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COMMENTARY

The Darwinian revolution

La revolución darwiniana

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ABSTRACT

The scientific revolution probably began at 16th century with the heliocentric theory of the eminent astronomer Nicolaus Copernicus, but it was culminated with the masterful discoveries of Galileo Galilei and Isaac Newton at 17th century who revealed that planet movements around the sun and other similar phenomena can be explained by simple mechanical laws of physics and astronomy. However, the origin, complexity and configuration of living beings remained in the mystery until 19th century, with the publication of "On the origin of species". In this essay I discuss the importance of the Darwinian scientific revolution, its beginnings, and the main objections of creationists to his evolutionary ideas. Darwin demonstrated that the origin and complexity of living beings can be explained by natural processes, without the intervention of a supernatural being. However, the beginnings of the Darwinian revolution were particularly difficult and 128 years after his death, the controversy between evolutionists and creationists still persists.

Key words: creationism, Darwin, evolution, religion, scientific revolution.

RESUMEN

Con base en la teoría heliocéntrica formulada por Nicolás Copérnico en el siglo XVI, Galileo Galilei e Isaac Newton iniciaron la revolución científica al demostrar que los movimientos de los planetas alrededor del sol podían ser explicados por las leyes de la física y la astronomía. No obstante, el origen y complejidad del mundo orgánico permaneció en el misterio hasta mediados del siglo XIX, cuando Charles Darwin publicó su célebre obra 'El origen de las especies'. Desde entonces, la selección natural se ha convertido en una de las teorías científicas más universalmente aceptadas y Darwin en el fundador de la biología moderna. En este ensayo se discute la importancia de la revolución darwiniana, sus inicios y las principales objeciones de sus detractores. Darwin demostró que el origen y la complejidad de los seres vivos pueden ser explicados por procesos naturales sin necesidad de la intervención de entidades sobrenaturales. Sin embargo los inicios de la revolución darwiniana fueron muy difíciles y la controversia entre creacionistas y evolucionistas persiste hasta nuestros días.

Palabras clave: creacionismo, Darwin, evolución, religión, revolución científica.

INTRODUCTION

This year marks the 200th anniversary of Darwin's birth and the 150th anniversary of the publication of his book entitled "On the origin of species by means of natural selection" (1859). As result, scientific circles world-wide celebrate this occasion with a large number of museum exhibitions, scientific essays, commentaries, symposia, meetings, internet forums, and some radio and television debates. But why is the Darwinian legacy so important? From my perspective, this anniversary is important due to two crucial reasons. Firstly, with the publication of his magnificent book Darwin established, for the first time, the scientific legitimacy of organic evolution, and hence he threw the gauntlet down on the traditionally religious story of who we humans are and how we came to be here in the first place. Thus, the Darwinian legacy may be considered as one of the greatest insights into human history, because it has shown that life began billions of years ago and the process of evolution is continuing around us even today and is likely to extend into an infinite future (Rejendran 2009). Secondly, despite the new scientific knowledge in the fields of genetics, molecular biology, paleontology, and biogeography accumulated during the last fifty years, evolutionary process by natural selection continues to be the best explanation of origin of life and its wonderful complexity on our planet. Currently some evolutionists

argue that the core of the evolutionary process lies in the competition among genes for representation in the next generation (e.g., Dawkins 1976) or that the structure of ecosystems determines the context in which genetic variation is winnowed by natural selection (e.g., Eldredge 2008). However, all of the discrepancies in modern evolutionary biology trace their own 'intellectual lineage' back to Darwin. For these reasons, Charles Darwin has been well-recognized as the founder of modern biological sciences, and his natural selection theory as the most influential theory in practically all areas of human knowledge (e.g., science, economics, politics, sociology, psychology, sexuality, philosophy and theology).

I will explain below how the beginning of the Darwinian revolution was especially problematic, tortuous, and slow, largely due to the fact that his evolutionary ideas were a source of constant controversy between evolutionists and creationists during many decades. This centennial debate still persists, and in fact, represents the eternal conflict between reason and human superstition.

From social-political to scientific revolution

Revolutionary processes include often two fundamental actors: the oppressed (i.e., the exploited masses or manipulated people) and the oppressors (i.e., those that, using their economic and/or political power, exercise the oppression for their own benefit). The 'revolution' itself arises when the oppressed acquire conscience of their own condition, and together they decide to transform the oppressing and dehumanizing reality into one that is more free and human (Freire 1973, 1994). Revolution per se involves a break from the past, a break from the erroneous ideas and behaviors which support the oppression. But contrary to the socio-political revolution described by Freire (1973), in the case of science and other areas of human knowledge, the revolutionary process tends to be much more difficult and time-consuming. Furthermore, a scientific revolution is not generated in the oppressed masses, but in the innovative, creative, crucial, and rational ideas of an individual or a small group of individuals such as Descartes, Copernicus, Galileo, Newton, and Darwin (Kuhn 1962, Shapin 2001). If successful, these ideas are validated and gradually diffused to different population strata thanks to a lingering process of reflection, argumentation and dialogue. If a scientific revolution is in fact 'revolutionary', it must result in a noticeable change of the thinking about nature and/or society and thus marks the transition to modernity (Kuhn 1962). Conversely, if the scientific revolution is not able to drive a significant change in the status quo (e.g., the progressive disappearance of creationism thinking and the related dogmas), it is only a failed attempt of revolution or a pseudo-revolution.

How revolutionary were the Darwinian theories?

In light of the above, Darwin undoubtedly should be considered as one of the greatest revolutionaries in the history of humanity (Aydon 2003, Ayala 2007a). Certainly, Charles Darwin did not discover evolution (because it was a speculation even before him: e.g., Darwin 1794, Lamarck 1809, Chambers 1844) but he was the first person to cast the subject in a thoroughly scientific mode. Thus, based on a huge amount of spatially distributed observational data in paleontology, geology, zoology, botany and, of course, an arduous reasoning process, Darwin transformed simple observations into a natural law (Ayala & Avise 2009). With his evolutionary ideas, Darwin demonstrated that the complexity of living beings can be explained by natural processes without the intervention of a supernatural being or 'Creator'. Darwin destroyed (at least partially) the primitive and convenient idea that human beings are the plus ultra of life on Earth and that all other living things were 'created' to serve them (unfortunately, this idea still persists in most human populations). Natural selection unavoidably removes the aura of divinity of human beings and returns us to the level of 'animality' (and hence our mortality). Darwin´s evolutionary theory also provides a framework for understanding the interrelations between humans and the rest of the animal kingdom. In light of evolution, human beings, formerly 'quasi-divine' beings, are seen for the first time as unfinished products governed by natural processes and

hence sharing a common origin and a similar end with the rest of the animal kingdom (Morin 1994, Young & Strode 2009).

Beginnings of the Darwinian revolution

The beginning of the Darwinian revolution (ca. from 1859 to 1870) was especially difficult, given the conservative attitudes of the time period. In Victorian England of the 19th century, to affirm or even to insinuate that different life forms were a product of 'transmutation' (i.e., former name given to evolution), was from all points of view, a flagrant blasphemy against the dogmas of the Christian faith. In response to blasphemy, sinners were exposed to severe punishment. For instance, apart from being stigmatized as heretic, enemies of the faith, pariahs and other moral sanctions, the blasphemers also were subject to persecution and ecclesiastical savagery against them, as occurred with some revolutionary scientists before Darwin. This was the case of the astronomer Nicolaus Copernicus, who conscious of the huge contradiction that represented his Heliocentric theory (i.e., that the Earth was in the center of the Universe) to the position of the powerful Roman Church, decided to delay the publication of his masterful job Of Revolutionibus Orbium Celestium (1543) until after his death. This allowed him to avoid the ecclesiastical punishment, but his posthumous job was severely censored. By contrast, the physical-astronomer Galileo Galilei had the courage to publish during his lifetime his landmark book entitled "Dialogue on the two chief systems of the world" (1632). However, Galileo was condemned by the Holy Office to life-in -prison because he supported Copernicus' Heliocentric theory. Finally, this sentence was commuted later to a life-sentence of residence arrest due to the fact that Galileo recognized in public that the Earth did not move around the sun, but rather the sun moved around the earth.

Likely because of the persecution of his previous academic colleagues and because Darwin feared to lose his excellent scientific reputation and social position that he had enjoyed since his return from the epic five year voyage aboard the 'Beagle' (Aydon 2003), he delayed the publication of "On the origin of species by means of natural selection" for two decades. It was not until 1859 (23 years after his voyage) that he found the courage to publish his evolutionary ideas. During this period Darwin lived a distressing double life on one hand, he was pressured to follow the customs of all 'gentleman' and to pretend to be a good believer; on the other hand, he was devoted to writing and developing his arguments to be presented in his seminal book. Darwin was aware that the publication of his evolutionary ideas would not only attract the animosity of both the most influential religious circles of England, as well as of important members of the scientific society, but would also create painful tensions with his devoted wife Emma. Despite these obstacles, his obsession to publish a theory that was a result of meticulous observational research, experimentation, and sound reasoning was stronger than his fears. In spite of the scientific-religious storm that Darwin knew would come after the publication of his book, there were several factors that he hoped would attenuate the possible reprisals against him. For example, he came from a rich and distinguished family that professed the Christian faith and the members of his family were all good taxpayers to the Church. In addition, he had studied Theology at the University of Cambridge and he had been declared agnostic in matters of faith, but never atheist (van Wyhe 2009). The latter certainly contrasts clearly with the theories and view-points espoused by his scientific work, but due to the historical circumstances in which he lived, it was probably the most convenient position to take. The public recognition of his atheism would have represented a large scandal and a true humiliation for his family. Nevertheless, Darwin could not spare himself from being ridiculed and degraded by some of the religious circles that classified his theory as 'absurd stupidity' and a true threat against the faith. English Creationists and most Catholic Bible-readers ferociously rejected evolution theory in order to maintain logical consistency within a framework of fundamentalist Christian dogmas, particularly the ones mentioned in the Genesis book (Dawkins 2008, Young & Strode 2009). This reaction was largely predictable, but what Darwin likely never imagined is that 128 years

after his death, the controversy between evolutionists and creationists still persists.

Intelligent design and the empire of the ignorance

In their desperation to find an acceptable argument to refute Darwin's evolutionist theories, the creationists resuscitated the concept of 'intelligent design' coined by the English clergyman and naturalist William Paley in his book "Natural theology" (1802). With this argument, the creationists tried to give a 'scientific air' to the biblical version of the 'Creation' narrated in the book of Genesis, and hence to reinforce the belief in a 'Creator' or 'intelligent designer' (Ayala 2007a, 2007b, Young & Strode 2009, Ayala 2010). Paley had a deep biological knowledge and he argued that: 'a clock is obviously designed for a highly specialized function which implies the existence of a watchmaker since never has been assembling by random forces. In the same way, the beautiful and complex adaptations of the alive organisms also imply the existence of a Creator'. For Paley, certain organs (e.g., the eyes) are extremely complex and their operation so mathematically perfect that never have been originate by the chance, and the only possible explanation is the existence of an intelligent designer. Thus, Paley' argument has two parts: organisms give evidence of being designed; second, that only an omnipotent God could account for the perfection, multitude, and diversity of the designs (Ayala 2007a, 2010).

According to the current version of the intelligent design, in many natural models there is a 'irreducible complexity' (i.e., the structure or organism appeared suddenly with all its complexity and therefore it cannot be reduced to their components) which contradicts categorically the theory of natural selection and hence these models only may be attribute to God (Carreño et al. 2009, Ayala 2010). This reasoning derives of an erroneous and distorted interpretation of one of Darwin's sentence in his book: 'if we could demonstrate that some complex organ has not been formed numerous and small successive modifications, my theory may be incorrect. But I did not found that case'. From this date, for diametrically different motivations, both scientists and creationists have been given to the arduous work of looking for that evidence. Currently scientists have not found it, but creationists believe that they have. According to creationists, it should be assumed by default that any adaptation or biological phenomenon for which science does not have a satisfactory explanation, unavoidably should be attributed to a supernatural force (of course, this force commonly is referred as 'God').

However, as Dawkins (2008) highlights, the medullar error of the intelligent design, is that the 'answer' to the 'problem' is in fact infinitely more complex, abstract and problematic that the problem it tries to solve, and therefore it is an useless theory (because evolution demonstrates that 'design' exists without the necessity of a 'designer'). Additionally, to the great question: Who designed the 'designer'?, the only answer of the creationists is the infantile, ignorant and quasi-ancestral argument of the 'sacred mystery' or some circular argument based on faith. Furthermore, creationism fails because it makes the unsuccessful attempt to fit the chronology of the Bible to the known chronologies of geology and evolution (Young & Strode 2009). Finally, as Ayala (2007b) mentions: 'if God designed the organisms, he has a lot to explain to us... An intelligent engineer would not design these organisms to purpose, with the defects, rarities and cruelty that prevail in the nature'.

CONCLUSIONS

The unnecessary controversy between creationists and evolutionists may have two possible outcomes. In the worst of cases, we may assume as certain the famous sentence of Albert Einstein: 'only two things are infinite, the Universe and human stupidity'. In this case, the more probable outcome may be a 'non-outcome' and hence the controversy will continue for many years. If the pathological necessity of human beings to believe in a supernatural Creator and hence in their own immortality (Morin 1994) prevails, even though Darwinism contradicts categorically that possibility, then the sentence of Einstein may be lapidary (i.e., creationism and ignorance may be sovereign for centuries and centuries). A more positive outcome may

occur if scientific and academic sectors decide to abandon their indifferent attitudes surrounding the danger that creationism represents to science and to the development of human societies. Under this scenario, scientists should acquire the necessary conscience that their activities always should be connected to the social reality (since they are in themselves an integral part of society), and, if it is the case, they should participate actively in the transformation of the factors that limit diffusion of science and evolutionism to all strata of human society.

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