes must be finite in number; on the other hand, Aristotle says in this passage that there may be an finite *or* infinite number of causes. The fact is Aristotle uses two different notions of infinity, a potential and an actual infinity; and, he denies that there is ever a presently-existing *actual* infinite. In *Physics* 3.5-7, Aristotle describes his notion of an infinite collection of things.

For in general infinity exists through one thing always being taken after another, what is taken being always finite, but ever other and other.^[18]

It seems safe, then, to conclude that Aquinas and Aristotle are not in disagreement here. They can both, despite the above semantic impediments, consistently maintain that number of intermediate causes could be extremely large, though not an actual infinite in number.

Looking more closely now at (2), 'it is impossible for this order of causes to proceed to infinity', we are struck by the plausibility of the claim as it is presented in the Second Way. On the one hand, assuming that an intermediate causal link merely transfers a cause to its successor, if there is no first cause-to-be-transferred, there will be no transferred cause, and hence no ultimate cause. If there is no ultimate cause, there is no ultimate effect, or 'seen' cause (as I have designated it above), and hence no action or motion in the world. Yet this is manifestly absurd. So, suppose that there is an ultimate cause. Therefore, given (c1), there must be a transferred cause. Either the transferring causes are one or many in number. If they are one, then we have a primary cause. If they are many, then they are either finite or infinite in number, since finitude and infinitude are the two possible cardinalities of numbers.

If the transferred cause is finite, then we arrive at a primary mover. However, what of the possibility of a series of transferred causes being infinite in number? From a modern science standpoint, there is a compelling kinematic argument that the number of causes in an essentially ordered series *must* be finite. I might state my kinematic argument in this way:

(2a) During a causal interaction between any two material relata, there is always a loss of energy, whether potential or kinetic energy.

(2b) In an infinite number of causal interactions, there is an infinite amount of energy lost, whether potential or kinetic.

(2c) There cannot be an infinite amount of energy in one kinetic system.

(2d) Therefore, any causal interaction must consist of a finite number of causes.

(2e) Therefore, there is a primary cause in this essentially ordered causal series.

The least plausible premise here is (2c); for if there *is* an infinite amount of energy in the universe, if the universe is infinite in time, space, and energy, then it is initially plausible that one kinetic system, that I am taking here to be an essentially ordered causal series, could feasibly serve to disclaim (2c). Given this argument, the only way in which we can ascertain its truth is

be to assume that the universe is finite in space, time, and energy. And, according to reason and a limited knowledge of the scope of the universe, it seems difficult to sustain this conclusion.

However, there is a way to narrow the scope and thus bolster this argument. What follows can be seen as a development of a statement in SCG 2.38.13, that it

is impossible to proceed to infinity in the order of efficient causes which act together at the same time, because in that case the effect would have to depend on an infinite number of actions simultaneously existing. *And such causes are essentially infinite, because their infinity is required for the effect caused by them.* [emphasis mine]

I shall assume that every one of the causes in the essentially ordered series under discussion is *material* in nature, whether that material be in the form of energy, light, electromagnetic radiation, or matter. (Recall here the Principle of the Conversation of Energy: in a closed system, matter is neither created nor destroyed; it only changes form(s).)

(2a') In the universe, a causal interaction between two or more material relata will involve a loss of kinetic energy, on account of at least one of these three: (i) gravitational pull on either side of the causal material that slows it, (ii) the giving off of sound in an interaction, or (iii) the giving off of heat via friction between the material causes.

(2b') In an infinite number of such causal interactions, there is an infinite amount of kinetic energy lost from the system.

(2c') There cannot be an infinite amount of kinetic energy in one kinetic system.

(2d') Therefore, any causal interaction must consist of a finite number of causes.

(2e') Therefore, there is a primary cause in this essentially ordered causal series.

In reformulating the Second Way to account for modern science, it is probably best to do away with the notion of simultaneity from our conception of essentially ordered series. As in the example of the elasticity of the couple that links the box cars, so also in the reconstruction of Thomas' Second Way we see a case in which simultaneity will apparently not work. However, there are considerations that come along with a *rejection* of simultaneity that may play in the favor of the defender of this argument. The plausibility of (2c') increases when it is remembered that to be *present* in a kinetic system means to be causally accessible to act as either the first cause or one of the intermediate causes of an essentially ordered series. However, there are two implausibilities attached to this fact, one Thomistic and the other from modern science.

(I). Thomas adopted the common sense notion that, at least for intermediate causes, all causality is *local*. Another way to state this is

(c2) For any material item x to causally interact with material item y, where such an interaction would form part of an essentially ordered series of causes, x must be either physically continuous with or contiguous to y.

On this point, we witness Aquinas in his first of three proofs for the impossibility of an infinity in an essentially ordered series, given in SCG.

Furthermore, that it is impossible for the above-mentioned infinities to be moved in a finite time Aristotle proves as follows. The mover and the thing moved must exist simultaneously. This Aristotle proves by induction in the various species of motion. But bodies cannot be simultaneous except through continuity or contiguity. Now, since, as has been proved, all the aforementioned movers and things moved are bodies, they must constitute by continuity or contiguity a sort of single mobile. In this way, one infinite is moved in a finite time. This is impossible, as is proved in the *Physics* [7.1 and 6.7]. (1.13.13)

(c2) represents the second principle that Aquinas assumes to be true of transitive causal interactions. Here we see the coming together of the First and Second Ways in yet another way. In the quote above, that is an attempt to establish (2) as it is used in the argument from motion in SCG, Aquinas uses (c2) to argue that the movers and the things moved must 'constitute by continuity or contiguity a sort of simply mobile'. That is, a body taken to be one whole through which a cause in to be distributed. We then see a third causal principle employed, viz.,

(c3) An infinite cannot traverse a finite in finite time.

Aquinas states this principle in SCG 1.13.12. Now in SCG 1.38.13 (*supra*), Aquinas states that it is impossible to proceed to infinity in the order of efficient causes which act together at the same time, because in that case the effect would have to depend on an infinite number of actions simultaneously existing.

We must decide, it seems, whether simultaneity is essential to this brand of causal series. I have relinquished it for reasons of modern science--and hence to speak to contemporary listeners a language that seems more plausible. To employ an already used example, if the elastic couple stretches a bit when it is pulled, then there seems to be some time lapse between the engine starting in forward motion and the box cars starting in forward motion. But perhaps the move available to us, to 'thomimize' the modern science outlook, would be to consider the train as a *simple body*. What if we view the engine, the elastic couple to its to posterior cars, and well as each of those cars and their links, as *one*, as a *unit* that is moved? Would this help matters at all?

There are two possibilities. If the time lapse is large enough between causal links in a unit body as above, then, the cause that proceeds down from the prior causes would never arrive, for it would be equivalent to counting down from infinity, which is impossible. Notice here that we have come to a position that sounds very much like the *kalam* cosmological argument. For the *kalam* argues that if we equate each moment with a natural number, then the number of moments that have gone by cannot be any larger than one could possibly *count* using natural numbers. For the coming and going of each day is very much like the counting of numbers, one following the other in a uniform manner.

The second possibility is to maintain the simultaneity of the causes, by adopting the 'simple body' thesis. To do this, we must account for the simultaneity of the transferred cause in a way that overcomes the elasticity of the simple body's parts. This has seemed an achievable task to some modern philosophers.^[19] What Aquinas avoids by endorsing the simultaneity of the causes in an essentially ordered series is the problems of interpretation regarding the cardinalities of infinity that figure prominently in the *kalam* argument of Philoponus and his Arabic followers. If we interpret the 'one simple mobile' thesis as not being able to pass through an infinite in finite time (i.e., *simultaneously*), then the argument seems right. And it seems right for the very reason that Aquinas argues:

Therefore, if there be no first cause among efficient causes, there will be no ultimate, not any intermediate cause. But if in efficient causes it is possible to go on to infinity, there will be no first efficient cause, neither will there be an ultimate effect, nor any intermediate efficient causes, all of which is plainly false. (ST I, art. 2, q. 3)

(II.) Above I promised to give some reasons stemming from modern science in favor of (2c'), 'There cannot be an infinite amount of energy in one kinetic system.' An appeal here is made to the construction of space-time. Given any continuous space-time 'worm' $(x_1, y_1, z_1, t_1 + *t)$ to $(x_2, y_2, z_2, t_1 + *t)$, there would have to be an infinite amount of energy available to this worm in order to transfer the cause through an infinite number of intermediaries. Now, if we adopt two theses, (i) the universe is relatively uniform in its distribution of matter, and (ii) principle (c2), the principle of material continuity or contiguity, then it seems reasonable that there are no essentially ordered causal series that possess infinite energy. To possess infinite energy would be for a continuous space-time worm to possess an infinity of matter.^[20] We have never observed this sort of entity before. And it is not a causally impossible state of affairs to have an infinite amount of energy available at one time slice at *every* point in space. The recent thesis of John Bell of non-local causality could supply the necessary underpinnings of such a position. As well, if one admits super-luminary particles in one's theory of physics, it could be argued that an infinite amount of energy in this sense could be accounted for. I find these accounts unlikely, though, for reasons that I need not explain here.^[21]

The third premise of the Second Way is (3) there must be a first efficient cause. We have seen that (3) follows if (2) (the denial of an infinite regress of causes) is true. Thomas attempts to prove that there are and indeed must be only a finite number of intermediate causes between the prior cause and the ultimate cause. There must be a first prior cause, the first cause. If there is nothing doing the moving, no movement happens. If one is able to point to a mover somewhere in the essentially ordered series and say, '*it is responsible!*', then he has located what Aquinas calls the first or *primary* cause. We cannot deny that there are orders of efficient causes in the world. What is the cause of the effects that we see? Earlier I said that legal responsibility was at work in the Second Way. It is in the present situation that it can be fruitfully employed.

Imagine, for the nonce, that Mr. Alpha is standing in line at the carnival, and there is an infinitely long line behind him, including (in order) Mr. Beta, Mr. Gamma, Mr. Delta, and so on.^[22] Suddenly, from way back in the line somewhere comes a shove, that inelegantly is transferred through the mass of people, until finally Mr. Delta pushes Mr. Gamma, Gamma pushes Beta, and Beta Alpha. Alpha plummets forward into an onlooker's puff of cotton candy,

spreading a thin coat of pink goo evenly across the front of his face. Alpha, furious over this unfortunate spill, demands to know *who* pushed him. When he asks the person immediately behind him, Beta quickly tells him that it was Gamma who had pushed *him*. Upon examination, similar responses are elicited from each predecessor in line. No one will claim responsibility; yet, something obviously happened. Aquinas says it's impossible that such an event could have an infinite number of causal nexuses; there must be a *first* shover, or else no shove at all.

III. CONCLUSION

In concluding, we come to premise (4), the first efficient cause is God. It has not been my purpose here to establish the theistic conclusion of the cosmological argument; rather I have attempted to examine carefully a certain aspect of Thomas' Second Way.^[23] If we grant that Aquinas' argument from step (1) to (3) is successful, that there must indeed be a first cause in any essentially ordered series, *what is it that Aquinas feels he has proved?*

In argument (2a)-(2e'), I assumed that all of the causes in the essentially ordered series were *material*. But perhaps the best approach in an argument of this nature is that of a *reductio ad absurdum*. If one could reduce to absurdity the idea that there can be an infinite chain of *material* essentially ordered causal series, then perhaps he could proceed to establish that there must be a first, *immaterial* cause.

The potential bugbear appears, though, at this juncture between cosmological argument and the Thomistic reasoning about God. For the proof offers justification of the claim that there is a *first* cause. However, Aquinas offers us the explanation that God is the first *transcendent* cause, which, given God's eternity and immutability, is *prima facie* very hard to accept. To jump from a first immanent cause to a first transcendent cause appears to be one of the most questionable moves in the Thomistic program. If a coherent doctrine of atemporal causality can be identified, the move between first transcendent and immanent causes would be justified. One must admit that there is a lot of theoretical potency in the Thomistic Theistic system (and in general in the Theistic system). Perhaps Thomas's way out here is to make yet another distinction: one need only say that at each specified cosmological time *t*, the transcendent first cause wills from eternity a change at *t* (that doesn't imply that he changes his will at *t* or at any other moment of cosmological time), and wills that the world be in state *S* at *t*. Thus God's will for the cosmos is a unitative, robustly complex sufficient cause determining and allowing the whole nexus of causality to be as He wills it to be at each cosmological time to achieve His good ends. The omnipotent, transcendent cause can indeed bring about a string of imminent causes on such a theory, and Thomas's view is seen to be consistent. However, it would take much more on the notion of eternal and transcendent causes to be fully justified in this theoretical analysis of transcendent and immanent causes just given, but I cannot dwell here more on the notion of eternal or atemporal causality.^[24]

I have shown that Aquinas fosters the idea of an essentially ordered series in the Second Way. I presented an interpretation of a vertical, transitive causal series while trying to be sensitive to present scientific concerns and approaches to cosmology.

As to what Aquinas takes himself to have proved in the Second Way, there is evidently some principle to which Aquinas appeals so that he can go from premise (3) to (4). In SCG 1.16.7, the kernel of his First and Second Way is seen in broader, cosmological terms. In this section Aquinas argues that there is no passive potency in God. One can recognize the relationship to the principle of motion in the First Way^[25].

We see something in the world that emerges from potency to act. Now, it does not educe itself from potency to act, since that which is in potency, being still in potency, can therefore not act. Some prior being is therefore needed by which it may be brought forth from potency to act. This cannot go on to infinity. We must, therefore, arrive at some being that is only in act and in no wise in potency. This being we call God.

This passage instructs us to remember *planetary motion* in his First and Second Way. Aquinas must have had the constant motion of the crystalline spheres in mind, the spheres in which the stars and planets traveled on their courses in Aristotelian astronomy. Every essentially ordered causal series is addressed in the Second Way, but some amount of prominence should be given to the idea of the constant motion of the heavenly bodies. This cosmological view has been shown to be inadequate; is the Second Way therefore emptied of its significance? I'm not sure. I hope to investigate these matters more closely in another essay.

In conclusion, then, Aquinas seems to foster the idea of an essentially ordered series in the Second Way. I have presented an interpretation of a vertical, transitive causal series while trying to be sensitive to present scientific concerns and approaches to cosmology. The Second Way was shown to be related to the First Way in many ways. In fine, it appears that these two Thomistic cosmological arguments hinge prominently on the principle of motion (c0); to the degree that the principle is plausible, the Thomistic First and Second Ways (save the problems I have pointed out earlier) will be, under one interpretative approach, at least as plausible.^[26]

ENDNOTES

- [1] Thomas Aquinas, *Summa contra Gentiles*, I.13 *passim*.
- [2] E.g. in a work (now lost) entitled 'On the Eternity of the World'.
- [3] I shall now represent this work as 'ST', and abbreviate his other *Summa* by 'SCG'.
- [4] As a ball that is found sitting in the sand causes the indentation in the sand simultaneously from its position in the sand. If the ball were sitting in the sand forever, the indentation is unswervingly caused by the ball's position, yet it would be the case that the causal relation between the ball, sand, and indentation is one that had no beginning in time.
- [5] Of course, this goes back to Aristotle, who wrestled with the problem of infinite regress arguments (for example, when he attempts to solve Zeno's paradoxes of motion). It is also numbered among Kant's 'Antinomies of Pure Reason'; cf. Kant's *First Antinomy*, in his *Critique of Pure Reason*.
- [6] Translations of Thomas' text of the Five Ways are taken from Antony Kenny's book *The Five Ways* (New York: Schocken, 1969), 6-69.
- [7] Chapters vii. and viii.
- [8] Thomas Aquinas, *Summa contra Gentiles* (Notre Dame, 1975), vol. 1: trans. Anton C. Pegis; vol. 2: trans. James F. Anderson; vol. 3: trans. Vernon J. Bourke.
- [9] Kenny, *op. cit.*, 12.
- [10] Thomas Aquinas, *Summa Theologiae*, trans. Fathers of the English Dominican Province, in *Great Books of the Western World*, ed. Robert Maynard Hutchins, vol. 19.
- [11] Keen insight regarding these issues can be found in Richard Sorabji, *Time, Creation, and the Continuum* (Ithaca: Cornell, 1983), 226-231.
- [12] Many of the translations of these ancient and medieval texts became available to Aquinas through his friend William of Moerbeke. See F. C. Copleston, *A History of Philosophy* (Garden City: Image, 1985), book I, vol. 2, 207; for references to these other works see Sorabji, *op. cit.*, 229-230.
- [13] Sorabji, *op. cit.*, 227.
- [14] I thank William Rowe for these helpful definitions.

[15] While the relationship between Aquinas' use of the word 'order' and the essentially related series of causes looms large, still in ST q. 46, art. 3, reply obj. 7, Aquinas does use this word while speaking of an accidental causal series: 'But it is not impossible to proceed to infinity accidentally as regards efficient causes; for instance, if all the causes thus infinitely multiplied should have the *order* of only one cause, their multiplication being accidental.'

[16] Miles Brand, "Simultaneous Causation", in Peter van Inwagen, ed., *Time and Cause* (The Netherlands: D. Reidel, 1980), 139.

[17] Aristotle, *Metaphysics* 2.2, 994a1-19; in *Aristotle's Metaphysics*, trans. Hippocrates G. Apostle (Indiana, 1966), 36.

[18] Quoted in Sorabji, *Time, Creation, and the Continuum*, 210.

[19] So Myles Brand, *op. cit.*, offers an interpretation: 'If we divide these events [the engine's moving, the couple's stretching, etc.] more finely, and consider only the event of the locomotive's moving from the point after the couple has been fully stretched to the point before it begins to compress and, similarly, the event of the caboose's moving from the point after it is fully stretched to the point before it begins to compress, then they appear simultaneous.' (139) I cannot tell whether Brand defends the notion of simultaneous causation or not, but in this passage he attempts to defend Richard Taylor, who does hold that there are some essentially ordered series that transfer their causes simultaneously. Taylor, incidentally, is the inventor of the 'train' example.

[20] On Einstein's supposition that energy equals matter times the square of the speed of light, or, $E = mc^2$.

[21] For further investigation of these issues, see James T. Cushing and Ernan McMullin, eds. *Philosophical Consequences of Quantum Theory: Reflections of Bell's Theorem* (Notre Dame, 1989); Nick Herbert, *Quantum Reality* (New York: Anchor, 1987).

[22] I'm indebted to Patterson Brown, "Infinite Causal Regress", *Philosophical Review* 75 (1966), 510-525, for the example.

[23] What could possibly justify the move from (3) there must be a first efficient cause, to (4) this first cause is God? The best response, it seems, is that of William Rowe: that is why Aquinas wrote the *rest* of the *Summa*. See his *The Cosmological Argument* (Princeton: 1975), 5; 168-269.

[24] For a Thomistic account of eternal causation, see Eleonore Stump and Norman Kretzmann, "Eternity", *Journal of Philosophy* 78 (1981), 428-456. See also the author's M.A. thesis, "The Eternal Generation of the Son of God in the Cappadocian Fathers," Trinity Evangelical Divinity School, 1990, for various arguments for the coherence of the notion of eternal or atemporal causality.

[25] That is, what we will call (c0): whatever is in motion must be moved by something else.

[\[26\]](#) For a rigorous defense of (c0), see Jan Salamucha, "The Proof 'Ex Motu' for the Existence of god: Logical Analysis of St. Thomas' Arguments", *New Scholasticism* 32 (1958), 334-372; Laurent Larouche, in a series of four articles, "Examination of the Axiomatic Foundations of a Theory of Change", *Notre Dame Journal of Formal Logic*, I: vol. 9 (1968), 371-384; II: vol. 10 (1969), 277-284; III: vol. 10 (1969), 385-409; and IV: vol. 12 (1971), 378-380.