

Michał Chaberek

Creation Is Not Generation: A Response to Brian Carl

Brian T. Carl¹ published a paper, “Thomas Aquinas on the Proportionate Causes of Living Species,”² in which he argues that modern evolutionary theory does not contradict the principle of proportionate causality when it is applied to the origin of species.

To give some background to this claim, let us notice that currently most Thomists (unlike their predecessors a few decades ago) believe that Aquinas’s teaching, or Aristotelian-Thomistic metaphysics, can be reconciled with modern evolutionary theory as presented by Darwin and his followers. In my book *Aquinas and Evolution*³ I argue that it is not possible to simultaneously hold on to classical metaphysics (as taught by Aquinas) and the theory of biological macroevolution. What do I mean by the term “biological macroevolution”? Firstly, by “biological” I mean that I do not include evolution in culture (such as the evolution of languages, laws or customs), or cosmic evolution (e.g., the production of stars and cosmic systems). The theory of biological macroevolution is then applicable to the realm of living beings, i.e., plants

Michał Chaberek, O.P. — Warsaw, Poland
e-mail: mckop@dominikanie.pl • ORCID: 0000-0001-8071-537X

¹ Assistant Professor of Philosophy at the Center for Thomistic Studies at the University of St. Thomas, Houston, TX, United States.

² In *Scientia et Fides* 8, no. 2 (2020): 223–248.

³ Michał Chaberek, *Aquinas and Evolution: Why St. Thomas Teaching on the Origins Is Incompatible with Evolutionary Theory?* (Chartwell Press, 2019).



and animals, including the human being. Secondly, by “macroevolution” I mean changes going beyond the level of taxonomical family, not the origin of new varieties, strains, races or biological species.

So the question is, whether classical metaphysics can be reconciled with the idea that new biological families, or the so-called “natural species,” can emerge thanks to the workings of natural secondary causes, such as generation, variation and natural selection. In my book⁴ I presented five arguments why such a reconciliation is not possible and I argued that Aquinas’s metaphysics flatly contradicts the idea of macroevolution. Dr. Carl’s paper is aimed at answering my first argument. In what follows I will explain why his answer does not really resolve the problem indicated in my argument.

At the beginning Dr. Carl sketches his goal: “I will show that Thomas’s understanding of . . . instrumental causality . . . should undercut any use of the principle of proportionate causality to argue that biological evolution is irreconcilable with Thomas’s metaphysical principles.”⁵ However, what he actually demonstrates is that the concept of spontaneous generation, as understood by the medieval scholars, does not contradict the principle of proportionate causality. To show what was intended, Dr. Carl would need to make another step and demonstrate, how medieval spontaneous generation can pose as biological macroevolution in the modern context. He does not make this step, leaving the reader with an impression that—once spontaneous generation is metaphysically justified—the same applies to biological macroevolution. But this is not so.

⁴ *Ibid.*, 51–56.

⁵ Carl, “Thomas Aquinas on the Proportionate Causes of Living Species,” 226.

Spontaneous Generation

According to pre-modern science some animals can be spontaneously generated from putrefaction (rotting materials such as meat, plants or slimy mud).⁶ This was considered a “mode” of generating some of the so-called “lower” or imperfect animals, among them flies, bugs and worms. The concept of spontaneous generation in its basic form persisted from antiquity to the 19th century when (thanks to the experiments of Louis Pasteur) we learned that “life comes from life only.” The entire concept was therefore based on the lack of pretty basic (according to our standards) knowledge about microbes. There is nothing spectacular in the fact that Aquinas, along with any learned (or not) person of his times, accepts this way of producing insects. The idea was so apparent to the senses that, without access to the advanced microscope, one could hardly resist it. Hence, it is not surprising that the pre-modern scholars did not realize that spontaneous generation caused by the heavens posed a problem to proportionate causality—one “black box”⁷ (the generation of bugs) was simply explained away by another “black box” (the “influence of the heavens”). Pre-modern scholars did not know how non-living matter can bring about life so they called for

⁶ When it comes to spontaneous generation, Aristotle lets his imagination run wild: “Others do not originate in animals of the same species, but their production is spontaneous, for some of them spring from the dew which falls upon plants. The origin of these is naturally in the spring, though they often appear in the winter, if fine weather and south winds occur for any length of time. Some originate in rotten mud and dung; and others in the fresh wood of plants or in dry wood; others among the hair of animals, or in their flesh, or excrements, whether ejected, or still existing in the body” (*The History of Animals*, IV, 17, trans. D’Arcy Wentworth Thompson; available online—see the section *References* for details). Obviously, Aristotle relies on merely phenomenal data about nature, so he sees spontaneous generation whenever a bug is born from an invisibly small embryo.

⁷ I am using here the term “black box” in the way M. Behe does it in his books. A “black box” is a system whose input and output data is known, but what happens inside is a conundrum.

help to the “heavens”—an entity sufficiently vast and mysterious to fill any gaps in natural knowledge. There is no reason to refer to Aquinas as if his position on spontaneous generation contained some unusual, groundbreaking metaphysics. Not surprisingly, Aquinas does not see that in spontaneous generation a sufficient cause is missing, because neither does he know the complexity of “lower animals” nor the “simplicity” of the heavens.

The starting point for any metaphysics is the observation of nature. For Aristotle facts of nature formed the basis for metaphysical principles. For Aquinas spontaneous generation was a “fact,” so we should not expect him to believe that a “fact” contradicts his own metaphysics. Even so, we can detect some uneasiness in Aquinas when he writes about life popping up from putrefaction, even if it happens with the help of the heavens. The Angelic Doctor brings up the problem of causation in a somewhat unexpected moment, when he speaks about creation and the formation of the universe.⁸ There is no reason for St. Thomas to mention it right there, in a completely different context, had he not wanted to somehow prop up this idea and, in a way, explain himself.

Spontaneous generation could philosophically justify biological macroevolution only if it actually referred to the origin of entirely new forms of life by natural transformation of previous life forms. But this is not the case. What does the theory of spontaneous generation tell us? Only that some animals may be born from non-living matter. It does not entail any of the essential elements of biological macroevolution: no transformation of species via natural generation, no emergence of entirely new species after creation was completed. Surely, if we limit the discussion to causality, leaving aside all other metaphysical problems in the evolutionary narrative, the occurrence of spontaneous generation would suggest there is sufficient cause in rotting material. The reason

⁸ *S.Th.*, I, q. 73, a. 1, ad 3.

for that is that the heavens supplement what is missing to bring about an individual of a species already created in the work of the six days. However, it does not follow that there is a sufficient cause in the combination of “matter and heavens” to produce an entirely new species, a new form of life, a new substantial form, or a new divine idea, from rotting matter.

Dr. Carl explains: “The general principle employed [in spontaneous generation] is not a version of the principle of proportionate causality, but is instead a principle about the need for mediating instrumental causes in order for a created remote cause to produce a more powerful effect.”⁹ The issue, however, is whether there is a proportionate cause in spontaneous generation. Dr. Carl’s answer is that this principle does not matter because it is all about mediating causes. But what difference does it make? If a set of mediating causes resolves the problem of proportionate cause, this only means that those mediating causes together make up for the proportionate cause. Or, does Dr. Carl want to tell us that the principle of proportionate causality does not apply if you have a chain (long enough) of mediating causes? This would be denying logic, so I do not think that this is what he means, however, it is not clear based on his paper alone. Nevertheless, whether mediating causes stand for proportionate cause or not is irrelevant for the debate, because it does not explain how proportionate cause could be found in biological macroevolution.

Therefore spontaneous generation, if it has any bearing whatsoever on the problem of evolution and metaphysics, could only be considered if it could bring about new natural species. Then, by a very long shot, Dr. Carl could probably make an extrapolation of this kind: Since spontaneous generation can bring about entirely new species just by the action of the heavens upon matter (with some mediating causes), then

⁹ Carl, “Thomas Aquinas on the Proportionate Causes of Living Species,” 239.

perhaps the heavens influencing living beings of given species could transform them on the way of natural generation into entirely novel forms of life. This would be quite an extrapolation, because the more determined the substance, the more power is needed to transform it into something else. Rotting matter does not have any (highly) specified form, therefore it is a better candidate for generating new species. But in regular generation the highly specified form of a parental individual would exclude the posterity to be transformed into something else, even if many mediating causes were present.

For Aquinas every being strives to keep its essence rather than lose it, which is captured by the principle “like generates alike.” In spontaneous generation the influence of the heavens may be sufficient because the rotting matter is somehow disposed to receive the form of a bug, but in a regular generation matter is not disposed to receive any other form but the form of the parents. So, the mere fact of Aquinas’s belief that there is sufficient cause in spontaneous generation does not imply that the same causation would suffice to transform one species into something completely new in a non-spontaneous generation.

This unfounded application of one type of causation to another effect makes irrelevant the question of whether new species can emerge after creation was completed. In other words, even if Aquinas allowed the production of new species in spontaneous generation, it would not *per se* justify the recourse to “heavens” as sufficient cause in biological macroevolution.

But it is not quite certain that Aquinas actually allows for new species (again, natural species or new families) to emerge as an effect of spontaneous generation. I can find only one place that could potentially be used to support this claim and, surely, Dr. Carl does not fail to quote it, and interpret it beyond what Thomas says. In the *Summa* (I, q. 73, a. 1, ad 3) Thomas states that nothing entirely new can come to existence that was not created in the work of the six days. So even the

individuals born through spontaneous generation belong to the defined species as they were created in the work of adornment (*opus ornatus*). No room for the novelty required by macroevolution. At this point, however, Thomas seems to make an exception:

Species, also, that are new, if any such appear, existed beforehand in various active powers; so that animals, and perhaps even new species of animals, are produced by putrefaction by the power which the stars [i.e., the heavenly bodies] and elements received at the beginning. Again, animals of new kinds arise occasionally from the connection of individuals belonging to different species, as the mule is the offspring of an ass and a mare; but even these existed previously in their causes, in the works of the six days.¹⁰

In this fragment Aquinas mentions three times the possibility of new species emerging after the completion of creation out of which the first two are conditional (*si quae apparent, si novae species producantur*) and only the last one is unconditional. So, Aquinas does not take for granted the third objection stating that many new things were produced after creation was completed “even of certain new species that are frequently appearing, especially in the case of animals generated from putrefaction.”¹¹ On the contrary, Aquinas is somewhat suspicious of this idea (let alone allowing it to “frequently appear”), because this would deny his major statement that creation was completed within the work of the six days. Indeed, the entire Article 1 of Question 73 is designed to say the opposite, namely, that creation was completed, and therefore no new things, especially no new species of living beings, can be anyhow produced afterward. If Aquinas allows it (provisionally) it is only under the pressure of the “bad science” of spontaneous generation. This is where Dr. Carl significantly strays from Aquinas: According to the theory of evolution, species should emerge normally and regularly by

¹⁰ *S.Th.*, I, q. 73, a. 1, ad 3.

¹¹ *S.Th.*, I, q. 73, a. 1, obj. 3.

evolution (in fact, all species should be the product of evolution) but Aquinas makes only a provisional exception for spontaneous generation to produce new species. Thus on Dr. Carl's account the entire thrust of Aquinas's argument would need to be reversed—whereas Aquinas says that creation was completed once for all within the six days, and maybe sometimes some new lower animal can emerge afterward, Dr. Carl proposes that all species are produced after creation was completed by means of generation. What is merely a doubtful exception for Aquinas becomes a rule for Carl; what Aquinas adopts as a rule, Carl entirely ignores.

The third time, the only one when Thomas speaks of such possibility unconditionally, he immediately gives an example of the kind of “species” he means. It is the mule, which is not a new species according to the definitions adopted in biological macroevolution. Mule belongs to *Equidae* family which includes both parents (horse and donkey). As such it is not the type of novelty that is required by biological macroevolution. Thomas could easily give an example of a true, fully distinct species, as he does in other places when speaking about the origin of species (he mentions human, lion). Most probably, by giving the example of a mule, Aquinas means here that if new species emerge after the completion of creation they are nothing but variants or combinations of previously created species, which remains within the limits of microevolution. We see therefore that Aquinas does not allow creation to be incomplete in the sense required by macroevolutionary theories.

Now, if one dismisses my argument because I resort to the type of taxonomy that Aquinas does not apply or even know, by the same token one should reject the very possibility of comparing the medieval “science of spontaneous generation” with modern “science of evolution,” because Aquinas does not know it either. In other words, there is nothing wrong with showing that the mule is not a new taxonomical family while discussing the problem of compatibility between Aquinas

nas's doctrine and evolution. The fact that Aquinas does not resort to modern taxonomy is as irrelevant for the discussion as the fact that he never mentions the modern theory of evolution.

All of the above undercuts Dr. Carl's approach to the issue of evolution and Aquinas. But a bigger problem arises only now, when we realize that the entire theory of spontaneous generation applies to only a handful among tens of thousands of species.¹² If spontaneous generation allows for the emergence of only lower animals (and not even all of them but just those few possible exceptions) then what would the evolutionary account of life look like? It would mean that very few species originated by evolution and the rest still had to be specially created. This leaves us with quite an odd, "half-evolutionary" vision that is anything but a harmonization of Aquinas and evolution. Who of the current evolutionists would embrace it? Apparently, even if we allow Dr. Carl to squeeze from Aquinas all what he wants, he is still less than half-way to the goal he claims to have achieved. Interestingly enough, my opponent frankly admits it at the beginning of his paper:

Like Aristotle, Thomas does in fact hold that there are *some* animal species whose members can only be generated through reproduction by already existing members of the same species: if this is so, then the emergence of such animals through any natural evolutionary process is impossible.¹³

Dr. Carl's indication that "some" animal species require a parent of the same species for reproduction is not quite accurate, because for Aquinas virtually *all* species follow this rule (with a few possible exceptions in spontaneous generation). But even taking this statement as it is, it

¹² The number of genera in biology is estimated at over 70 thousand whereas the number of families at over 20 thousand. Somewhere between these numbers is the number of natural species. See data from the Integrated Taxonomic Information System (available online—see the section *References* for details) and the National Center for Biotechnology Information, USA (available online—see the section *References* for details).

¹³ Carl, "Thomas Aquinas on the Proportionate Causes of Living Species," 224, emphasis added.

means that Dr. Carl dismisses his own conclusions right at the outset of his argument. If I was to look for consistency, I would say that his search for proportionate cause in evolution is only theoretical. He acknowledges that for Aristotle and Aquinas the evolutionary origin of species “is impossible” perhaps for reasons other than the lack of proportionate cause.

The Status of the Mule

It seems that for some theistic evolutionists the entire question of whether evolution is compatible with Aquinas hinges upon the taxonomical status of the mule.¹⁴ They seem to believe that if the mule is a distinct species then evolution is possible, because Aquinas allows for at least one new species to arise after creation was completed. But is it really the case?

In order to see why the mule, even if it was a new distinct species, does not help to reconcile Aquinas and evolution we need to look closer at the evolutionary scenario. We are used to thinking that evolution is a biological process that makes one species change into another. Hence, evolution proponents typically focus on demonstrating how species “A” (it can be a species, a particular protein, a gene, an organ or anything of this kind) could have transformed into species “B.” On the other hand, evolution deniers provide reasons for why the transition from “A” to “B” is not possible. But in any realistic evolutionary scenario we do not move from “A” to “B,” because we do not have the “B.” There is an evolving species “A,” but evolution does not know whether it should be transformed into “B” or maybe “C” or anything else. It does not even know what “B” is. Therefore the *transformation*

¹⁴ Cf. N. P. G. Austriaco, “In Defense of Thomistic Evolution: A Response to Chaberek,” *Public Discourse. The Journal of the Witherspoon Institute* (available online—see the section *References* for details).

of species is not the same as the evolutionary *origin* of species. We can say that the possibility of species transformism is a *necessary* but not a *satisfactory* condition for biological macroevolution.

And this is where the mule turns out to be another dead end for evolutionary reasoning: In the generation of the mule we see species “A” mating with species “B” producing offspring “C.” But the generation of the mule is as repetitive and constrained to the limits of natural generation as any other generation. It does not create anything new in every instant or even occasionally. Donkey mating with mare will always produce a mule, sometimes a lame mule or a dead mule, but nothing more, nothing less and nothing else. The mule being infertile proves not to be a good candidate to begin any new evolutionary branch. But this is not different from any other generation—if the offspring is fertile then it produces the posterity of the same species. If the posterity is infertile then it does not produce any posterity. Either way, evolution does not make any progress toward an entirely new, so far unknown species “X.”

Let us now turn to an even more restrictive issue¹⁵ of whether the mule is actually considered by Aristotle a new species. Dr. Carl is quite committed to proving so, because he believes that the issue of Aquinas and evolution is at stake. I have just shown this is not the case. The mule does not help either way. We can therefore relax and carefully re-read what Aristotle and Aquinas say and perhaps retrieve what Dr. Carl has missed. I will analyze Dr. Carl’s entire argument statement after statement.

Dr. Carl first refers to Aristotle’s *Metaphysics*, where the Philosopher includes the mule in the common genus with its parents (horse

¹⁵ It is a “more restrictive issue,” because if the mule does not help Thomistic evolutionists when considered a genuine species, it helps even less if it is not a genuine species.

and donkey) as a beast of burden.¹⁶ To be precise, Aristotle states that “the genus next above them [horse and ass], has not received a name, but it would doubtless be both [horse and ass] in fact something like a mule.”¹⁷ Only Aquinas in his commentary adds: “in reference to that genus it can be said that like generates like; for example, if we might say that that proximate genus is beast of burden, we could say that, even though a horse does not generate a horse but a mule, still a beast of burden generates a beast of burden.”¹⁸ So the name “the beast of burden” as designating the closest genus for horse, donkey and mule is actually given by Aquinas.

Dr. Carl tells us that there are “some authors” who, based on the quote from Aristotle, “deny that the mule is a genuine species, by suggesting that the mule is somehow an imperfect member of a genus but not a member of a genuine species.”¹⁹ However, “it would seem impossible to square with Aristotle’s understanding of genera and species to suppose that some individual could exist which was merely of a genus without belonging to a species.”²⁰ This statement introduces a twofold confusion. Firstly, the issue is not about whether mule belongs to a species or just to a genus. Rather the question is if the species it belongs to is distinctive enough to call it a separate genus, which would be required to justify macroevolution. Secondly, this is precisely what Aristotle and Thomas teach (as we will see below)—mule is not a species of its own, but a species in between horse and donkey.

¹⁶ Carl, “Thomas Aquinas on the Proportionate Causes of Living Species,” 229.

¹⁷ Aristotle, *Metaphysics*, bk. VII, part 8, trans. W. D. Ross (available online—see the section *References* for details).

¹⁸ Thomas Aquinas, *Commentary on the Metaphysics of Aristotle*, vol. II (Books VI–XII), trans. John P. Rowan (Chicago: Henry Regnery Company, 1961), bk. 7, lesson 7, set 1433. Available online—see the section *References* for details.

¹⁹ Carl, “Thomas Aquinas on the Proportionate Causes of Living Species,” 229.

²⁰ *Ibid.*

Unfortunately, Dr. Carl does not provide any reference to “some authors,” so it is hard to check exactly what they say. If we go, however, to the place in *De anima* (bk. 2, part 3), to which Dr. Carl refers the reader (in the footnote), there is nothing that would support his thesis.²¹ Aristotle discusses there the relation between the soul and the sensory functions, and states that the faculties of different animal souls should determine their assignation to different kinds. But the mule does not differ in its sensory functions from either of its parents, so this Aristotle’s teaching is hardly applicable to assign a distinct species to the mule, which contradicts what Dr. Carl implies.

My adversary refers to “some authors,” who deny that the mule belongs to a species, and he dismisses their thesis (by offering a misleading reference), but he completely overlooks the real challenge to his thesis that comes from the quoted Aristotle’s passage. In *Metaphysics* (bk. VII, part 8), the Philosopher strives to explain how things “come to be” and his main thesis is that in the generation of animals neither the form is produced nor matter but the substance is passed on. This, according to the Philosopher, applies primarily to “natural” generation, but the generation of the mule is “contrary to nature.” Even so, Aristotle believes that the mule is not an exemption to the general principle

²¹ Dr. Carl probably refers to the following fragment: “It is now evident that a single definition can be given of soul only in the same sense as one can be given of figure. For, as in that case there is no figure distinguishable and apart from triangle, etc., so here there is no soul apart from the forms of soul just enumerated. It is true that a highly general definition can be given for figure which will fit all figures without expressing the peculiar nature of any figure. So here in the case of soul and its specific forms. Hence it is absurd in this and similar cases to demand an absolutely general definition which will fail to express the peculiar nature of anything that is, or again, omitting this, to look for separate definitions corresponding to each infima species” (*On the Soul*, bk. 2, part 3, trans. J. A. Smith. Available online—see the section *References* for details). Here, we can interpret Aristotle as proposing that the distinction between the genus and the species is only intellectual, but in reality every living being is determined in such a way as to belong to a genus and to a species (excluding the possibility of belonging to a genus alone). It does not follow that the mule must be a genuine, distinct or novel species.

of how animals “come to be.” He recognizes the exceptionality of the mule’s generation, yet his entire goal is to say that regardless of this exceptionality, mule follows the general principle of the natural coming to be. In my opinion, the fragment is not decisive, but—especially in the light of Aquinas—it definitely speaks in favor of including the mule in one, very narrowly defined genus (*genus proximum*), together with horse and donkey. And this undermines Dr. Carl’s claim.

Then my adversary refers to *De potentia* (q. 3, a. 8, ad 16) where Aquinas explicitly speaks of the mule’s status: “Although a mule is unlike a horse or ass in species, it is like them in the proximate genus: by reason of which likeness one species, a mean species as it were, is engendered from different species.”²² So, contrary to what Dr. Carl promotes, Aquinas does not consider the mule a distinct or perfect species on its own terms. The mule is actually a species in between two other—horse and donkey, all three belonging to the same proximate genus. This solution lends some support to Dr. Carl’s thesis, but it takes him only half way through, because we can interpret Aquinas either way—the mule is a species, or it is not a species, like with a glass of water: It is half empty or half full.

Does it mean we cannot resolve the issue? I think not, because the context clarifies Aquinas’s message. In that particular Article 8, Thomas defends the thesis that creation was completed within the six days, therefore it is not mingled with the works of nature. The objections quoted by Aquinas propose that there are many new things that appear after creation was completed and they should be attributed to the work of creation (which would mean that creation is mingled with the

²² “Licet mulus non sit similis equo vel asino in specie, est tamen similis in genere proximo: ratione cuius similitudinis ex diversis speciebus sua species, quasi media generatur.” Thomas Aquinas, *Quaestiones Disputatae de Potentia Dei. On the Power of God*, q. 3, a. 8, ad 16, trans. the English Dominican Fathers (Westminster, Md.: The Newman Press, 1952).

works of nature). Now, Thomistic evolutionists believe that species emerge by evolution, i.e., by the work of nature. Thomas, on the contrary, attributes the origin of species to the work of creation (see below). The point of contention is whether species are on the side of creation or on the side of the works of nature. The entire goal of Aquinas's response to the objection 16 is to say that the mule is not an example of the type of novelty that would require creative divine causality, so it is not a species in the same sense as those other species that had to be created. Hence (regardless of whether Aristotle and Thomas consider the mule a distinct species, or just a species in-between two other species), in the context of evolution, this is not the type of species that would be a point of contention. Both creationists (such as Aquinas) and evolutionists (such as Carl) agree that the mule emerges naturally. Since true species need to be created and the mule does not, the mule is not a true species, at least not in the sense that is employed in the debate over evolution and its compatibility with Aquinas. Therefore, Aquinas's mule from *De potentia* does not lend any support to Carl's ultimate conclusion that "novel species might arise from the active powers of already existent natural agents."²³

Next, my adversary refers to "some interpreters" (unfortunately, a reference is missing again) who "assume that Aristotle thinks that the mule is sterile simply because it is generated through hybridization and that its sterility is a consequence and sign of its imperfection or its failure to be of a genuine species."²⁴ Then he brings up Aristotle's deductive explanation²⁵ for why mule is sterile. But Aristotle does not think that the deductive explanation regarding nature merits any attention and

²³ Carl, "Thomas Aquinas on the Proportionate Causes of Living Species," 230.

²⁴ *Ibid.*

²⁵ Aristotle, *Generation of Animals*, trans. A. L. Peck (London: William Heinemann LTD, Cambridge, Mass.: Harvard University Press, 1943), 253–255. Available online—see the section *References* for details.

dismisses it as “empty.” Carl recognizes this fact and moves on to present next argument. Here one could rightly ask, what was the aim of even bringing up the question of sterility of the mule hybrid? Without providing any reference nor any argument from Aristotle this entire paragraph is nothing but attacking a straw man.

Then Dr. Carl continues: “Aristotle has in fact listed numerous fertile hybrids of which he is aware earlier in the *De generatione*, and he has claimed that, as far as he knows, the mule alone is sterile among hybrid animals.”²⁶ Indeed, Aristotle mentions many other examples of hybrids, but he never suggests that they are of any other, genuine or entirely distinct species. On the contrary, when discussing crossbreeds such as among dogs, foxes, wolves and jackals, or among some birds, Aristotle confirms that these animals “are closely allied in their nature [syneggys ten physin], and are not very different in species [eidei].”²⁷ Aristotle also mentions a story about Libya, where apparently animals of different species meet at very limited spaces (due to the scarcity of water) and then the unrelated [me homophyla, me homogene] animals mate. But clearly here the Philosopher does not make any argument for the production of new species; his goal is to only say that perhaps there are some more distant animals that can mate in very specific conditions. Aristotle does not take the “stories about Libya” for granted, neither does he provide any actual example. We see therefore Dr. Carl informing us about Aristotle’s recognition of fertility among hybrids other than the mule, but failing to add that the Philosopher considers the mating parents not very different from each other. On Aristotle’s account they are

²⁶ Carl, “Thomas Aquinas on the Proportionate Causes of Living Species,” 230.

²⁷ Aristotle, *Generation of Animals*, 243. Translation by A. Platt conveys the same message: “[those animals] whose nature is near akin and whose form is not very different, if their size is much the same and if the periods of gestation are equal.” *On the Generation of Animals* by Aristotle, Available online—see the section *References* for details.

far from being distinct species, they do not produce new species, so there is no support here for Dr. Carl's argument.

Perhaps I have spent too much time on explaining the mule. This, however, detailed clarification of just two pages of Dr. Carl's paper provides a sample of how his entire article is woven from minute, manipulative misrepresentations of both Aristotle and Aquinas which accumulate throughout to produce entirely wrong conclusions by the end.

Clarification on Instrumental Causality

Dr. Carl, similar to other Thomistic evolutionists, abuses the concept of instrumental causality implying that if there is a divine prime cause then the instrumental cause can produce any effect whatsoever. Specifically, my opponent applies instrumental causality to the origin of new species by claiming that for Thomas an instrumental cause can act beyond its species.²⁸ It is hard to find consistency in Carl's argument, because on the one hand he confirms that "the generation of perfect animals requires the instrumental contribution made by the animal reproducing within its species,"²⁹ on the other hand he believes that the principle of mediating instrumental causes "hardly seems irreconcilable with a theory of biological evolution."³⁰ One wonders, how could evolutionary generation produce a new kind of a higher animal when it requires a parent of the same kind for that animal?

²⁸ Carl quotes Aquinas's *Commentary on the Sentences* (*Super Sent.*, lib. 4, d. 12, q. 1, a. 2, qc. 2, ad 2): "[P]ropriam virtute nihil agit ultra suam speciem: sed virtute alterius, cuius est instrumentum, potest agere ultra speciem suam, sicut serra agit ad formam scammii" ("Thomas Aquinas on the Proportionate Causes of Living Species," 228, note 8). And later on he states: "It is essential to the notion of instrumental causality that an instrumental cause produces an effect that exceeds its own independent power, by virtue of its being moved by a principal agent . . ." (*ibid.*, 237).

²⁹ Carl, "Thomas Aquinas on the Proportionate Causes of Living Species," 237.

³⁰ *Ibid.*, 239.

The problem with the evolutionists' appeal to the instrumental cause is that they do not see the limits to instrumental causality when God is involved as the prime cause. According to Aristotelian-Thomistic approach, things have their natural operations that can be exceeded when they act as instrumental causes. Let's refer to an example: A teacher exits a classroom leaving a piece of chalk on the table. A window is left ajar and the wind blows strongly enough to move the chalk across the table. The chalk leaves chaotic marks on the table before it falls on the floor. In this case, the marks are the effects of the natural operation of the chalk. However, when the teacher returns and starts writing mathematical equations on the blackboard the meaningful patterns left by the chalk vastly exceed its natural agency. Then the chalk becomes an instrumental cause in the hands of the teacher who produces effects unattainable to the chalk on its own power. Aquinas refers to exactly the same principle when speaking of a saw making a bench or chisel making a statue. Their natural capacity of cutting wood or stone is exceeded by the power of the chief agent, such as a carpenter. We need to notice, however, that in each of these examples the effect produced by the instrumental cause does not exceed its capacity in an absolute or completely arbitrary way. Still a chalk, a chisel, a saw, a brush, or anything of this kind is used according to its nature, because it belongs to the nature of a chalk to write, or a saw to cut, etc.

Now, let's translate the Thomistic understanding of instrumental causality into evolutionary terms. According to Dr. Carl, an instrumental cause in the form of a univocal generator is needed to produce offspring of the same species. So, the seed itself cannot generate posterity, but when it acts as an instrumental cause for the "heavens" then it can generate posterity. And this is analogous to the saw making a bench owing to the power of the carpenter. However, if a carpenter wanted to make an ice-cream using the saw or a teacher cut stone with a piece of chalk they would fail in each case, because these effects are completely

disproportional to the nature of the instruments. Similarly, in evolution, the “heavens,” that is, the influence of any heavenly or earthly factors (be it sunlight, water, gravitational energies, environmental pressures, or anything of this kind) will not suffice to produce a new species, because none of these factors is proportionate to produce new types of life. To produce a new species a designer is absolutely necessary, because each new form of life entails a solution to a number of “technical” (physical, chemical, biochemical) problems that need to be resolved to make a functional organism. The solution to the problems can be found only by an intellect which has foresight, not by blind or random, or repetitive (necessary) workings of the “heavens.” Dr. Carl completely misses this obvious point, but this is precisely the point when we realize that a proportionate cause is missing in biological macroevolution.

Theistic evolutionists typically say that even though the “heavens” do not have the capacity to produce species, but when they act as the instrumental cause they bring about all kinds of novelties. As I mentioned before, in Aquinas the instrumental cause can act beyond its natural capacity, but not against its nature. Surely, God can overcome the limits of the “heavens” in producing new species as easily as He can cut rocks with peanut butter. But then evolution would not be an instrumental cause anymore, rather God would work beyond secondary causes creating the effects regardless of the instruments. In this case evolution would not be a natural process, indeed, it would not be a process at all, but rather a form of creation, i.e., the supernatural work of God in the universe constantly surpassing the limits of nature. And this takes evolutionists back to the original Thomistic idea of second creation (*secunda creatio*), which is contrary to theistic evolution.

One specific reason why Dr. Carl seems unable to notice this obvious limitation of instrumental causality may stem from the fact that

he conflates the problem of *proportionate cause* with the problem of *sufficient cause*. For instance, he concludes:

[T]he only general metaphysical principle that St. Thomas invokes in order to argue for the need for the instrumental contribution of a univocal generator is not the principle of proportionate causality, but instead the principle that a remote created universal cause needs the instrumental contribution of mediating instruments to produce more powerful effects. This principle seems reconcilable with evolution.³¹

The very juxtaposition of “the need for proportionate cause” and “the need for mediating instrumental causes” is doubtful, because the first principle is quite general and sometimes the lack of the mediating cause may mean the lack of proportionate cause. Nevertheless, I formulated the metaphysical problem for biological macroevolution as the production of “higher effects” by “lower causes,”³² which translates into the lack of sufficient rather than proportionate cause. Surprisingly, this otherwise insignificant difference turns out important in the case of animal generation—the lack of mediating cause is the lack of sufficient cause.

The Origin of Species in Aquinas

So far I have shown that even if there were sufficient causation in spontaneous generation and even if spontaneous generation would be capable of producing new species after creation was completed it does not follow that there would be sufficient cause in biological macroevolution.

³¹ *Ibid.*, 244–245. Carl proposes this conclusion twice. In the first place, he writes: “The general principle employed is not a version of the principle of proportionate causality, but is instead a principle about the need for mediating instrumental causes in order for a created remote cause to produce a more powerful effect. This principle hardly seems irreconcilable with a theory of biological evolution” (*ibid.*, 239).

³² Chaberek, *Aquinas and Evolution*, 51.

Now I will turn to the more fundamental problems with Dr. Carl's paper and his entire approach to the issue. My adversary believes that for Aristotle and Aquinas the question of the origin of species finds its solution not so much in metaphysical principles but in "some details of their biology and cosmology."³³ He thinks that "consideration of such topics as spontaneous generation and hybridization" is "directly relevant to thinking about the reconcilability of biological evolution with Thomistic metaphysics."³⁴ There are two problems with this approach: The first is confusion, and the second is a complete misrepresentation of Aristotelian-Thomistic tradition regarding the origin of species.

The First Problem: A Confusion

Let's begin with clarifying the confusion. Dr. Carl applies the principles of generation to explaining the causes of the origin of species. But when Aquinas teaches about generation he explains the origin of *individuals* belonging to the same species (ontogenesis). This does not explain or even apply to the origin of *species* (phylogenesis). This permanent confusion between the former and the latter kind of origination is evident pretty much in all Thomistic writers who distort Aquinas to make him compatible with evolution. Aquinas clearly teaches that a different type of causality is needed to originate an individual from the one needed to create a species:

A perfect thing [such as a fully distinct animal species—M.Ch.] participating in any nature, makes a likeness to itself, not by absolutely producing that nature, but by applying it to something else. For an individual man cannot be the cause of human nature absolutely, because he would then be the cause of himself; but he is the cause of human nature being in the man begotten . . .³⁵

³³ Carl, "Thomas Aquinas on the Proportionate Causes of Living Species," 245.

³⁴ *Ibid.*, 228.

³⁵ *S.Th.*, I, q. 45, a. 5, ad 1.

This distinction between the generation of an individual and the creation of a species is taught by Aquinas in several other places. But two particular instances thoroughly expose the entire confusion of Dr. Carl's paper. Interestingly, the first of the quotes below comes from Aquinas's teaching on creation, the second from his teaching on divine preservation of beings in existence (*conservatio rerum*). This means that whether he explains the work of creation or the work of preservation (and providence) he consistently applies the same distinction:

Whatever is caused as regards some particular nature cannot be the first cause of that nature, but only a second and instrumental cause; for example, since the human nature of Socrates has a cause, he cannot be the first cause of human nature; if so, since his human nature is caused by someone, it would follow that he was the cause of himself, since he is what he is by virtue of human nature. Thus, a univocal generator must have the status of an instrumental agent in respect to that which is the primary cause of the whole species. Accordingly, all lower efficient causes must be referred to higher ones, as instrumental to principal agents. The existence of every substance other than God is caused, as we proved above. No such substance, then, could possibly be the cause of existence otherwise than as instrumental and as acting by virtue of another agent. *But it is only in order to cause something by way of motion that an instrument is ever employed; for to be a moved mover is the very essence of an instrument. We have already shown, however, that creation is not a motion. Hence, no substance besides God can create anything.*³⁶

And the other quote:

No particular univocal agent can be the univocal cause of a species; for instance, this [individual] man cannot be the cause of the human species, for he would then be the cause of every man, and, consequently, of himself—which is impossible. This man, properly speaking, is the cause of that individual man. Now, this man exists because human nature is present in this matter, which is the principle of individuation. So, this man is not the cause of a man, except in the sense that he is the cause of a human form

³⁶ *S.c.G.*, II, ch. 21 [5], emphasis added.

coming to be in this matter. This is to be the principle of the generation of an individual man. Clearly therefore, neither this man, nor any other univocal agent in nature, is the cause of anything else but generation of this or that individual thing. Now, there must be some proper agent cause of the human species itself; its composition shows this, and also the ordering of its parts, which is uniform in all individuals unless it be accidentally impeded. And the same reasoning applies to all the other species of natural things. This cause is God, either mediately or immediately. For we have shown that He is the first cause of all things. So, He must stand in regard to the species of things as the individual generating agent in nature does to generation, of which he is the direct cause (*per se causa*).³⁷

We see that Aquinas attributes a different type of causality to the production of an individual from the one producing a species. In the first case it is enough to have a univocal generator acting as an instrumental cause, but in the latter only God by his direct power is capable of producing new species. Aquinas makes an analogy—as parents are immediate causes of individuals so God is the immediate cause of species. Thomas does not mention any “cooperation of heavens” in the production of species, even if they participate in the generation of individuals. Moreover, no secondary causes whatsoever can take part in the production of species, because this would entail a contribution of chance factors. For Aquinas (unlike for Carl and other evolutionists) chance is

³⁷ *S.c.G.*, III, ch. 65 [4]. See the same rule applied to the generation of the horse: “When a horse is generated, the generating horse is indeed the reason why the nature of horse begins to exist in this being, but it is not the essential cause of equinity. For that which is essentially the cause of a certain specific nature, must be the cause of that nature of all the beings that have that species. Since, then, the generating horse has the same nature, it would have to be its own cause, which is impossible. It remains, therefore, that above all those participating in equinity, there must be some universal cause of the whole species. . . . [I]t must be reduced to that which is essentially the cause of that nature, but not to something which participates in that nature in a particular way.” Thomas Aquinas, *Treatise on Separate Substances*, chap. 10, no. 58, trans. F. J. Lescoe (West Hartford, Conn.: Saint Joseph College, 1959). Available online—see the section *References* for details.

entirely excluded from the origin of species. In reply to Avicenna's claim that the distinction of things into different species is due to secondary causes, Thomas writes:

This cannot stand . . . because, according to this opinion, the universality of things would not proceed from the intention of the first agent, but from the concurrence of many active causes; and such an effect we can describe only as being produced by chance. Therefore, the perfection of the universe, which consists of the diversity of things, would thus be a thing of chance, which is impossible.³⁸

In another place Aquinas applies this general rule of creation specifically to the origin of species:

Those things whose distinction from one another is derived from their forms [and these are different animal species—M.Ch.] are not distinct by chance, although this is perhaps the case with things whose distinction stems from matter. Now, the distinction of species is derived from the form, and the distinction of singulars of the same species is from matter. Therefore, the distinction of things in terms of species cannot be the result of chance; but perhaps the distinction of certain individuals can be the result of chance.³⁹

According to Thomas, the differences between, let's say, puppies from one litter may be due to accidental changes (like an accidental mutation could cause one to alter hair color and another to have slightly different nose shape or anything of this kind) but the distinction between dogs and cats cannot be accidental. This clearly contradicts the evolutionary thinking postulating that the accumulation of accidental changes in subsequent generations would ultimately produce an individual of a different species. In Aquinas's terms not only would it make the individual to be a cause of itself, but even worse, it would make an individual being a creator of forms in matter—the action attributable

³⁸ *S.Th.*, I, q. 47, a. 1, co.

³⁹ *S.c.G.*, II, ch. 39 [3].

exclusively to God. This obviously contradicts Aquinas's teaching on sufficient causality.

The Second Problem: A Misrepresentation

Having clarified the confusion between ontogenesis and phylogenesis, on which the entire argument of Dr. Carl is founded, now I will show how he misrepresents Aquinas's teaching regarding the origin of species.

Since evolution is a natural process operating constantly in nature, Thomistic evolutionists attribute the origin of species to the ordinary works of nature. Hence they look for a justification of their position in those places where Aquinas teaches on divine providence and conservation of things (as these describe the causation in the universe already formed). But this approach misrepresents Aquinas, who clearly and consistently attributes the origin of species to the unique divine causality that he calls second creation or the formation of the universe.

According to Aquinas, in the first creation God produced the universe out of nothing. In the second creation God formed the universe by producing specific forms in the previously created matter. The formation of the universe is further divided by Thomas into the work of distinction and the work of adornment. The latter refers to the production of animal species. All of these are unique, supernatural and mostly direct actions of God, finished once for all with the creation of man. It is no less than staggering that Thomistic evolutionists (including Carl) quote Aquinas's *Summa Theologiae* (I, q. 65–74) and completely ignore the fact that these parts refer to the supernatural formation of the world by God which, by itself, excludes the possibility of species being formed by natural secondary causes. The structure of Aquinas's *Summa* alone refutes the postulates of Thomistic evolutionists. In particular, Aquinas's teaching contradicts Dr. Carl's belief that chance factors with the "help of the heavens" can produce a new species by the gen-

eration of individuals. According to Aquinas, this would contradict the principle of sufficient cause, because a new species is like a new idea that first has to be educed from matter by the immediate act of God in order to make the propagation of individuals possible:

In the first production of corporeal creatures no transmutation from potentiality to act can have taken place, and accordingly, the corporeal forms that bodies had when first produced came *immediately from God*, whose bidding alone matter obeys, as its own proper cause. To signify this, Moses prefaces each work with the words, “God said, Let this thing be,” or “that,” to denote the formation of all things by the Word of God, from Whom, according to Augustine, is “all form and fitness and concord of parts.”⁴⁰

The material principle in the generation of either kind of animals [those born from seed and those born from putrefaction], is either some element, or something compounded of the elements. But at the first beginning of the world the active principle was the Word of God, which produced animals from material elements.⁴¹

We see that Thomas finds the answer to the problem of origins in the Book of Genesis. Now, my opponent could say that the revealed sources do not belong to Aquinas’s metaphysics but rather his theology, therefore they are not relevant to the question of whether evolution contradicts Aquinas’s metaphysics. But this charge is invalid, because there is no answer to the question of origins outside of historical theology, i.e., neither in metaphysics nor natural philosophy, and even less so in physics (like teachings on generation and corruption). The reason is that all these latter disciplines are confined to causes operating in the universe already formed. But the question of the origin of species concerns the issue of where the universe with its basic forms came from in the first place. And these questions exceed the capacity of natural knowledge (physics, metaphysics) as much as the origin of species itself ex-

⁴⁰ *S.Th.*, I, q. 65, a. 4, co.

⁴¹ *S.Th.*, I, q. 71, a. 1, ad 1.

ceeds the capacity of nature. In order to know how things started to exist we need special divine revelation, which for Christians has been set forth in the Book of Genesis. Aquinas is entirely aware of this fact and this is why, when he discusses origins, he repetitively returns to the authority of the Bible (the “sed contras” entail just a brief statement: “Suffices the authority of Scripture”). Aristotle, who did not have access to the supernaturally revealed knowledge, did not know how species could have originated nor how the universe came to being. This is why he believed in eternity of species existing along with an eternal universe.

Thomas indeed incorporates the biblical revelation to his entire metaphysical system. This is why he emphasizes that the formation of the universe had to be caused by the immediate power of God (as it is clear from the citations above). But there is an even more interesting statement in which Aquinas derives the argument for the need of direct divine power in the creation of species from metaphysics alone (without reference to Genesis). We can deem it a transitory concept by which he connects his metaphysics with his (or rather Christian) theology:

[I]t cannot be posited that something after God is the cause of another, except by way of motion and generation. And thus we must assert that God is the immediate cause of all things that did not begin through generation, such as angels, souls, the substances of the heavens, the matter of the elements, and the first hypostases in all species.⁴²

For this reason the first hypostases were immediately created by God, such as the first man, the first lion, and so forth.⁴³

Aquinas divides the entire spectrum of possible types of causes into just three categories: generation, movement and direct divine activ-

⁴² *Super Sent.*, lib. 2, d. 18, q. 2, a. 2, co.

⁴³ *Ibid.*, lib. 2, d. 1, q. 1, a. 4, co.

ity.⁴⁴ Then he states that there are some things that cannot start to exist by generation nor by movement. Among them there are the first hypotheses in every species. We see therefore that for Aquinas the belief in the direct creation of species is not just a matter of Genesis (which is easily dismissed by theistic evolutionists who say that Genesis was wrongly understood by entire Christianity before Darwin “clarified” its meaning). On the contrary, Thomas makes his argument deductively, based on metaphysical principles.

All of this is relevant to the problem of causality. Aquinas believes that species could have been produced only by direct divine act, which means that there is no sufficient cause in the generative power to produce new species regardless of how many mediating or heavenly causes are involved. In fact, no secondary causes can take any part in the act of creation.⁴⁵ If evolution was to produce new species, then: Firstly, an individual would be the cause of itself and, secondly, it would be the cause of a new nature, which contradicts the principle of sufficient cause. In evolution a “lower cause would need to produce a higher effect.” Thus the argument from the lack of sufficient cause against biological macroevolution as I formulated it in *Aquinas and Evolution* withstands Dr. Carl’s response.

Two Paradigms

When we focus too much on particulars we may lose sight of the whole. Polish kids read a short and funny poem about Mr. Hilary, who looks for his glasses in panic, turns upside down his entire household only to discover, by accidentally peeking in the mirror, that they had

⁴⁴ In this context Angelic causation would be considered a movement, such as Angels moving celestial spheres, or Angels moving human hearts.

⁴⁵ *S.Th.*, I, q. 45, a. 5, co; *De Pot.*, q. 3, a. 4, co; *Super Sent.*, lib. 2, d. 14, q. 1, a. 3, co; *Super Sent.*, lib. 2, d. 1, q. 1, a. 3, co.

been sitting on his nose the entire time. This story reminds me of Thomists who dig into the tiniest details of Aquinas's teaching on generation to reconcile it with evolution just missing the fact that for Aquinas the origin of species is not due to generation but creation. The trick in Dr. Carl's article consists not so much of tinkering with Aquinas doctrine, but rather taking the reader into a wrong alley right at the outset of his paper. If one does not immediately realize it, one may think is guided around all the corners in the correct direction. Only the point of arrival may be somewhat disappointing: Who would actually believe that the entire biodiversity, according to Aquinas, was created by the "power of generation" under the influence of "heavens"?

Aquinas, as any other Christian before Darwin, was a creationist. Surely, his creationism stemmed from the Biblical faith, so it was his "theology," but it would be somewhat incoherent to say that Aquinas integrated all other parts of his theology with the metaphysical principles derived from Aristotle, with the one exception of the theology of creation. In fact it is the opposite: the Biblical theology of creation, as confessed by Aquinas, finds very thorough and convincing underpinnings in his philosophical system. Dr. Carl, together with other Thomistic evolutionists, may not like Aquinas's creationism. But it is one thing to honestly reject Aquinas's teaching, because it contradicts the modern theory of evolution, and another thing to distort it in order to claim its compatibility with modern ideas that otherwise remain in a head-on opposition. I am not claiming that Aquinas is right (although I believe he is, for the most part); what I am saying is that his teachings flatly contradict, on the philosophical and theological grounds, what the modern theory of biological macroevolution holds. One cannot simultaneously hold on to both.

A vast majority of Thomists fifty and even a hundred years after Darwin still believed that Aquinas's philosophy, classical metaphysics, excludes the metaphysics adopted in the theory of biological macroevo-

lution.⁴⁶ Since then neither Thomas's teachings nor Darwin's theory have changed. So, how is it possible that today's Thomists present interpretations directly opposite to the ones offered by their counterparts from a few decades ago? The reason is that these two groups grew up intellectually in two different paradigms. We can call the older paradigm creationist, or biblical, and the newer one evolutionary, or naturalistic. A paradigm is like a lens that determines the entire perception of an individual. In order to understand and properly juxtapose the Thomistic system with the Darwinian system one needs to adopt the paradigm shared by the author of the system. Otherwise one falls into anachronism. Of course we could also ask whether the evolutionary paradigm should be accepted by contemporary Christians, and if so, on what grounds, and is it better than the creationist paradigm. But these are questions for another paper.

Dr. Carl believes that evolutionary theory does not create difficulties in the light of Aquinas's metaphysics. But he comes to this conclusion by distorting Aquinas's view on the origin of species. For Aquinas the cause of species needs to be found in the divine intellect and His creative action. For Dr. Carl it is found in the combined power of heavens and natural generation. Interestingly, this kind of shift in search for causes is not an original invention of Dr. Carl or any of Thomistic evolutionists. Erasmus Darwin (the grandfather of Charles) authored a book *Zoonomia* (1796) in which he presented a primitive version of theistic evolution. Erasmus believed that it was the power of generation and "external influences" rather than the power of an intellect that created living beings. He also believed that this idea went back to David Hume, who

concludes that the world itself might have been generated, rather than created; that is, it might have been gradually produced from

⁴⁶ Cf. Chaberek, *Aquinas and Evolution*, 11–16.

very small beginnings, increasing by the activity of its inherent principles, rather than by a sudden evolution of the whole by the Almighty fiat.⁴⁷

Erasmus Darwin was enchanted by the idea of God not acting directly in the material universe, but through “laws of nature,” i.e., natural secondary causes. He also believed that this mode of divine operation revealed more of His greatness and potency. But this entirely non-biblical concept contradicted Catholic theology and healthy philosophy and for this reason the book was condemned in 1817, which can be considered the first ecclesiastical condemnation of theistic evolution. It is important to realize that the inspirations for Dr. Carl actually do not come from Aquinas or Aristotle but rather D. Hume, E. Darwin, Ch. Darwin, deists of the Enlightenment and 19th century positivists. Thomistic evolution contradicts St. Thomas’s teachings because it draws on a different paradigm, one born from modern materialism.



Creation Is Not Generation: A Response to Brian Carl

SUMMARY

Dr. Brian T. Carl published a paper, “Thomas Aquinas on the Proportionate Causes of Living Species,” in which he defends a thesis that the principle of proportionate cause, as understood by Aquinas, cannot be used to contradict the modern theory of biological evolution. This rejoinder explores thoroughly Carl’s argument, specifically his idea that spontaneous generation serves as a model to explain causality in biological evolution. It is shown that Aquinas indeed accepts proportionate causes in spontaneous generation, but this fact cannot be extrapolated to modern evolutionary theories. The origin of new species after creation was completed is not a straightforward thesis in Aquinas; rather Thomas sees it as a possible exception, which contradicts the evolutionary origin of the vast majority of species. Additionally, Carl misses the major point that in Aquinas the

⁴⁷ Erasmus Darwin, *Zoonomia or the Laws of Organic Life*, vol. 1 (London: Printed for J. Johnson, in St. Paul’s Church-Yard, 1794), 509.

origin of new species belongs to the work of creation rather than the natural operation of secondary causes.

KEYWORDS

Thomas Aquinas, Aristotle, evolution, creation, causality, metaphysics, species, generation.

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