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*Galileo, Darwin and the Limits of Science*

THEISTIC EVOLUTION

In this paper I would like to address the problem of a seeming analogy between the Galileo's and Darwin's cases in the context of faith and science. Both scholars have generated much controversy and both apparently have created problems for a Christian worldview in general and Catholic dogma in particular. Hence the question: Is it justified to use Galileo's case as a template for resolving the controversy over Darwin's theory of the origin of species?

Before we will move on to address this question we need to clarify one term that will be important in the later discussion. This term – theistic evolution – was coined soon after Darwin came up with his theory of the evolutionary origin of species in the mid-19<sup>th</sup> century. The core message coming from Darwin's works was that God did not create species directly, or at least supernaturally, but used natural forces such as mutation (variation) and natural selection. In Darwin's view, God was removed from natural history and his place was taken by natural laws.

This Darwinian proposal was followed by two opposite reactions from the Christian community. One was a defense of traditional theology in some form of "creationism" another was the acceptance of Darwinian postulates and the attempt to reconcile them with Christian teaching. The latter approach is called "theistic evolution".

Theistic evolution is a theological concept claiming that God used evolution to produce different forms of life. In more general terms, theistic evolution maintains that God did not work directly or supernaturally in the natural history of the universe, but instead He chose to work through natural secondary causes to produce everything we see in the material realm. Thus the history of the universe begun with the Big Bang and then natural laws and properties, established by God, did the rest.

Until our times both creationism and theistic evolution still find their proponents, however, theistic evolution gained overwhelming popularity. Sometimes Galileo's case is used to promote theistic evolution in the Church. In what follows we will clarify why the "argument from Galileo" does not work in the case of Darwin and thus it cannot be used to implement theistic evolution in Christianity.

## FROM GALILEO TO DARWIN

The proponents of theistic evolution often compare Darwin to Galileo and extrapolate from the latter to the first. One good example can be found in the writings of Francisco J. Ayala who presents the problem in the following way:

Darwin's greatest contribution to science is that he completed the Copernican Revolution by drawing out for biology the notion of nature as a system of matter in motion governed by natural laws. With Darwin's discovery of natural selection, the origin and adaptations of organisms were brought into the realm of science. The adaptive features of organisms could now be explained, like the phenomena of the inanimate world, as the result of natural processes, without recourse to an Intelligent Designer. The Copernican and the Darwinian Revolutions may be seen as the two stages of the one Scientific Revolution. They jointly ushered in the beginning of science in the modern sense of the word: explanation through natural laws.<sup>1</sup>

According to Ayala, Copernicus and his greatest promoter Galileo are the scientists who produced the idea of the universe independent from religious beliefs. Ayala's interpretation is somewhat far-fetched because Copernicus did not do much to dispense the planetary system from angelic or otherwise unknown forces. This was the contribution of Isaac Newton who came up with the modern theory of gravity. But it is true that in the Copernicus/Galileo's case the conflict of the scientific observation and the theological interpretation played a crucial role.

For some other proponents of theistic evolution challenging Darwin from the perspective of the faith is tantamount to repeating the error of the Church condemning Galileo four centuries ago. The thought pattern presented by Christian evolutionists goes more or less along these lines: Church authorities were proved wrong in Galileo's case. Until today the condemnation of Galileo is a shameful chart in the history of the Catholic Church. Today we cannot risk another condemnation of science therefore, the Church should either embrace evolution or stay away from the problem altogether and leave it to biologists. This line of reasoning leads some of the Christian evolutionists to embracing the strong separation of science and religion. Because the 17<sup>th</sup> century ecclesiastical judgment so strikingly missed the point, the Church should not make such judgments at all. In the extreme form of this argument it is said that religion is not concerned with the material world. It is confined to the spiritual, the moral and the eschatological.<sup>2</sup>

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<sup>1</sup> F. J. Ayala, <https://www.ncbi.nlm.nih.gov/books/NBK254313/>; (02.20.2020).

<sup>2</sup> See for example F. Euve, *Darwin i chrzescijanstwo (Darwin et le christinisme)*, Polish Edition, Krakow: WAM 2010, pp. 10–11.

Galileo's case from 400 years ago is often used today to promote evolutionism in the Church and limit the authority of theology in settling any questions that have any bearing on our understanding of nature. As Galileo changed our understanding of planetary movements Darwin changed our understanding of the origin of man – so say theistic evolutionists. According to them, questioning Darwin is risking a new “Galileo affair”.

The problem with this argument is that it very thoroughly confuses some true premises with some false conclusions that do not follow. To understand why extrapolating from Galileo to Darwin is often misleading we need to wrestle with a few distinctions that are usually overlooked by the proponents of this argument.

#### WHAT WAS THE GALILEO'S CASE ABOUT?

First we need to admit that Galileo was condemned for claiming that the Sun sits still and the earth is in motion. The relevant piece of the 1633 condemnation issued by the Inquisition reads:

1. The sun is the center of the world, and entirely immobile insofar as location movement.

*Appraisal:* All have said the stated proposition to be foolish and absurd in Philosophy; and formally heretical, since it expressly contradicts the sense of sacred scripture in many places, according to the quality of the words, and according to the common exposition, and understanding, of the Holy Fathers and the learned Theologians.

2. The earth is not the center of the world, and not immobile, but is moved along Whole itself, and also by diurnal motion.

*Appraisal:* All have said, this proposition to receive the same appraisal in Philosophy; and regarding Theological truth, at least to be erroneous in faith.<sup>3</sup>

We need to observe two things regarding Galileo's condemnation. First, the Inquisition did not rely on a “religion versus science” argument. The document accuses Galileo of contradicting both the religious belief derived from the Bible and “Philosophy” which in his times contained astronomy and other natural disciplines. Thus the authors of the condemnation assumed that the mobility of the Sun was an established astronomical fact. This is important because this shows that the ecclesiastical authority did not want to oppose any scientific assertion with a theological doctrine. On the contrary, the

<sup>3</sup> This follows the best currently available translation based on the original in C.M. Graney, *The Inquisition's Semicolon: Punctuation, Translation, and Science in the 1616 Condemnation of the Copernican System*, available at <http://arxiv.org/abs/1402.6168> (02. 22. 2015).

theologians believed that astronomy supports the natural sense of the Holy Scripture here and thus we have a well-established synthesis of astronomy and the Bible that is worthy of defense.

The second thing to notice is that when it comes to the matter of facts neither the Holy Office nor Galileo were completely correct. It is neither the Sun revolving the earth nor the other way round, but both bodies revolve around the common center of gravity. Surely, because the Sun accounts for over 99% of the mass of the entire Solar System the center of gravity is in the Sun and very much in the middle of it. But the orbits are not circular (as Copernicus and Galileo claimed) but elliptical. And it is hard to say that the Sun itself is immobile. In our times, when we see the entire Solar System as just a part of one of billions of galaxies, and all of them are in different kinds of motion, nothing in the universe is actually immobile. The later discoveries and specifically Einstein's relativity made the Galileo's problem somewhat irrelevant.

Yet, it is important to say that even if Galileo was not quite right he was closer to the truth than his opponents. After all, science constantly delivers new evidence and sometimes theories get confirmed and sometimes replaced with other theories. The good scientist pushes our knowledge towards greater understanding of natural phenomena, even if his solution is not ultimate. For this reason Galileo deserves commendation rather than condemnation.

We also need to take into account that the Church authority has no power over material facts and the claims of natural sciences. Therefore, what is essential in the Holy Office's document is the theological appraisal clearly condemning Copernican system as opposing the Bible. Within two hundred years after Galileo, astronomers had evidence at hand for the motion of the earth.<sup>4</sup> In the light of these new facts, it became clear that the Biblical interpretation was mistaken. Theologians realized that when the Bible speaks about the motion of the Sun and the stability of the Earth it uses an ordinary human way of speaking. Even today we still speak about the rising Sun or a sunset rather than "the movement of the Earth unveiling the Sun in the morning". The conclusion follows that the Bible in these passages cannot be used to establish the facts of nature. The theologians therefore went beyond their competence and the traditional Biblical interpretation was extended beyond its scope. That the ecclesiastical authority made a mistake in the case of Galileo was officially confirmed by the commission established by John Paul II. The final document speaks of a "subjective error of judgement" on the part of the Holy Office.<sup>5</sup>

<sup>4</sup> In 1838 Friedrich Bessel was the first to successfully measure stellar parallax – the evidence long missing for confirming earth's motion.

<sup>5</sup> See Cardinal Paul Poupard, *Address to the Holy Father in the name of the Pontifical Commission on the Galileo case*, [in:] *Papal Addresses to the Pontifical Academy of Sciences 1917–2002*, Vatican: The Pontifical Academy of Sciences 2003, pp. 344–348., 348. John Paul II when assessing Galileo's case spoke about "the error of the theologians of the time, when they maintained the centrality of the earth". See John Paul II, *Speech delivered at the concluding summary presented by the Papal Commission on October 31, 1992*. *ibid.* pp. 336–343., 342.

In the light of these facts the claim that the Church should never judge science seems quite reasonable. By extrapolation, it seems that the proponents of theistic evolution are right: the Church should stay silent about Darwin's theory and accommodate the Biblical interpretation to match Darwin's idea of the origin of species. How can reasonable and faithful believers, risk another condemnation of a scientific truth? Even so, Galileo does not teach us how to deal with Darwin. To understand why, we need to first briefly present the Darwin's theory and its challenge to Christianity.

### THE CHALLENGE OF DARWIN

As I mentioned, the core of the entire Darwinian project was the removal of supernatural divine acts from the formation of the universe.<sup>6</sup> Darwin questioned what traditional theology called the second creation (Lat. *secunda creatio*).<sup>7</sup> Catholic theology used to offer a consistent teaching about the origins of the universe. It was called the tract on God the Creator.<sup>8</sup> The tract was formulated by the Fathers of the Church (among them St. Augustine) and holy doctors, such as Thomas Aquinas. It's true that they did not know modern science, they did not know of the expanding universe, billions of years of natural history and laws of biosphere, such as adaptations due to genetic mutations and natural selection. Moreover, they differed among themselves on many elements concerning the correct interpretation of the Genesis account of creation.

The most "out of the box" was Augustine's opinion that the entire creation happened in one moment along with the creation of the universe out of nothing. According to Augustine, most species were created according to their kinds right from the beginning, but some were created in a seminal form to develop only later under natural conditions. Today many theistic evolutionists appeal to Augustine to show how evolutionary ideas were always present in the Christian tradition. In fact, however, Augustine and Darwin used the term "evolution" in essentially different ways. We do not find any of the core ideas of Darwin in Augustine. The Doctor of Grace does not allow the idea of universal common ancestry nor the natural origin of species, nor the natural transformation

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<sup>6</sup> Francisco Ayala, who agrees with Darwin, additionally believes that: "Copernicus, Galileo, and Newton brought the world of inanimate nature, on Earth as well as heavens, to the domain of science, thereby excluding supernatural explanations. Darwin brought the world of life, with all its diversity and splendid contrivances, to the domain of science, making unnecessary the awkward recourse to a designer who would again and again intervene in the natural world with designs that are often imperfect and occasionally dysfunctional." F. J. Ayala, *Darwin's Gift to Science and Religion*, Washington DC: Joseph Henry Press, 2007, pp. 181–182.

<sup>7</sup> See Thomas Aquinas, *S. Th.* I, 66–73.

<sup>8</sup> Usually the tract *De Creatione* was combined with the treaty on the fall and elevation of man. Hence, the tract *De Deo creante et elevante*. It was one of the core parts of systematic theology presented in the manuals of theology until mid 20<sup>th</sup> century. By today this tract has almost completely disappeared from theology. Its place was taken by considerations about the relations of science and faith maintained in the theistic-evolutionary paradigm.

of species. Moreover, Augustine's approach, that was already marginal in medieval times, was later completely disproved by the scientific evidence showing that the universe did not emerge in its current form all at once but rather stage by stage with different species appearing in big and sudden explosions of life over time (for example the Cambrian explosion of life). Augustine's authority does not support theistic evolution.

If we ignore particular differences surfacing among the Church authors we can say that theologians before Darwin would agree on at least three major claims:

1. The universe was not only created out of nothing in the beginning of time, but also formed supernaturally by God over the time described in Genesis as the "six days". This period was called the second creation (*secunda creatio*).

2. Species understood as distinct and separate natures of living beings (so called *natural species*) can come only directly from God. Specifically the human body was not derived from a brute but specially formed by God from the dust of the earth and simultaneously made alive by the infusion of the rational soul.

3. Creation was finished once and for all with the creation of man. After creation was finished no entirely new forms of life can emerge. God maintains the universe in existence all the time (*conservatio rerum*), but he does not create anything new.<sup>9</sup>

It is important to notice that none of these teachings was disproven by later factual discoveries such as the expanding universe, "deep time" or billions of galaxies.

Now the problem is that Darwin's theory as well as contemporary theistic evolution contradicts and expressly denies all three of these fundamental principles of the Catholic understanding of creation. According to theistic evolution, creation is a one-time event that sparked the Big Bang, but later no supernatural or direct divine causality occurred in the formation of the universe. Species, including man according to his body, emerged through the natural evolutionary process. Consequently, creation has never ended and entirely new forms of life may still appear due to the workings of natural laws such as random mutations and natural selection. This idea has been presented as a theological concept of continual creation (*continua creatio*) which contradicts the completion of the divine work of creation expressly proclaimed by the Bible and defended by the Church Fathers and holy doctors. The very notion of creation is substantially redefined in theistic evolution – no longer is it the direct and sole action of God, but a form of cooperation in which God invites his creatures to take part in the act of creation.

For our topic the important conclusion is that Darwin, unlike Galileo, challenged several Christian doctrines regarding the origins of the universe. In fact, Darwin's theory inspired an entirely new theory of origins called theistic evolution, or a New

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<sup>9</sup> Thomas Aquinas teaches this explicitly along with the entire tradition based on the Biblical account of creation. See for example *S. Th. I*, 118,3 ad 2.

Creation Story. But if a “scientific” theory requires a substantial redefinition of theology one may doubt that the theory is actually scientific. In what follows we will explain the similarities and the differences between Darwin and Galileo and show why Galileo did not challenge the faith whereas Darwin did.

#### GALILEO AND DARWIN – THE SIMILARITIES

Both Galileo and Darwin were careful observers of nature. They were passionate naturalists. However, neither really made any new discovery based on new observations.<sup>10</sup> Galileo and Copernicus did not know more about the sky than their contemporaries. Around the same time another astronomer, Tycho Brahe, proposed still a geocentric model that accounted for all of the observable data even better than the heliocentric system. The novelty of the Copernican system was not in the *discovery* of anything new, but in the new *interpretation* of the existing data. The similarities (homologies) between different organisms and organs were also known before Darwin. People knew of adaptations due to selection, whether natural or artificial, long before Darwin was born. Different shapes of birds’ beaks were also commonly recognized. There was not a single discovery provided by Darwin that would necessitate his theory. Thus Darwin did not derive his theory from new discoveries but rather imposed it on the same data that had been available to all including the proponents of creationism who dominated the academia of his times. Creationism was compatible with the observational facts at least to the same degree (if not more) than evolutionism.

Both Galileo and Darwin clashed with the commonly held consensus and both were initially rejected by the Church, although the condemnation of Darwin was rather tacit (never made public), fragmentary, and for the most part delivered by theologians rather than the ecclesiastical authority.<sup>11</sup> Thus both cases seem to show how a “new truth” may be first rejected by a majority only to be later accepted while its opponents are proved wrong and forced to shamefully withdraw.

Based on so many analogies between the two it would be reasonable to assume the logic of the proponents of theistic evolution: The Church should refrain from making definitive judgments and work on redefining the creation story so as not to conflict with Darwinian theory. Actually, this task has already been accomplished and the solution has been accepted by a majority of theologians.<sup>12</sup> Still there are important reasons why this logic is a dead end and a faux pas of contemporary theology.

<sup>10</sup> Here I am confining Galileo’s work to astronomy, particularly to his heliocentrism.

<sup>11</sup> More about the early reactions to Darwin and theistic evolution see M. Chaberek, *Catholicism and Evolution: A History from Darwin to Pope Francis*, Angelico Press 2015, chapters 3 and 4.

<sup>12</sup> A document by the International Theological Commission from 2008 entitled *Communion and Stewardship* is a good example of how the Catholic theological community (at least through her official representatives to the Vatican) adopted theistic evolution. For more about the history of the first Catholic evolu-

## WHY GALILEO'S CASE IS NOT A TEMPLATE FOR DARWIN'S CASE

As we already showed, the crucial difference between Galileo and Darwin is that the first did not challenge any Catholic belief whereas the latter did.<sup>13</sup> The condemnation of Galileo stemmed more from the personal animosity of conservative clergy towards a prideful astronomer rather than from any serious theological premises. Theologians who fought Galileo indeed quoted the Bible to support geocentrism.<sup>14</sup> But the geocentric model was adopted by Christianity from the Pagan astronomers such as Ptolemy and was never considered a truth of faith. There are no ecclesiastical documents that would establish the central place of the earth as a matter of faith. In contrast, if Darwin's theory were accepted in Christianity some of the crucial teachings on creation would need to be abandoned. Why is this so? Why is there a substantial difference between the Galileo's case and Darwin's?

The reason is that these two addressed two very different questions. Galileo was concerned with the workings of the universe. Generally speaking, his academic endeavor was focused on the question of "how?" – how the universe is built, how the planetary system works, which planet is where, what are their relative positions. The questions of "how?", if they concern nature, are properly addressed by natural science. Darwin, however, addressed a substantially different problem – the problem of origins. He asked where did the different forms of life come from? His academic endeavor concerned the question "from where?"

This difference is clearly revealed when we compare the titles of the two foundational books for both naturalists. Copernicus's work, that introduced the heliocentric model, was entitled *De revolutionibus orbium coelestium*, that is, *On the Revolutions of the Celestial Spheres*. Darwin's book has the title *On the Origin of Species*. Copernicus tried to explain how the planets revolve, Darwin – where the species came from, i.e., the origin of new natures. The first question belongs to science the second to theology. The first book of the Bible is entitled *Genesis*, which is a Greek word for "origins" because it was designed to explain the origins. Darwin, by proposing a theory of origins actually proposed an alternative Genesis. This is why his theory clashes with Christian faith and this is also why it cannot be accepted in the same way as Galileo's heliocentrism.

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tionists and our take on *Communion and Stewardship*, see *Catholicism and Evolution*, op. cit. pp. 85–136. and pp. 244–252., respectively.

<sup>13</sup> Interestingly, some proponents of theistic evolution also admit that Darwin's work was theologically driven and had an enormous impact on matters of Catholic faith. J. F. Haught, *Making Sense of Evolution: Darwin, God, and the Drama of Life*, Westminster: John Knox Press, 2010, p. XII. Cf. footnote 6.

<sup>14</sup> The Biblical fragments usually quoted to support the immobility of the earth were: Psalm 104:5: "The Lord set the earth on its foundations; it can never be moved" (see Ps 93:1, 96:10, 1 Chr 16:30). In another place we read about the movement of the sun: "And the sun rises and sets and returns to its place" (Eccl 1:5).

Interestingly enough, some of the greatest scientific minds before Darwin were aware of this distinction. For example, Isaac Newton once wrote:

Though these bodies may indeed continue in their orbits by the mere laws of gravity, yet they could by no means have at first derived the regular position of the orbits themselves from those laws. Thus, this most beautiful system of the sun, planets, and comets, could only proceed from the council and dominion of an intelligent and powerful Being.<sup>15</sup>

For Newton it was clear that the laws of nature may account for the operations of nature, but the same laws cannot account for the origins of nature. To explain origins Newton needed an “intelligent and powerful Being”. This distinction applies to all disciplines: physics cannot explain the origin of physics (natural laws), chemistry cannot explain where chemistry, i.e., the chemical properties of matter, come from, and the origin of biology cannot be explained by an appeal to the laws of biology.

The problem with Darwin’s approach is that he tried to explain the origin of biodiversity by appealing to the laws that operate only when biodiversity exists. He wanted to explain the origin of species by invoking biological laws. But the laws cannot generate new forms, they can only explain the behaviors of the forms already in existence. In order to explain the origin of biodiversity and the laws that govern it we need— as Newton put it — an “intelligent and powerful Being”.

A new form of life is constituted by a new set of functional information whether genetic, epigenetic, structural or any other. Information is never generated by laws. Laws can pass on information (it happens, for instance, in the process of biological generation when information is passed on from parents to posterity), but laws do not generate new functional sets of information. New information is generated by a mind and thus the origin of species cannot be explained without invoking an intelligent Creator.

The theological explanation of origins is found in the Bible. Genesis explains that species were distinguished according to their kinds right from their inception and produced by nothing and no one but God. The Biblical vision thus excludes anything like front-loaded evolution, universal common ancestry or any other evolutionary concept proposed within theistic evolution. Scientific facts, such as that the fossil record shows sudden appearance of many species in short periods of time and their unchanged existence for millions of years (stasis), are perfectly compatible with the Biblical vision and provide an indirect support for the veracity of the traditional Christian belief.

Here we come to see the failure of the analogy between Galileo and Darwin. Galileo offered a new interpretation of scientific facts whereas Darwin offered a new theory

<sup>15</sup> Sir Isaac Newton, *Newton’s Principia Mathematica*, Motte’s Translation Revised, translated by Andrew Motte, revised by Florian Cajori, 1686, 1934, pp. 543–544.

of origins which, for a greater part, is theological (philosophical) rather than scientific. This is why Galileo's theory should be judged by astronomers not by theologians whereas Darwin's theory should be judged by theologians. Theologians derive their knowledge about origins from the Bible authentically interpreted by holy Tradition, the teachings of the Fathers and Doctors and sound philosophy, such as that found in Thomas Aquinas. The Church takes no risk of another "Galileo affair" by judging theistic evolution according to the classical theological standards.

## TWO POSSIBLE CHALLENGES TO THE ARGUMENT.

At the end we need to anticipate the two possible charges that might be filed against what has been said thus far. Answering them up-front will also allow me to additionally clarify my argument.

1. The first question may arise, how can we say that Darwin's theory is not quite scientific while it is quoted by virtually all biology textbooks and discussed in science classes all around the globe?

To explain our argument we need to distinguish between two layers present in the Darwin's idea. First is the layer of factual statements. For example, Darwin speaks about homologies (similarities) between different organisms and organs. He picks the eye and shows how it differs from one species to another and how it can be ordered from the least to the most biologically complex. He compares the wing of a bat, the fin of a porpoise, the leg of a horse, and the hand of a human and shows that the basic bone structure is the same in all of them. He can also show a number of different variations within populations such as different beak sizes among the Galapagos finches. Another example of Darwin's factual statements is that there is some kind of selection in nature which adapts organisms to different environments. And this is the layer of science in his theory. In the neo-Darwinian version it is claimed that the adaptations we observe in nature are primarily an effect of random genetic mutations and natural selection. These factual claims of Darwin and his followers do not create a controversy.

But there is also the second layer in the Darwin's theory which consists of very general non-factual statements, such as that all living beings can be traced to a single common ancestor via natural process of generation, or that one type of an animal can be transformed into a completely different type (such as a reptile into a bird) thanks to the same laws of variation and selection that accommodate it to different environments. These grand claims are not provable for the simple reason that our observation cannot extend for millions and billions of years.

Now, when we speak of the non-scientific nature of Darwin's theory we do not mean the first but the second layer. In other words, there is the scientific part of Darwin's idea, which consists of the mechanism of evolution based on random variation and natural selection. This mechanism actually works and to some extent explains some

changes in organisms. But the second layer speaks not about the *mechanism* of evolution but about the alleged *effects* of its working in the form of the entire variety of species. Science can study the mechanism, but the supposed effects are only philosophical postulates that evade scientific scrutiny. In academic discussions about Darwin's theory (or neo-Darwinism) these two layers get thoroughly confused, sometimes intentionally, to make an impression that the grand non-scientific claims are equally as provable as the observable biological phenomena. The confusion of these two layers is what gives Darwin's theory extreme vitality. On the one hand it makes room for a truly scientific endeavor, on the other, it delivers an answer to religious questions without resorting to any religion or the supernatural.

But the controversy is about the grand claims. This is where Darwin appropriated for biology something that cannot belong to biology by the very nature of the issue. The "alternative Genesis" is hidden not in the first but in the second layer of his theory. When we postulate judging Darwin by theological standards we mean only the second layer which is actually the whole reason why he came up with his theory in the first place. If Darwin explained only why finches have different beaks it might be interesting for some academics but no eye brow outside of biological community would rise. He claims, however, to offer an explanation to the origin of finches (or the eye or the brain) by appealing to a very simple natural process. This is where he abandons science, invades theology and creates the controversy that divide people across disciplines and creeds.

2. The second objection refers to our distinction between the question of origins (from where?) and the question of the workings of nature (how?). Does not science explain many things about origins? It seems that science explains things such as the formation of stars, the origin of the universe (Big Bang), the formation of rivers, mountains and oceans. Does it not tell us about the origin of species which we observe in the fossil record?

To all these questions the answer is no. Let's scrutinize briefly all of the quoted examples to show why they do not ruin the distinction of "how?" and "from where?". The Big Bang theory is not a theory of origins strictly speaking. It postulates that the universe began with an initial singularity, that is, the physical state where all laws and constancies collapse. But we cannot scientifically address the question of how this tiny particle of immense density and energy began to exist. The theological concept of creation out of nothing (*creatio ex nihilo*) is perfectly compatible with (though not identical to) Big Bang cosmology. The Big Bang tells us about the earliest stages of the universe available to science whereas the concept of the first creation (*prima creatio*) tells us where the universe came from. Thus the Big Bang addresses the question of "how?" (how the universe unfolded) whereas the theology of creation addresses the question of origins "from where?" (where did the Big Bang come from, that is, out of nothing, by the direct act of God).

Cosmology and geology, as far as they can explain the phenomena under their scrutiny, do not speak about origins but changes. Stars most probably form naturally from interstellar dust, they burn over millions of years, grow, turn into red giants and explode. This is comparable to the regular biological generation in which a dog begets a dog that transits from embryonic to adult state, ages and dies. Nothing new is generated in this kind of processes. The same applies to geology – one formation is replaced with another, but all of them are just rearrangements of the same elements over and over again. Nothing substantially new emerges owing to the geological processes. At least nothing like a new form of life or a new organ.

In paleontology the history of species is studied. This science provides answers to the questions such as: What kind of species existed? How many of them, when and where on the planet? It also speaks about their anatomy, behaviors and diets. But establishing their origins, that is, how they started to exist goes beyond paleontology.

Neither does the concept of deep time that was established by modern cosmology, geology and physics address the question of origins. The age of the universe refers to its current state (how old it is now) and thus it is an answer to “how?” rather than “from where?”. As such the question of the age of the universe belongs entirely to science and should not be judged by theologians according to the revealed sources.

From all of these examples we see that the distinction of “how?” and “from where?” remains valid across the disciplines. By switching from the first to the second type of questions Darwin abandoned the domain of natural science. His theory turned into philosophy and alternative theology. Today Darwin’s theology is called theistic evolution. The Church has the authority to judge it. And because theistic evolution contradicts the Bible, the Christian worldview and the classical theology of creation it should be rejected by the Church not on scientific but doctrinal grounds.

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