Summary

"Thomas Aquinas and Theistic Evolution" is an article about the problem of using Aquinas' thought to defend theistic evolution within the Christian theological tradition. The paper begins with definitions of terms such as "evolution" and "species." The main part of the paper is structured according to the medieval articles written by Aquinas himself, such as those contained in his *Summa Theologiae*. First, the author presents twelve arguments that can be found in the writings of contemporary Thomists in favor of theistic evolution. In the next part, the author elaborates upon the answer to the question and he goes on to respond to the twelve arguments by referring to Aquinas' writings. In the conclusion, the author shows seven points of disharmony between the three types of evolution (namely, atheistic, materialistic and theistic) and Aquinas' teaching on the origin of species.

THOMAS AQUINAS AND THEISTIC EVOLUTION

Since the late 19th century, scholars have explored the compatibility of Thomas Aquinas's teaching with modern evolutionary ideas in biology. Initially, the majority of Catholic scholars opposed the idea of the evolutionary origin of species, drawing heavily on Aquinas's writings. At the same time some Catholic philosophers, like St. George Mivart, John Augustine Zahm or Henri Dorlodot, contended that nothing contrary to modern evolutionary theories can be found in the writings of the Church Fathers and Doctors, among them Augustine and Thomas Aquinas. Catholic scholars remain divided, though the "compatibilist" view predominates.

The purpose of this paper is to analyze the essential arguments employed in this long debate in light of Aquinas's teachings.

Aquinas was a precise author and we should follow his precision. In his 1996 address to Pontifical Academy of Sciences, Pope John Paul II said that we should not speak about one, but rather many theories of evolution, which have different explanations and are based on different philosophies.[1] Thus, to keep things clear, first we must specify what kind of "evolution" we are talking about.

1. THE NOTION OF EVOLUTION RELEVANT IN THE DEBATE

For many philosophers and theologians, the most theologically problematic aspect of evolutionary theory is the apparent purposeless of the Darwinian mechanism of random variation and natural selection. But even if we exclude that idea for the sake of argument, the notion of biological evolution itself seems to suggest trouble for those loyal to the thought of Thomas Aquinas. Leaving aside concepts of "evolution" in fields outside biology, we can distinguish two main types of evolutionary theories applied to the origin of species. First is *materialistic evolution,* according to which the origin of biological forms and their adaptations to their environment is a *purely natural process*, which the natural sciences are competent to address fully, and which doesn't demand any supernatural influence of any kind. (The Darwinian mechanism may be the main contender here, but we are intentionally defining materialistic evolution to include other mechanisms as well.) Proponents of materialistic evolution need not deny the existence of God, but simply leave the question aside. Charles Darwin, Thomas H. Huxley and Ernst Haeckel were the first to introduce materialistic evolution in modern times. Materialistic evolution could be also called "agnostic evolution" as Huxley styled first Darwin's followers "agnostics."

[1] Address to the members of the Pontifical Academy of Sciences of 22 October 1996 in relation to the session "The origin and evolution of life" [in:] *AAS,* 89(1997), p. 186–190.

Atheistic evolution would then be just one form of materialistic evolution, which *assumes* that God doesn't exist and so deduces that all natural phenomena can, indeed must be reducible to underlying physical causes. The first prominent scholars to introduce atheistic evolution were Ernst Mayr, Julian Huxley, George Gaylord Simpson and Jacques Monod. Today one of the most widely renowned atheistic evolutionists is Richard Dawkins.

A second type of evolutionary theory may be called *theistic evolution*. In general, theistic evolutionists contend that God somehow guides the evolutionary process. Different authors have different accounts of how this works, but the common point is that God doesn't work directly or supernaturally, but, at least in natural history, operates entirely through natural causes. It is this definition of theistic evolution that I will employ in what follows. (As a result, any theory that invokes God's direct causality at any point in the history of life will by definition *not* be theistic evolution.)

Perhaps the most popular view among theistic evolutionists is that God "uses" evolution as a secondary or instrumental cause in the process of production of the new species. Some authors regard this as a "cooperation" between nature and God, while others say that God works as a "final cause", or that he simply pre-planned or "guides" all evolutionary development. Some theistic evolutionists[2] distinguish between the creation of the world out of nothing (*creatio ex nihilo*) in the beginning and continuous creation (*creatio continua*), which God conducts throughout the ages. Only that first creation of "matter and energy" from nothing demanded a direct and supernatural act on the part of God.

Aquinas, of course, was neither an atheist nor an agnostic. Therefore we will not focus on the question of whether materialistic or atheistic evolution is compatible with his views. We will limit ourselves only to the question of whether his views are compatible with the *theistic* kind evolution.

There can be many different mechanisms to explain evolution[3] but every account of biological macroevolution includes two ideas: (1) universal *common ancestry*, which means that if we went back in time we could see one or a few organisms which had been natural ancestors of all living organisms; and (2) *transformation of species*, which means that one natural species can be changed into another by means of small, accidental changes. (The idea of macroevolution also sometimes includes the origin of the first life from non-living chemicals, though such "prebiotic" evolution is distinct from the subsequent evolution of living organisms from biological ancestors.)

The central questions, then, are: Would Thomas allow the transformation of species due to accidental changes? Would he allow universal common ancestry? And, is his own concept of the emergence of species compatible with that of modern theories of biological macroevolution?

2. The Notion of Species Relevant in the Debate

One impediment to answering these questions is the notorious ambiguity of the concept of species. For our purposes, we should distinguish four senses of it:
1) *Logical species*—the idea of species taken as a logical subcategory of the broader category of genus. In this sense, species can be identified quite arbitrarily, simply by projecting new working definitions on different classes of beings. Species, taken in merely a logical sense, is

[2] J.F. Haught, *God After Darwin*, Westview Press: 2008, p. 37. R.J. Schneider, *Essay II: Theology of Creation: Historical Perspectives and Fundamental Concepts*, http://community.berea.edu/scienceandfaith/essay02.asp (12.11.14).

[3] M. Ryland gives an example of six modern evolutionary concepts, which accept basic Darwinian ideas of random variation and natural selection, but employ also some other mechanisms. See: M. Ryland, *What is Intelligent Design Theory?* in *Second Spring* (15) 2012, p. 46-57, 48.

a relative term that simply maintains a distinction between classes and sub-classes of a specified group of objects or organisms.
2) *Metaphysical species*—a species predicated with respect to a substantial form. In other words, metaphysical species include beings that possess the same substantial form.
3) *Natural species*—natural kinds of living organisms, such as dogs, cats, cows and horses. From a theological perspective, natural species could be equaled to those mentioned in the creation account of Genesis. From a metaphysical perspective, a natural species includes organisms that share the same nature. In this sense "nature" is defined by Aquinas as "the essence of a thing as it is ordered to the proper operation."[4] From the same, metaphysical perspective, natural species can be seen also as physical realizations (or examples) of metaphysical species, that is, *living* composites of a substantial form and matter. From the biological perspective these are organisms that can be included in one taxonomic group of family or genus.
4) *Biological species* (or *modern scientific notion of species*)—according to one modern definition by Ernst Mayr, a biological species signifies all populations in which individuals are prospectively able to interbreed in their natural environment and produce fertile offspring.[5]

The controversy between nominalists, who consider "species" as merely an organizing concept imposed by the investigator, and realists, who hold that species exist in the biological realm, has a long history. Thomas Aquinas was not a nominalist. He viewed species as really existing not just in the mind but in the physical world. Actually, Aquinas employed the term "species" many times—sometimes understanding it according to the first meaning (logical species), sometimes according to the second (metaphysical species), or the third (natural species). On the other hand, naturalists like Linnaeus and Lyell, and early evolutionists, seemed to understand species according to the third definition.

Darwin is perhaps best considered as a transition figure whose views (insofar as they were consistent) sit somewhere between the natural species and the modern understanding of biological species. He thought the varieties of Galapagos finches were separate species, whereas he seemed to recognize that the category of finch itself corresponded to the earlier understanding of natural species. In fact, Darwin rejected the distinction between species and varieties, since he did not believe the source of variations among varieties was fundamentally different from that of species.[6] One might even suppose that because Darwin didn't believe in the fixity of species, he had abandoned the concept altogether. But this seems too strong since, if species didn't exist in some sense, there would be no reason to write a book on their "origin." Even if Darwin did deny the *existence* of natural species, his argument in the *Origin of Species* presupposes the intuitive cogency of the concept.

One more distinction will serve our purpose: transitions between organisms within natural species are usually called *microevolution*, whereas transitions from one species to another are typically called *macroevolution*. By extension, macroevolution refers to the complexification and diversification of life across all taxonomic categories—species, genera, families, orders, classes, phyla, and kingdoms—by gradual, accidental changes in individual organisms and populations.

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[4] "And so the Philosopher says in V *Metaphysicae* that every substance is a nature. But the term nature used in this way seems to signify the essence of a thing as it is ordered to the proper operation of the thing, for no thing is without its proper operation" (*De Ente et Essentia*, cap. 1).
[5] E. Mayr, *Systematics and the Origin of Species from the Viewpoint of a Zoologist*, New York: Columbia University Press 1942. We are aware of the fact that Mayr's definition is not the only one accepted in contemporary science. Scientific literature abounds in definitions, and the debate on how to define biological species is far from end. Nevertheless, in our paper we deal with natural species, therefore the exact definition of biological species is irrelevant.
[6] Marc Ereshefsky, "Darwin's solution to the species problem," *Synthese* 175 (2010), p. 407.

With these clarifications in mind, we can reduce our three questions to one precise question. Is Thomas Aquinas's teaching on the origin of natural species compatible with *biological macroevolution* ["evolution" hereafter], which allows or presupposes God's guidance, influence, or cooperation?

To answer this question we will apply the classical scholastic method that Aquinas followed in his *Summa*, which involves a dispute between two parties.[7]

3. Is Aquinas's Teaching Compatible with Theistic Evolution?

It seems that Thomas Aquinas's teaching is not contrary to theistic evolution.

1. God's causality doesn't exclude natural causality in the world. Thus, for Aquinas, evolution is simply a secondary or instrumental cause, which God used to form different species.[8]

2. The power of God is manifested by the fact that He gives the power for some causes to be secondary causes of creation. The more perfection God conveys to nature, the more of God's perfection is manifested through the working of secondary causes. Thomas argued: "The perfection of the effect demonstrates the perfection of the cause, for a greater power brings about a more perfect effect. But God is the most perfect agent. Therefore, things created by Him obtain perfection from Him. So, to detract from the perfection of creatures is to detract from the perfection of divine power. But, if no creature has any active role in the production of any effect, much is detracted from the perfection of the creature" (*ScG*, III, 69).[9] Moreover, a created being that is endowed with causality has more dignity and value than the one that doesn't cause anything.[10] Thus, although God could have produced species directly, He chose to produce causes of species, which, generally speaking, is an evolving world.

3. On the other hand, Aquinas says, "The universe in its beginning was perfect as regards the species of things" (*De Potentia*, I,q.3,a.10,ad2). If everything was created immediately by God right from the beginning, there would be no room for secondary causation, which Aquinas also affirms. Therefore "this teaching, which speaks of perfection, does not necessarily preclude the addition of new species through the agency of secondary causes."[11]

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[7] Note that we are not going to address only those arguments that are made by Thomists who are theistic evolution proponents, but the arguments presented by theistic evolutionists in general. Of course, it doesn't mean that all theistic evolutionists would pose all of the objections, or that they agree with them to the same degree.

[8] F. Ryan, *Aquinas and Darwin* [in:] *Darwin and Catholicism*, ed. L. Caruana, NY: T&T Clark 2009, p. 54-55; F.J. Beckwith, *Intelligent Design, Thomas Aquinas and the Ubiquity of Final Causes*, The Biologos Foundation, p. 6. http://biologos.org/uploads/projects/beckwith_scholarly_essay.pdf (10.12.12.), W.E. Carroll, *Creation, Evolution and Thomas Aquinas*, http://www.catholiceducation.org/articles/sc0035.html (10.12.12), W. Tkacz, *Aquinas vs. Intelligent Design* [in:] "This Rock", Nov. 2008. "It would seem philosophically impossible to say that this ontologically more perfect organism is the evolutionary effect of less perfect organisms … We can resolve this possible dilemma between philosophy and science by using the notion of instrumental causality … So higher species may be brought forth from lower species if the natural causes of this process are also instrumental causes of a higher principal cause… God's causality does not constitute a miraculous intervention; nor does it negate the real causality of all the natural agents involved in the evolutionary process. In this way, God is most intimately involved in the process of evolution, acting through the natural causes that science studies". M. Dodds, *Unlocking Divine Action*, CUA Press: 2012, p. 201-202.

[9] This fragment is quoted by: P. Lichacz, *Czy stworzenie wyklucza ewolucję?* [*Whether Creation Excludes Evolution*] [in:] *Teologia św. Tomasza z Akwinu dzisiaj* [*Theology of Thomas Aquinas Today*] Poznań: Uniwersytet Adama Mickiewicza, Wydział Teologiczny 2010, p. 71-94; F. Ryan, op. cit. p. 54.

[10] F. Ryan, op. cit. p. 54.

[11] F. Ryan, op. cit. 55. This argument can be presented also as *reductio ad absurdum*: "If all forms were created in the beginning it would mean, that nothing new appeared in natural history. But we know that many new species appeared successively in the long history of earth. Therefore, either we interpret Aquinas in such a way

4. Although God created the world in the beginning, He never ceased to create it and still maintains it by His power, which is called continuous creation (Lat. *continua creatio*). Thus, the emergence of new species in the evolutionary process is easy to justify within the concept of continuous creation.[12]

5. Accidental changes—natural selection and random genetic mutations, genetic drift, and so forth—are the main driving force behind the formation of new species in the majority of evolutionary theories, including modern theistic ones.[13] Aquinas argued that in the visible world there are not only planned events, but also events that are "random" or "chance" in a proper sense. God exercising providence over the world can use both—planned and random events to achieve pre-planned results. Thus, Thomas' teaching can accommodate the role of chance in producing different natural species.[14]

6. Aquinas taught that all matter tends toward "the furthest and most perfect actuality to which it can attain, as to the ultimate end of generation.… Hence the last stage of the whole process of generation is the human soul, and matter tends to this, as to its ultimate form" (*ScG*, III,22,7). Thus, according to Thomas, matter is subjected to the natural desire to achieve the most perfect form. This premise *supports* theistic evolution as it also assumes that all living beings are to acquire still new forms of higher and higher organization with a rational soul as the end.[15]

7. Aquinas taught that natural reason cannot prove the temporal beginning of the universe and that this truth is known to us only by Revelation. According to Aquinas, the created universe could exist eternally. Therefore, it is not *the temporal beginning* of the world that is important in the doctrine of creation, but *the fact* that the world is still maintained in existence by God. So the core of Aquinas's doctrine of creation is *dependence* in being, which is compatible with theistic evolution. It is so, because theistic evolution also emphasizes the world's *dependence* on God and not its *temporal beginning*.[16]

8. "Creation" for Aquinas doesn't mean temporal beginning of things but "dependence of the existence of all things upon God." On the other hand, science speaks about changes in things and not about their dependence in being. Therefore, there can be no contradiction between biological evolution and Aquinas' teaching on creation.[17]

9. Aquinas taught that there are two different types of truths contained in Revelation: the first are truths which pertain to the essence of the faith, and other type are those which pertain to faith only accidentally (*In II Sent*, Dist.12,q.1,a.2c). The mode or order of creation of the world belongs to the latter category. Thus, "what is essential to Christian faith according to Aquinas is the *fact* of creation, not the *manner* or *mode* of the formation of the world."[18] Therefore, evolution can be the mode of creation of species.

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that he allows emergence of new substantial forms by natural causation in the course of time or his teaching contradicts facts. Even if his teaching contradicts facts, it is only because he didn't know the theory of evolution. Thus, if he had known it, he would have accepted it." This reasoning, however, omits one more possible solution, namely, that Aquinas could have allowed supernatural emergence of new species in the course of time.

[12]. Cf. note 2.

[13] Cf. M. Ryland, *What is Intelligent Design Theory?* op. cit.

[14] A document of the International Theological Commission of 23 July 2004, *Communion and Stewardship*, nr 69, S.M. Barr, *Chance, by Design* [in:] "First Things", Dec. 2012, p. 25-30 (28). M.I. George, *On Attempts to Salvage Paley's Argument from Design* [in:] "Science, Philosophy, Theology", ed. John O'Callaghan, South Bend, Indiana: St. Augustine's Press 2002.

[15] E.C. Messenger, *Evolution and Theology*, NY: The Macmillan Company 1932, p. 94; F. Ryan, op. cit., p. 53;

[16] S.E. Baldner, W.E. Carroll, *Aquinas on Creation*, Toronto: Pontifical Institute of Mediaeval Studies 1997. J. Salij, *Pochodzenie człowieka w świetle wiary i nauki* [in:] *Kontrowersje wokół początków człowieka*, ed. G. Bugajak i J. Tomczyk, Katowice: Księgarnia Świętego Jacka 2007, p. 277-286.

[17] W.E. Carroll, *Creation, Evolution and Thomas Aquinas*, op. cit;

[18] W.E. Carroll, *Creation, Evolution and Thomas Aquinas*, op. cit; P. Lichacz, op. cit.

10. There is nothing against theistic evolution in Augustine's writings. Aquinas says that he prefers (*plus mihi placet*) Augustine's concept of emergence of natural species from seminal reasons to Ambrose's doctrine of special creation of different species (*In II Sent*, Dist.12,q.1,a.2c). Therefore, Aquinas's teaching must be compatible with theistic evolution.[19]

11. Thomas Aquinas quotes Augustine's convictions about the origin of the world: "It is our business here to inquire how God has constituted the natures of His creatures, not how far it may have pleased Him to work on them by way of miracle." Thus, Aquinas didn't require miracles in the formation of the world, which is consistent with the fact that theistic evolution also does not require or allow miracles.

12. Aquinas believed in spontaneous generation, which means that living beings can originate from unanimated matter. Therefore his teaching is consistent both with the contemporary theory of abiogenesis, and with the possibility of spontaneous generation of new species.[20]

On the contrary,

The Mother of the seven sons says: "Look upon heaven and earth, and all that is in them, and consider that God made them out of nothing, and mankind also" (2 Macc 7:28). It follows that heaven and earth were not the only things that God made out of nothing.

I answer that,

The answer can be given in two ways: One can show that Aquinas's teaching excludes theistic evolution—and this is an explicit answer (A). Or one can show that Aquinas acknowledged the supernatural and direct formation of species—and this also excludes theistic evolution, although not explicitly but *a fortiori* (B).

Ad A. According to theistic evolution the lower (i.e., less perfect) cause can lead to the higher effect (i.e., more perfect). But in Aquinas's view, no being can convey more act than it possesses.[21] Here "act" is understood as any kind of perfection or realization. Indeed, although theistic evolution has a final cause, as God governs this process with His omniscience, it still maintains that more perfect beings can be produced through generation and propagation of less perfect ones. Thus, even though theistic evolution invokes final

[19] W.E. Carroll, ibid., P. Lichacz, ibid.

[20] F. Ryan (op. cit. p. 55-56) quotes Aquinas to support this thesis: "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 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". (*STh*, I,73,1,ad3).

[21] "Every imperfect thing is caused by one perfect". (*STh*, I,44,2,ad 2). „The perfection of the effect demonstrates the perfection of the cause, for a greater power brings about a more perfect effect". (*ScG*, III,69,15). Similarly in the *Summa Theologiae*: „Effectus non est potior sua causa." (*STh*, I,45,8,2). Someone could argue that in biological evolution the notion of perfectness (or more/less perfect) is nonsensical. But theistic evolutionists acknowledge different grades of living beings (cf. M. Dodds, op. cit. p. 202). The more does Aquinas: "In natural things species seem to be arranged in degrees; as the mixed things are more perfect than the elements, and plants than minerals, and animals than plants, and men than other animals; and in each of these one species is more perfect than others." (*STh*, I,47,2,c). However, even if biological evolutionists don't recognize different grades of perfectness in biological realm, it doesn't follow that they don't exist. Actually, it is impossible to coherently maintain that no grades of perfectness exist in biology. Even the notion "the fittest" implies existence of different grades of fitness, which--in terms of underlying metaphysics--would mean the same as "more perfect". Therefore evolutionary biologists who speak about grades of fitness, also have to admit the cogency of the idea that there are levels of perfectness.

causality, it reduces "down" efficient causation to material causation. And, according to Aquinas, matter cannot be the efficient cause of anything.[22]

Another reason theistic evolution contradicts Aquinas' doctrine is that it presupposes that the nature (or substantial form, or natural species) of a living being can be changed into a different nature by an accidental change. However, this is impossible in Aquinas's view: accidental change can lead only to accidental differences whereas a change of nature requires substantial change. That is why transformation of species in any evolutionary scenario (i.e., through the accumulation of minor accidental changes) is not possible. And because it is a formal cause (and not matter) which produces a substantial form, theistic evolution lacks formal causation which is reduced "up" to final causation alone.[23]

Moreover, theistic evolution presupposes that one nature can be a cause of another nature. However, according to Aquinas no "perfect thing" produces its own nature, but only participates in the nature that it inherits. A "perfect thing," in Aquinas's thinking, is a being that has a highly specified substantial form or essence. Good examples of a "perfect thing" can be different species of living organisms. Aquinas himself invokes a human being as it is the most perfect among composite things. Thus, a man cannot be a cause of mankind, a dog cannot cause a dog's nature, a cat, a cat's nature, and so on. But if a being is not a cause of its own nature, much less it can produce a different nature.[24] And this is why Thomas says that „generation of nothing except a man results from the semen of man,"[25] which means that species of living beings are fixed and never change into an entirely different species by generation.

Still another reason is that, according to Aquinas, God wanted different degrees of perfection in nature. This happens between different species, as well as within one organism—between its organs. Thus, things less perfect and more perfect exist for the sake of the greatest perfection of the whole material world.[26] This order is intended by God.[27] And this is contrary to an evolutionary view of the biosphere, which requires continual change to acquire greater perfection in a "struggle for life" and "survival of the fittest."

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[22] Somebody could argue that theistic evolutionists don't say that matter (understood as pure potency) is the cause of new species, but rather that species are produced by other beings—composites of form and matter. Our argument, however, doesn't employ matter as pure potency, but matter with a form. Aquinas calls it *materia signata* which is "considered under determinate dimensions" (cf. *De Ente et Essentia*, cap. 1). But none of the known processes that operate in nature (i.e. which involve composite beings) are *known* to produce new species of living beings. Therefore efficient causation in theistic evolution, after all, boils down to matter, which underlies a composite being (*materia signata*). Still matter—whether informed or not—cannot be the efficient cause of anything.

[23] (*Materia est propter formam, et non e converso*). "Matter is for the sake of the form, and not the form for the matter, and the distinction of things comes from their proper forms. Therefore the distinction of things is not on account of the matter; but rather, on the contrary, created matter is formless, in order that it may be accommodated to different forms" (*STh*, I,47,1,c).

[24] "A perfect thing 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 what human nature is in this man begotten". (*STh*, I,45,5,ad1; cf. *ScG*, II,21; *ScG*, III,65,4).

[25] *ScG*, III,69,c.

[26] "It is part of the best agent to produce an effect which is best in its entirety; but this does not mean that He makes every part of the whole the best absolutely, but in proportion to the whole; in the case of an animal, for instance, its goodness would be taken away if every part of it had the dignity of an eye. Thus, therefore, God also made the universe to be best as a whole, according to the mode of a creature; whereas He did not make each single creature best, but one better than another" (*STh*, I,47,2,c and ad1; cf. *STh*, I,65,2,c).

[27] "We must say that the distinction and multitude of things come from the intention of the first agent, who is God. For He brought things into being in order that His goodness might be communicated to creatures, and be represented by them; and because His goodness could not be adequately represented by one creature alone, He produced many and diverse creatures". (*STh*, I,47,1,c).

Ad B. According to Aquinas not only the creation of the world but also its formation demanded supernatural and direct acts of God. There are three distinct moments in the world's history; two of these are periods, and one is a single act. This single act is the creation of heaven and earth out of nothing. And this act starts time and all beings visible and invisible at once, without any potency preceding it. In order to describe this act of God, Thomas employs the term *opus creationis* (work of creation) or *prima creatio* (first creation). However, after that first creation two subsequent periods follow, that is, *opus distinctionis* (work of distinction) and *opus ornatus* (work of adornment). Creation of different species of plants Aquinas attributes to the work of distinction whereas the creation of animals to the work of adornment (cf. *STh*, I,69,2,c; *STh*, I,72). And after the work of adornment was finished on the sixth day, no new species can be added to the completeness of the world.[28] In the first creation matter with form is made at once, out of nothing, whereas in the work of formation (i.e. distinction and adornment) totally new forms are infused supernaturally and immediately by God into the matter that has been produced in the first creation.[29] Today, the work of formation has been finished once and for all, and the fourth period started—that is the time of God's providence and the history of salvation. Therefore, according to Aquinas, neither the natural formation of new natural species nor their constant emergence is possible, as theistic evolution claims.

Reply to objections:

Ad 1. Since only God can create, secondary causation belongs to the order of providence (or administration) and to the order of salvation, but not to the order of creation. Thus, this popular argument stems from a confusion made about the order of creation and the order of administration of things. This confusion is more apparent when we consider that authors who *affirm secondary causation in creation* refer only to these parts of Aquinas's teaching where he speaks about God's providence and not about the work of creation.

The full answer to this objection is given by Aquinas himself: "It happens, that something participates in the proper action of another, not by its own power, but instrumentally, inasmuch as it acts by the power of another; as air can heat and ignite by the power of fire. And so some have supposed that although creation is the proper act of the universal cause, still some inferior cause acting by the power of the first cause, can create. [And thus Avicenna and the Master say] that God can communicate to a creature the power of creating, so that the latter can create ministerially, not by its own power. But such a thing cannot be, because the secondary instrumental cause does not participate in the action of the superior cause, except inasmuch as by something proper to itself it acts dispositively to the effect of the principal agent. If therefore it effects nothing, according to what is proper to itself, it is used to no purpose; nor would there be any need of certain instruments for certain actions. Thus we see that a saw, in cutting wood, which it does by the property of its own form, produces the form of a bench, which is the proper effect of the principal agent. Now the proper effect of God creating is what is presupposed to all other effects, and that is absolute being. Hence nothing else can act dispositively and instrumentally to this effect, since creation is not from anything presupposed, which can be disposed by the action of the instrumental

[28] "Something can be added every day to the perfection of the universe, as to the number of individuals, but not as to the number of species". (*STh*, I,118,3,ad2).

[29] This is also why Thomas says that creation is not just making matter or form, but "creation is the production of a thing in its entire substance". ("Creatio est productio alicuius rei secundum totam suam substantiam". *STh*, I,65,3,c; cf. *STh*, I,45,4,ad3).

agent. So therefore it is impossible for any creature to create, either by its own power or instrumentally—that is, ministerially" (*STh*, I,45,5,c)[30].

However, opponents will argue that this reasoning is too general and should be applied only to the first creation understood as the first act of the emanation of being out of nothing. It would follow then, that although no creation can create being out of nothing, it can produce (or co-create) new forms in the matter already created as it happens with the emergence of new animal species. To this claim Aquinas would reply by putting forward his positive doctrine: "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" (*STh*, I,65,4,c). Aquinas excluded secondary causation not only in producing being as such, but also in the production of new forms in the beginning.[31]

Nevertheless, some will still argue that although new forms could have been produced only directly by God, many new forms could have arisen later through natural generation. And to this claim Aquinas replies, as was already said, that *the emergence of different living species belongs to the work of creation and not to the work of administration*. Therefore, in his view, no natural process or any kind of evolution can serve as an instrumental or secondary cause in the production of natural species.

Ad 2. The short reply to this objection is that Aquinas attributed to beings the actions that are appropriate to their natures.[32] But the production of living beings by inanimate matter or generation of birds from reptiles is not an action appropriate to respective beings. Thus, for instance, the fact that an amphibian cannot generate a reptile doesn't diminish the perfection of the amphibian.

This objection, however, demands more explanation. The argument presupposes that secondary causation takes place in creation, which, according to Thomas, is impossible (as was said in the reply to the first objection). However, the argument also draws on a new premise, namely, that our notion of God and the dignity of creation is more sublime when God uses nature as a secondary cause for creating new species. This argument has a long history dating back to 18th century deism. It was David Hume and Erasmus Darwin who said that it is not fitting that God should create everything separately. The true God, "the highest Power," "*Ens Entium*," as they said, should rather create the causes of effects and not the effects themselves. Not only deists and early evolutionists accepted this line of thinking. William Paley, a well-known Christian apologist, fought for the recognition of the divine design in the world by employing an analogy of a watch: As a watch is purposeful and we

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[30] Cf. *In II Sent*. Dist.1,q1,a.3c: "Illa actio esse creatio quae non firmatur super actione alicujus causae praecedentis; et sic est actio tantum causae primae: quia omnis actio secundae causae firmatur super actione causae primae. Unde sicut non potest communicari alicui creaturae quod sit causa prima; ita non potest communicari sibi quod sit creans".

[31] The same idea is presented in the next question, when Aquinas replies to the objection: "Nature in its working imitates the working of God, as a secondary cause imitates a first cause. But in the working of nature formlessness precedes form in time. It does so, therefore, in the Divine working". Reply: "Nature produces effect in act from being in potentiality; and consequently in the operations of nature potentiality must precede act in time, and formlessness precede form. But God produces being in act out of nothing, and can, therefore, produce a perfect thing in an instant, according to the greatness of His power". (*STh*, I,66,1,2). "And above all it is absurd to suppose that a body can create, for no body acts except by touching or moving; and thus it requires in its action some pre-existing thing, which can be touched or moved, which is contrary to the very idea of creation". (*STh*, I,45,5,c). "The first production of corporeal creatures is by creation" (*STh*, I,65,3,c).

[32] "Since every agent intends to introduce its likeness into its effect, in the measure that its effect can receive it, the agent does this the more perfectly as it is the more perfect itself; obviously, the hotter a thing is, the hotter its effect, and the better the craftsman, the more perfectly does he put into matter the form of his art. Now, God is the most perfect agent. It was His prerogative, therefore, to induce His likeness into created things most perfectly, to a degree consonant with the nature of created being". (*ScG*, II,45,2).

know that it has been designed by man, the same is true with living beings, which work for the sake of their purpose and thus they must have been designed by a higher mind. But Paley didn't stop there. He developed the idea of a craftsman who produces not only watches but watches that can produce more watches. According to Paley, this kind of work, namely, the production of causes that can produce effects by their own power, reveals more of God's contrivance than a simple production of effects.

This vision of God as a mainly "Cause of causes" prevailed in academic theology and it was one of the main reasons that theistic evolution enjoyed an overwhelming victory among Christian scholars a hundred years after Darwin.

Nevertheless, the vision of God that underlies this reasoning is not in accordance with the views of Thomas Aquinas. For Thomas, although more dignity is endowed with the power of being a cause, it gives a thing even greater honor to be created directly by God: "It is greater for a thing to be made according to its entire substance, than to be made according to its substantial or accidental form" (*STh*, I,45,art.3). Moreover, God's infinite power is revealed by creation of things out of nothing but not by producing finite effects. Creation is also more perfect and excellent than generation and alteration.[33] Therefore, theistic evolution would not enhance our image of God, but rather diminish God's power and goodness.

Ad 3. In favor of this argument are also Biblical words: "He who lives forever, created all things together" (Sir 18,1a). And the wording of the Fourth Lateran Council (1215): "From the beginning of time [God] made at once (*simul*) out of nothing both orders of creatures, the spiritual and the corporeal, that is, the angelic and the earthly, and then (*deinde*) the human creature."[34]

Aquinas replies to a Biblical argument that all things were created together so far as we mean the creation of matter, with some basic forms that existed right from the beginning. But this doesn't exclude some additional formation of the world in the work of distinction and adornment. Thus, in this particular Biblical sentence, the word "creation" was taken in its proper and most significant meaning as the first creation out of nothing.[35] And if we consider the statement of the Lateran Council, the response given by Aquinas to the Biblical argument can be applied as well. It is even more evident, because the Council speaks only in a very general way about things created at once (*simul*) by calling them "two orders"—of the spiritual and corporeal creatures. But when it comes to a human being, which is one specified nature, the Council put the word "then" or "next" (*deinde*), which indicates the sequence of time.[36]

Next, if we consider Thomas' statement from *De Potentia* (quoted in the objection), the word "beginning" means the beginning of "the seventh day," which is the moment when God ceased to create, but still administers beings in the history of salvation. Therefore, it doesn't follow that Thomas excluded any and all succession in the formation of the world nor that he allowed the emergence of new natural species after the work of creation was finished.

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[33] "It is an act of much greater power to make a thing from nothing, than from its contrary". (*STh*, I,45,5,ad2). "Although to create a finite effect does not show an infinite power, yet to create it from nothing does show an infinite power". (*STh*, I,45,5,ad3). "Creation is more perfect and excellent than generation and alteration, because the term "whereto" is the whole substance of the thing; whereas what is understood as the term "wherefrom" is simply not-being". (*STh*, I,45,1ad2).

[34] *Dei Filius*, I: DS 3002; cf. Lateran Council IV (1215): DS 800.

[35] "God created all things together so far as regards their substance in some measure formless. But He did not create all things together, so far as regards that formation of things which lies in distinction and adornment. Hence the word *creation* was used in one proper meaning". (*STh*, I,74,2,ad2).

[36] And that Aquinas favored succession in creation can be inferred from such or similar statements: "All things were not distinguished and adorned together, not from a want of power on God's part, as requiring time in which to work, but that due order might be observed in the instituting of the world. Hence it was fitting that different days should be assigned to the different states of the world, as each succeeding work added to the world a fresh state of perfection". (*STh*, I,74,2,ad4; cf. *In II Sent*., Dist.12,q.1,a.2,ad1).

Ad 4. The notion of continuous creation does not even appear in Thomas Aquinas's writings. Instead, he employs the term "conservation (or preservation) of things" (*conservatio rerum*), which contradicts continuous creation for two reasons.

First, as is clear from what has been argued thus far, Aquinas taught that there are three periods in the history of the visible universe—the work of creation, the work of formation, and the work of conservation. The first two periods demanded God's supernatural operation to produce new beings. In contrast, in the third period nature is completed and does not demand any further supernatural action. This is why Thomas says that "in the works of nature creation does not enter, but is presupposed to the work of nature" (*STh*, I,45,8,c). Therefore continuous creation, as understood in theistic evolution, confuses creation with conservation, and thus is different from Aquinas's doctrine.

Second, the conservation of things is not due to any new action of God, but only due to the continuation of that action which gave them existence.[37] Conservation is nothing else (*nihil aliud est*) but the infusion of being into a thing, which is caused and brought about by God as long as the thing remains in existence.[38] Thus, although conservation is a type of operation and not just an act of providence (cf. *ScG* III,65), it does not lead to the emergence of any new things, such as new species. Again, in the notion of continuous creation the work of creation and the work of conservation are confused.

However, it is not just the incompatibility of continuous creation with conservation of things that is problematic. There are at least two other obstacles in Aquinas' teaching that make continuous creation impossible. First, it is his clear teaching that after the sixth day of creation, God *ceased* to create.[39] Another is his doctrine regarding the perfection of beings. According to Aquinas there are two perfections of things. The first makes a thing perfect substantially, and the second makes a thing achieve its proper end. But the perfection of species is the perfection of substance, therefore it belongs to the first perfection, which Thomas states was completed within creation (cf. *STh*, I,73,1,c).

Ad 5. This argument stems from confusion introduced between the order of God's providence and the order of creation. It is true that Aquinas didn't exclude chance from God's providence and he maintained that God can use chance events to bring things to an intended end. However, this teaching doesn't apply to the emergence of new species—something which Aquinas attributed to the work of creation. Creation excludes secondary causation as well as chance.

In reply to Avicenna's claim that the distinction of things into different species is due to secondary causes, Thomas wrote: "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" (*STh*, I,47,1,c). Aquinas also taught that accidental changes between individuals cannot be the cause of new species: "Those things whose distinction from one another is derived from their forms [and these are

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[37] "Conservatio rerum a Deo *non est per aliquam novam actionem; sed per continuationem actionis* qua dat esse, quae quidem actio est sine motu et tempore". (*STh*, I,104,1,ad4). English translation unfortunately diminishes this important opposition "nova actio – continuatio actionis" which was deliberately introduced here by Aquinas: "The preservation of things by God is a continuation of that action whereby He gives existence, which action is without either motion or time".

[38] "Conservatio rerum in esse, nihil aliud est quam influentia esse rei […], scilicet quod Deus, quamdiu res est, causat et efficit esse rei". (*In II Sent*, Dist.15,q.3,a.1,5).

[39] "God might have made many other creatures besides those which He made in the six days, and hence, by the fact that He ceased making them on the seventh day, He is said on that day to have consumed His work". (*STh*, I,73,1,ad2; cf. *STh*, I,73,2,ad1; *STh*, I,73,3,c). "God ceased on the seventh day from the creation of new creatures, yet He ever works by keeping and governing His creatures". (*STh*, III,40,4,ad1).

different natural 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" (*ScG*, II,39,3).[40] For Thomas, therefore, chance cannot take any part in the formation of new species.

Ad 6. The statement quoted in the objection refers to the development of an individual (ontogenesis) and not to development of species (phylogenesis). But even in this quote, Aquinas maintains that matter tends to its proper form. Whereas, in theistic evolution, matter tends to exceed form, which is impossible in Aquinas's doctrine.[41]

There are many other instances where Thomas states that some natural being tends to its end or that matter tends to its act. Authors who use these kinds of utterances to reconcile Thomas and macroevolution are confusing creation with generation, or the first perfection with the second perfection of a thing (as it was said in reply to fourth objection), or they are forgetting, that, for Aquinas, the potentiality of matter demands an agent to be brought to act (cf. *In II Sent*. Dist.18,q1,a.2c). But no law of nature, including evolution understood as a law-like process, can be an agent, because a law is merely a way in which the agent can proceed. Therefore there is no support for theistic evolution in Aquinas's writings.

Ad 7. Aquinas says that it is not necessary for the world to always exist, as its existence depends on God's will. And as God created the world not of necessity but by a free act of His will, therefore, it is not possible to prove by demonstration that the world is eternal (cf. *STh*, I,46,1,c.). However, it doesn't follow that the *beginning* of the world is less important than its *dependence* in being. On the contrary, according to Aquinas the temporal beginning of the world can be known only by faith, but its dependence in existence can be inferred by metaphysical reasoning (as it is done for example in the third way in *STh*, I,2,3,c). Therefore, for natural reason it is more important that the world *began* to exist, because reason wants to know the truth and this truth cannot be discovered by the same reason. And it is also more important for the faith, as this truth (about temporal beginning of the universe) is a proper object of a supernatural act of belief (cf. *STh*, I,46,2).

Ad 8. There are two problems in this argument: First, it employs a false notion of creation, which is redefined as "dependence in being." However, Aquinas says that no being precedes creation: "Creation, which is the emanation of all being, is from the *not-being* which is *nothing*" (*STh*, I,45,1,c). This means that creation initiates being—there is nothing about dependence, although dependence could be probably ascribed to conservation of being. Moreover, Thomas says that creation is not a change or movement, but a simple emanation (cf. *In VIII Physic*,l.2,n.4) which again implies that creation designates a beginning and not continual dependence. Now, the argument presents two notions—"science" and "creation"—and states that creation is not contradictory to science. However, the notion of creation employed is distorted, therefore the conclusion doesn't follow.

There is also the second problem: Even if science and creation are not contradictory, it doesn't mean that evolution and creation are not contradictory. As we have shown (in the *corpus*) Aquinas attributed the origin of species to the work of formation, which required

[40] In another place Aquinas rejects the general evolutionary idea that random events play a role in the origin of the universe: "That God acts for an end can also be evident from the fact that the universe is not the result of chance, but is ordered to a good" (*ScG*, II,23,6).

[41] "The active qualities in nature act by virtue of substantial forms: and therefore the natural agent not only produces its like according to quality, but according to species" (*STh*, I,45,8,ad2). A multitude of individuals of one species exists in order to preserve variety of species among composites: "And as the matter is on account of the form, material distinction exists for the sake of the formal distinction. Hence […] in things generated and corruptible there are many individuals of one species for the preservation of the species. Whence it appears that formal distinction is of greater consequence than material." (*STh*, I,47,2,c).

direct acts of God. But the direct action of God is always *supernatural* and it cannot be the subject of *natural* science. Thus, the origin of species is not the proper subject of scientific investigation either. Therefore the argument does not solve (nor even address) the problem of compatibility between an evolutionary origin of species and Aquinas's doctrine.

Ad 9. The understanding of the word *mode* or *order* (*modus et ordo*, cf. *In II Sent*, Dist.12,q1,a.2c) in the argument is not in accordance with Aquinas's view. Thomas states that mode of creation is not essential to faith, because it doesn't matter whether species were created simultaneously at the beginning—as Augustine maintained, or one after another—as maintained Ambrose and most theologians. By the *order* of the creation Thomas means the succession of different elements or species. As an example he talks about earth being created before stars or formation of creatures when the earth was still covered with water (cf. *STh*,I,74,2,c). Thus, in the contemporary debate, it would be not essential to faith, for example, whether flying reptiles were produced before or after crawling reptiles or dinosaurs. However, the dispute between Thomas and theistic evolution is not about whether species were made all at once or successively, but whether the production of species required the immediate and supernatural action by God. Thomas does not claim that the supernatural work of God in the formation of species is irrelevant to the truths of the faith. On the contrary, since creation exceeds the capacity of nature, it is the proper object of faith. Therefore, the creation of species, in whatever order, belongs to truths that are "essential to faith."

Moreover, it is incorrect to discuss "*how* the thing was created" because creation, taken in its proper meaning, designates both *the fact* of temporal beginning and the *mode* or *manner* of emergence of things. It is characterized by three features: (1) instant emergence, (2) out of nothing, (3) due to God's supernatural act. And because there is only one "manner" of creation it is pointless to discuss *how* things were created (cf. *STh*, I,45,2,ad2; *STh*, I,46,3,ad2).

Ad 10. Aquinas says that in Christianity there are two equivalent traditions of interpretation of the Genesis account. One comes from Ambrose and another from Augustine. Ambrose's tradition says that God created different species separately over the course of time. According to Augustine, different species were created simultaneously at the beginning of time, although in a form of "seminal reasons" which developed only later, during the course of time. Aquinas says that Augustine's interpretation is shared by a minority and is less compatible with the Scripture, but is more rational (*rationabilior*) and is more resistant to the attacks of infidels. In contrast, Ambrose's interpretation prevails among Church Fathers and holy Doctors and is more compatible with Scripture, but also more vulnerable to critics and ridicule by unbelievers. This pragmatic benefit, namely resistance to attacks of unbelievers, leads Thomas to prefer Augustine's interpretation. However, it doesn't follow that he rejected Ambrose's interpretation. On the contrary, he says that he is going to defend both traditions (Cf. *In II Sent*, Dist.12,q.1,a.2c; *STh*, I,74,2,c).

Now, if Ambrose's tradition is contrary to theistic evolution and Thomas is going to defend it, he would be in contradiction with himself. Thus, either Thomas is inconsistent in his reasoning or Augustine's concept is not compatible with theistic evolution.[42]

The Ambrosian tradition excludes theistic evolution because it postulates direct formation of different species immediately by God over a course of time. And the Augustinian tradition contradicts theistic evolution for the same reason, because it postulates the direct creation of different species, though at one moment, in the beginning. Theistic

[42] The argument in a formal notation:
If (AM is not TE) and (TH is AM) and (TH is AU) then (AU is not TE) or (TH is TE and TH is not TE) where AM – Ambrose's concept of the origin of species, TE – theistic evolution's concept of the origin of species, TH – Thomas Aquinas's concept of the origin of species, AU – Augustine's concept of the origin of species, "is" – is compatible with, "is not" – is not compatible with.

evolutionists claim that the idea of species being created in *seminal reasons* leaves room for biological macroevolution. But from the statement "species were created in seminal reasons" one cannot derive the conclusion: "species were not created but evolved". Whatever the hidden form of the primordial existence of species (in seminal reasons) means, this concept excludes (1) natural explanation for the origin of species, (2) universal common ancestry and (3) the transformation of species – all substantial elements of biological macroevolution.

Ad 11. That quotation and all these kinds of utterances, whether by Augustine or other holy writers, refer to God's providence, which acts after the world is constituted and formed by Divine power. However, they don't apply to the constitution and formation of the world.

Ad 12. Spontaneous generation was assumed by all authors from antiquity to the 19th century. It was not a case of belief, but of natural knowledge. Aquinas simply adopted opinions prevailing among ancient scientists (i.e. philosophers of nature) regarding the origin of some animals. There are two different problems, that accompany the argument of spontaneous generation.

(1) The first question pertains to the origin of totally new species: Can new species appear as a result of spontaneous generation? To this Aquinas (as well as Augustine and other Church Doctors) answered "no." Although some organisms can generate out of putrefaction, they belong to the species that were created before, in the beginning.[43] Interestingly, however, Thomas says that if any new species arise by putrefaction (which he doesn't deem certain) even they were created in potentiality in the work of "six days".[44] Still this idea doesn't harmonize with theistic evolution, which postulates universal common ancestry, transformation of species and the emergence of totally new species after creation was completed.

(2) The second question pertains to the possibility of generating individuals belonging to species previously created in the work of formation. Even this concept was difficult for Aquinas, as dead bodies of animals or other substances subjected to putrefaction did not provide adequate cause to generate living beings. However Aquinas found sufficient cause in the influence of celestial bodies.[45] We must remember that in medieval times, celestial bodies

[43] "It ought, then, rather to be said that in the natural generation of all animals that are generated from seed, the active principle lies in the formative power of the seed, but that in the case of animals generated from putrefaction, the formative power is the influence of the heavenly bodies. The material principle, however, in the generation of either kind of animals, 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" (*STh*, I,71,1,ad1). "The production of plants from out the earth is a work of propagation, and therefore they were not produced in act on the third day, but in their causes only. However, in accordance with other writers, it may be said that the first constitution of species belongs to the work of the six days, but the reproduction among them of like from like, to the government of the universe" (*STh*, I,69,2,c).

[44] "Since the generation of one thing is the corruption of another, it was not incompatible with the first formation of things that from the corruption of the less perfect the more perfect should be generated. Hence animals generated from the corruption of inanimate things, or of plants, may have been generated then. But those generated from corruption of animals could not have been produced then otherwise than potentially". (*STh*, I,72,1,ad5). "Nothing entirely new was afterwards made by God, but all things subsequently made had in a sense been made before in the work of the six days. […] 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 and elements received at the beginning". (*STh*, I,73,1,ad3; cf. *In II Sent*. Dist. 15,q3a.1ad7)

[45] "It was laid down by Avicenna that animals of all kinds can be generated by various minglings of the elements, and naturally, without any kind of seed. This, however, seems repugnant to the fact that nature produces its effects by determinate means, and consequently, those things that are naturally generated from seed cannot be generated naturally in any other way. It ought, then, rather to be said that in the natural generation of all animals that are generated from seed, the active principle lies in the formative power of the seed, but that in the case of animals generated from putrefaction, the formative power of it is the influence of the heavenly bodies". (*STh*, I,71,1,ad1; cf. *ScG*, III,69,4).

were seen as higher causes of all works of nature on the earth. On the other hand, Aquinas knew nothing about the inner complexity of even the simplest organisms. This surely made acceptance of spontaneous generation much easier. But even then he allowed spontaneous generation only in the case of the "imperfect animals."[46] His intensive search for causality in spontaneous generation proves how much he was concerned about the existence of sufficient causes in any works of nature. Spontaneous generation remained somewhat problematic to the medieval scholar, and therefore we can assume that Aquinas would joyfully embrace later experiments that disproved spontaneous generation. Nevertheless, even the possibility of spontaneous generation of individuals within previously created species doesn't help to reconcile Aquinas' views with theistic evolution which assumes generation of entirely new species.

4. CONCLUSIONS

These arguments show a substantial incompatibility between Thomas Aquinas's teachings on the origin of species and the concept of theistic evolution. The table below summarizes this analysis. The table shows the differences between three concepts of evolution (as defined at the beginning of this paper) and the teachings of Aquinas. As we can see there are substantial differences between Aquinas's position and theistic evolution, although the distance between theistic and materialistic evolution is not so great.

	Atheistic Evolution	Materialistic Evolution	Theistic Evolution	Thomas Aquinas's Doctrine
Nature is self-sufficient / is a closed system	+	+	nc	-/nc[47]
Creatio ex nihilo (first creation)	-	-/nc	+	+
Evolution as a secondary/instrumental cause of species formation	na	nc	+	-
The need for a supernatural action by God in the formation of species	-	-	-	+
Creatures can be an active help for God	na	nc	+	-

[46] "Perfect animals, produced from seed, cannot be made by the sole power of a heavenly body, as Avicenna imagined; although the power of a heavenly body may assist by co-operation in the work of natural generation […]. But the power of heavenly bodies suffices for the production of some imperfect animals from properly disposed matter: for it is clear that more conditions are required to produce a perfect than an imperfect thing". (*STh*, I,91,2,ad2; cf. *STh*, I,45,8,ad3).

[47] Many scholars strongly defend the thesis that nature according to Aquinas is self-sufficient, that is, it doesn't require any supernatural act of God to work. Therefore this interpretation is one of those possible. However, when Aquinas puts forward the argument of self-sufficiency of nature as an argument against existence of God, he then refutes it. This undermines bold acceptance of nature's self-sufficiency in his writings. Cf. *STh*, I,2,3,ad2.

in the work of formation (so-called second creation)				
New species can still arise	+	+	+	-
Universal common ancestry	+	+	+	-
Transformation of species by accidental change is possible	+	+	+	-

nc (not clear) – lack of response to a question or the answer is ambiguous
/ – two interpretations are possible
na – not applicable

If Aquinas's teaching doesn't fit with any of the evolutionary viewpoints, what was his answer to the riddle of the origin of species? To answer we have to develop a new idea, which is different from both materialistic and theistic evolution. This third answer states that species were produced by God who acted directly (without using secondary causes) in the natural order. Aquinas's doctrine agrees with theistic evolution regarding the first beginning of the physical universe, which couldn't have come into existence other than by "creatio ex nihilo." However, Aquinas maintains that the emergence of natural species required some kind of supernatural power on the part of God. Moreover, he implicitly rejects the notion of "creatio continua," or constant emergence of new species since he maintains that this "creative" action of God was finished once and for all with the appearance of human beings.

There are many ideas in Aquinas's writings that have been overturned by later scientific discoveries. These include his beliefs in the immutability of the celestial bodies, in geocentrism, and his convictions about the existence of spherical firmament high above the earth. Sometimes these facts make scholars think that Thomas Aquinas is not worthy of their trust when he speaks about the origins of the natural world. However, as we have demonstrated here, Aquinas placed the origin of species on the part of God rather than nature. He taught the supernatural formation of species. Science deals with the works of nature. Therefore, if Aquinas was right, then contemporary scientists cannot fully explain the origin of species. This does not mean that Aquinas was right, but that his teaching is irreconcilable with theistic evolution.