THE DARWINIAN VIEW OF LIFE

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Summary

The Darwinian evolutionary theory is a composite and complex theory elaborated by Darwin during a long period of time, which proposed a new conception of life that evaded the metaphysical and finalist dimension, and which was firmly grounded on the level of scientific and naturalistic explanation. In the new interpretative picture, life emerges as an historical process realized by the descent with modification of the species through the production of a superabundant and not prearranged variation and the action of natural selection with adaptive function.

1. Introduction

"It is interesting to contemplate a tangled bank, clothed with many plants of many kinds, with birds singing on the bushes, with various insects flitting about, and with worms crawling through the damp earth, and to reflect that these elaborately constructed forms, so different from each other, and dependent upon each other in so complex a manner, have all been produced by laws acting around. …There is grandeur in this view of life, with its several powers, having been originally breathed by the Creator into a few forms or into one; and that, whilst this planet has gone cycling on according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are being evolved (*Origin*, pp.462-63)".

This passage marked the most famous work written by Charles Darwin (1809-1882): *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in Struggle for Life*, published in 1859, after twenty years of untiring work

through which the evolutionary theory was elaborated, i.e., in accordance with Darwin's expression, the theory of descent with modification.

This is, without any doubt, one of the theories that is most frequently shown as a symbolic case of scientific revolution, of a radical breakup and substitution of the preceding scientific paradigm and, contemporarily, of one of the cases that have particularly stimulated historians to search for the anticipation that prepared the ground that guaranteed its ready acceptance.

2. Evolutionism and Darwinism

It is beyond argument that Darwin's contemporaries greeted the Darwinian theory as revolutionary. Already in 1868, in its *Natürliche Schöpfungsgeschichte (History of Natural Creation),* the German zoologist Ernst Haeckel (1834-1919) proclaimed that Darwin had finally disposed of that traditional conception that imposed an explanation of Nature, and above all of Life in pre-ordinated terms: the finalist and teleological conception and of Nature. The phenomena of Nature could now be investigated in their totality and explained through purely mechanic natural causes. In his *Anthropogenie* (1874) Haeckel compared Darwin's name to Copernicus', proclaiming the merits of the two heroes for the annihilation of the anthropocentric and geocentric concept of the universe; he also pointed out that the incomparable importance of Darwin's theory lies in the fact that it explains the origin of organic forms in a mechanic way; above all, Haeckel celebrated the enormous importance of the inevitable consequence of the theory of descent, i.e., the doctrine of the animal origin of man.

On the other hand, Darwin's contemporaries began at once hunting for precursors of the idea of evolution, which was not new at all, according to the American paleontologist Henry Fairfield Osborn (1857-1935), and which reached its actual fullness by slow addition over a span of 24 centuries. In his *From the Greeks to Darwin. An outline of the development of the evolution idea* (1894) Osborn affirmed that Darwin would be always the *ante et post urbem conditam* of biological history, and recognized that, before 1859, the speculation was way ahead of the facts, and that the development of the idea was sometimes halted and sometimes even receded. However Osborn also repeated his conviction that the law of evolution was reached not with a decisive jump, but through progressive developments of its diverse components, before it was recognized as one whole structure by Lamarck and then by Darwin. It will be for the future, Osborn concluded, to determine if the precursors of Darwin and Darwin himself have come to a full solution of the problem, or if, instead, it will still be necessary to await another Newton for our philosophy of Nature. Recalling Newton, Osborn quoted what became a diffuse and suggestive way to celebrate Darwin's greatness. The "Newton of the leaf of grass" that Kant, in 1790, in his *Kritik der Urtheilskraft* had despaired could ever be born, declaring the impossibility to know and to explain the organized beings in accordance with pure and simple mechanistic principles, or through natural laws not ordered to any end, as it seemed to Darwin.

Yet Haeckel and Osborn, in spite of their positions so openly in Darwin's favor, could not be considered *tout court* Darwinians. It is true that, in fact, the idea of evolution was rapidly spreading and becoming welcomed. (This seems to support the thesis according

to which the Darwinian revolution was not a true revolution, since it fell in a context that was already broadly prepared to receive it). But it is also true that the idea that spread rapidly was a general idea of evolution, in many cases significantly different from the idea theorized by Darwin.

What happened is that among the many who declared themselves as evolutionists and more or less quickly converted to evolutionism, the "true" Darwinians were indeed a few only, if, by Darwinians, we mean those who were willing to accept *in toto* the particular concept of life and of evolution that the composite and complex theory of Darwin proposed.

So, if in Osborn and Haeckel the difficulty to accept natural selection in full gave rise to evident deviations aimed at retrieving a development that could reconcile a readapted Lamarckism with the Darwinian paradigm, analogous inquietudes also involved the entourage of the scientists who were closer to Darwin and shared with him that "battle for evolution" that the immediate, but not for this uncontested success of the theory, didn't spare both on the more properly scientific, and further on the religious and ideological-political front. Even Thomas Huxley (1825-1895) always had some reserves on Darwin's theory. Huxley is well known in the chronicles of Darwinism as Darwin's "bulldog" for the role of paladin he assumed in the famous debate with the Oxford archbishop Samuel Wilberforce in 1860 (let alone the other public debates that animated the scene after the publication of the *Origin*, mainly converging on the theme of the monkeyish origin of man). Thomas Huxley considered natural selection a probable hypothesis that was not definitely and experimentally proven, and judged the Darwinian gradualism to be an unnecessary difficulty, whereas the acceptance of the idea that in Nature there could be jumps would have spared the theory many difficulties. Also, the geologist Charles Lyell (1797-1875) and the botanist Asa Gray (1810-1888), even though converted to the idea of evolution, persisted in a providential vision of variation. The case of Alfred Russell Wallace (1823-1913) is even more interesting: he was the co-author and staunch supporter of the theory of natural selection, and his debate with Darwin on sterility, hybridism, sexual dimorphism, sexual selection, put in evidence what, according to some historians, was an original divergence of views on natural selection: a divergence that would subsequently become resoundingly manifest.

In his work on the historical and theoretical analysis of evolutionary biology, Ernst Mayr has underlined the presence, in the explanatory mechanism of evolution elaborated by Darwin, of five diverse theories that, even if they do not exhaust its contents, define its basic theoretical structure. Although there are tight connections among them from the logical point of view, they would have had different and partially independent histories, above all in relation to their acceptance. The five theories are: evolution as such, common descent, the multiplication of species, and the gradual manner of evolution and natural selection. If "evolution" soon became a fact, the "evolutionists" were able, however, to choose different options between the diverse components of the Darwinian theory, accepting, depending on the circumstances, one or more of them, therefore creating several theoretical combinations that constitute one of the preconditions to the innumerable debates on "Darwinism" that marked the history of the evolutionary thought from the second half of the 19th century, underlining the

superficiality, from the historical point of view, of the synonymic use of the terms "evolutionism" and "Darwinism".

Darwinism is similar to all the other conceptual systems: it has been and continues to be an evolving theory, as testified by the diverse elaboration and modification phases that Darwin himself went through for its generation, and by the abundance of the contemporary debates, despite the consolidated existence of a clearly strong and decidedly Darwinian evolutionary paradigm.

When Darwin made his theory public, it was not the idea of evolution that encountered the greater obstacles. According to the historian Peter J. Bowler, the evolutionism that affirmed itself at that time was not a properly Darwinian evolutionism. Darwin's theory should not be considered the central theme of the evolutionism of the 19th century, but rather a "catalyst" that helped to determine the transition toward the so called "non-Darwinian Revolution", i.e., an evolutionary point of view within an essentially non-Darwinian conceptual scheme. This conceptual scheme was revolutionary for the refusal of some key aspects of creationism, but was non-Darwinian for the permanence of substantially teleological conceptions. There was the permanence of a "developmental" model of evolution that accented its orderly, goal-directed and usually progressive character. The majority of Darwin's contemporaries, in short, succeeded to elude and subvert exactly the anti-teleological components of his thought, such that they were, according to Bowler, able to arrive to a full affirmation only by following "Darwinism" and as such, found it hard to receive consent on account of their originality.

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Biographical Sketch

Barbara Continenza is a researcher in the philosophy and history of science at the University of Rome "Tor Vergata". Her major research interests are in theoretical and methodological problems of biology, and in the history of evolutionary biology and the behavioral sciences.