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The Deteleologization of Nature: Darwin's Language in *On the Origin of Species*

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Abstract: Although a detailed analysis of Darwin's lexicon in *On the Origin of Species* has not been undertaken, critical literature claims that there are lexical signs of a teleological nature in the language used in this work. I intend to refute, through an analysis of the lexicon in Darwin's work, the criticisms that claim a teleological subtext in Darwin's language and that conceive said language to be a reflection of a teleological conception of nature. I will place special emphasis on the lexical material that Darwin uses in those paragraphs dedicated to the description of the function of Natural Selection.

Keywords: teleology, nature, Darwin, *Origin of Species*, lexicon analysis

There has never been a comprehensive critical analysis of Darwinian lexicon in *On the Origin of Species*¹ undertaken, although there are brief studies² (I will be referring to some of these studies in the next chapter) focusing on certain aspects of the vocabulary chosen by Darwin for his works. The collision between a line of thinking free of teleological concepts, and another influenced by deterministic or finalist beliefs and concepts, is one of the issues that is most often studied by Darwin's critics.³

1 All citations from *On the Origin of Species* will be extracted from the first edition of the work (1859), as it is the most original edition and its lexical content has not been affected by modifications and stylistic corrections. Occasionally however, there will be references to subsequent editions of *On the Origin of Species* published after the 1859 edition. In these cases, the year of the edition related to the citation will be specifically indicated. I will use the acronym OS when referring to this work by Darwin.

2 These works are succinct studies focusing on certain aspects of Darwin's vocabulary which either do not focus on the question of teleology (Sulloway 1985; Levine 2011; Hidalgo-Downing 2014) or try to find lexical signs that confirm the influence of teleological thinking in Darwin's work (Sloan 2005; Richards 2011).

3 Other critical approaches that do not focus on the Darwinian lexicon, either directly advocate that "Darwin was a teleologist" putting emphasis on the explanatory structure of two of

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The critical literature that detects a language with a teleological basis in OS assumes, through the use of certain lexical clues, the persistence of a teleological way of conceiving nature. They seem to obviate, at times, one of the main implications of the theory that Darwin develops throughout the work, that is, the fundamental alteration of a basic pre-Darwinian conception of nature, characterized by *not differentiating natural order from design*.

Darwin's explanation of nature's evolving mechanisms without appealing for teleology is one of the reasons for which Darwin's work has provoked a turn in the way the world has been usually explained.⁴ I assume that the teleological conception of the world is incompatible with the Theory of Evolution, and therefore, I do not share the interpretations of OS that note the presence of some residuals or features of finalism in this work. But instead of analyzing this problem only from the point of view of the conceptual implications of Darwin's Theory of Evolution, I expect to test it by doing an analysis of the lexicon in Darwin's OS. I will place special emphasis on the lexical material that Darwin employs in the work to express both his theoretical certainties about the Natural Selection mechanism, and his insecurities in specific reference to teleology.

In the first section, I summarize and analyse the studies that focus on Darwin's language in OS and highlight lexical signs that supposedly confirm the presence of teleology in the Darwin's argument. In the second section, I analyse the main arguments set out in OS regarding the incompatibility between Darwin's theory and a teleological conception of nature. Finally, in the third section, I present an analysis of Darwin's lexicon in OS focused on exposing his theoretical certainties about Natural Selection and his difficulty in accepting finalist arguments, in order to confirm the validity of the arguments in the second section.

Are There Traces of Teleological Language in *on the Origin of Species*?

There are critics like S. E. Hyman, who find teleological traces in the work of Darwin: "Darwin's teleology is as sacred and supernatural as Paley's, but with

Darwin's botanical works (Lennox 1993), or accept that although Darwin's language may have seemed teleological, his ideological structure was not teleological (Ghiselin 1994).

⁴ This has been thoroughly accepted by general philosophical and scientific criticism: Ruse (1986), Richards (1992), Sober (1993), Dennett (1996), Gould (2002), Mayr (2003) and Dawkins (2009).

all-seeing Mother Nature substituted for God the Father” (Hyman 1962, 40). Hyman’s argument is in itself fallacious. To say that Darwin’s teleology is as sacred and supernatural as Paley’s because God the Father has been substituted by Mother Nature in Darwin’s work equals saying that every evolutionist is a creationist because God has been substituted by Nature. It is Darwin himself who refers in his *Autobiography* to the overcoming of Paley’s “old argument of design in nature”⁵: “The old argument of design in nature, as given by Paley, which formerly seemed to me conclusive, fails, now that the law of natural selection has been discovered. We can no longer argue that, for instance, the beautiful hinge of a bivalve shell must have been made by an intelligent being, like the hinge of a door by man” (Barlow 2005, 73).

Hyman’s assertions seem to be based in those passages such as the one below:

It may be said that *natural selection is daily and hourly scrutinising, throughout the world, every variation, even the slightest*; rejecting that which is bad, preserving and adding up all that is good; silently and insensibly working, whenever and wherever opportunity offers, at the improvement of each organic being in relation to its organic and inorganic conditions of life. *We see nothing of these slow changes in progress, until the hand of time has marked the long lapse of ages, and then so imperfect is our view into long past geological ages, that we only see that the forms of life are now different from what they formerly were* (Darwin 1859, 84).⁶

Darwin, certainly, chooses a language that simulates a personification of the selector principle of nature and gives it an agent capacity over the entire organic world. Moreover, he recalls a classic opposition, namely, that which contrasts the works of nature with the works of art. Taking Darwin’s ideas literally however would be excessive, especially if Darwin’s explanation that determines what Natural Selection is, is not obviated. To do this, Darwin compares it with human artificial selection: “I have called this principle, by which each slight variation, if useful, is preserved, by the term of Natural Selection, in order to mark its relation to man’s power of selection. We have seen that man by selection can certainly produce great results, and can adapt organic beings to his own uses, through the accumulation of slight but useful variations, given to

⁵ William Paley attributes the evidences of design in nature to the existence of a divine designer in *Natural Theology*; or, *Evidences of the Existence and Attributes of the Deity* (1802), a work that is of considerable importance to Darwin, whose ideas result, initially, in being absolutely convincing. von Sydow (2005) records studies by critics of Darwin who find in his work evident traces of the influence of the Paleyan ideas.

⁶ All emphasis added. In those cases where the emphasis corresponds to the original text, this will be specified in a new footnote.

him by the hand of Nature. But Natural Selection, as we shall hereafter see, is a power incessantly ready for action, and is as immeasurably superior to man's feeble efforts, as the works of Nature are to those of Art" (Darwin 1859, 61).

The clarifications that Darwin includes in the first pages of OS around the notion of the "struggle for existence" should, anyway, dispel any assumptions that consider the presence of teleological evidence in his argument: "As many more individuals of each species are born than can possibly survive; and as, consequently, there is a frequently recurring struggle for existence, it follows that any being, if it vary however slightly in any manner profitable to itself, under the complex and sometimes varying conditions of life, will have a better chance of surviving, and thus be *naturally selected*.⁷ From the strong principle of inheritance, any selected variety will tend to propagate its new and modified form" (Darwin 1859, 5).

Finally, it is necessary to note the lines where Darwin highlights the futility of the doctrine of final causes as an argument that contemplates equivalence in the structure of organs and specific limbs between different species. In other words, an analogy between, for example, bone structures, which allows us to infer the anatomical relationship between species and refutes the premise in favour of species considered as individual products or creations, without mutual links: "Nothing can be more hopeless than to attempt to explain this similarity of pattern in members of the same class, by utility or by the doctrine of final causes" (Darwin 1859, 434–435).

The presumption that there are teleological arguments in Darwin's work should be refuted by his own words. Returning to the OS notes that have been outlined from the start, it should be emphasized that, whether or not Darwin believes in the active, agent, selector Mother Nature, his intentions are clear: once the mechanisms of Natural Selection are known, not for perceiving appearance and function similarities between the hinge of the shell of the bivalve and a door's hinge, it should be inferred that the former has been designed by an intelligent being, just as door hinges have been designed by the human being. ("We can no longer argue that, for instance, the beautiful hinge of a bivalve shell must have been made by an intelligent being, like the hinge of a door by man"). In short, there is no room for the concept of final causes in OS, since it is not possible to reconcile Natural Selection, a principle which does not allow the projection of final adaptive results in species, with a finalism that sets off a particular outcome.

It is worth pointing out that the note defining the function of the struggle for the existence of Natural Selection appears in OS almost 60 pages before the

⁷ Emphasis in the original.

paragraph containing the supposedly teleological connotation on the hinge of the bivalve's shell. It is there, in the early appearance of the lines that advance the further and more extensive development of the mutual relationship between Natural Selection and the struggle for existence, where Darwin's writing acquires a passive undertone. Claiming that species are naturally selected causes a loss of the teleological character the lexicon might take on.

Nevertheless, Richards (2011, 192) considers exaggerated the thesis of a complete lack of purpose or final cause in OS. To prove this, Richards makes an approximate count of the number of times that *purpose* and *object* appear in OS, and he compares the results with the approximate number of cases in which the nouns *mechanical* and *mechanistic* appear. The result of the count shows that *purpose* and *object* appear with a greater frequency (some 63 times) than *mechanical* and *mechanistic* (some 5 times). Richards infers from this that it is not possible to completely disregard that Darwin's conception is finalist.

But Richards' argument is weak. Choosing *mechanical* and *mechanistic* as terminology that is representative of a non-teleological argument is a too restrictive election. It is even less relevant to highlight *purpose* and *object*, without stopping to even analyze whether any of the appearances of *object* is in reference to a simple, concrete object, from the material and quotidian world, or if effectively these appearances refer to a fact or action with a previously established purpose.

Sloan (2005), meanwhile, follows the thesis previously studied and defended by Richards in *The Romantic Conception of Life* on the influence of the Romantic conception of nature, existing in the *Naturphilosophie* and, more specifically, of the influence of A. von Humboldt on Darwin. According to this author, it would be too simplistic to conceive Darwin's lexical-intellectual evolution as a line beginning with a partial acceptance of teleological ideas on nature and culminating in a total rejection of finalist ideas, which would lead to the abandonment of the use of a teleological lexicon.

Sloan (2005, 155) argues that, despite the obvious changes in the way of describing nature, as the progressive elimination of "intentional metaphors" concerning nature and Natural Selection in the work of Darwin would show, the Humboldtian influence from the *Beagle* years would have determined the Darwinian view of nature, to the point where lexical signs that would confirm the persistence of a metaphysical conception of nature with Romantic influences are noticeable in OS and in later works. Sloan believes he is able to confirm his thesis showing the progressive, but not complete, abandonment of the finalist language in Darwin's work. To do so, he counts the number of times the noun *Nature*, the syntagm *Natural Selection* and the number of "intentional metaphors"

that appear in the first and sixth editions of OS, as well as in the works *Various Contrivances of Orchids*, *Expression of the Emotions* and *Descent of Man*.

According to Sloan's count, in the first edition of OS the syntagm *Natural Selection* appears 271 times; in the sixth edition its use does not decrease, but significantly increases to reach 363 uses. Sloan further argues that there are 21 uses of "intentional metaphors" in the first edition of OS, and in the sixth edition its use decreases to a total of 16 cases; in the other works a decrease in its use is also observed: 5 times in *Various Contrivances of Orchids*, none in *Expression of the Emotions* and once in *Descent of Man*. However, these results do not represent strong support of Sloan's thesis. Firstly, Sloan does not specify what the "intentional metaphors" are. The term *Natural Selection*, despite also being a metaphor susceptible of being interpreted in a finalist sense, as Darwin himself had to verify, appears more times in the sixth edition of OS than in the first. If Darwin was ever, as Sloan argues, a finalist, he had stopped being so by the time he started writing OS. Secondly, if one takes into account, on the one hand, the extension of a work like OS, and on the other hand, the significant reduction in content as well as the change of the theme of the works *Various Contrivances of Orchids*, *Expression of the Emotions* and *Descent of Man*, then the decrease of unspecified "intentional metaphors" is a trivial fact. It is possible that Darwin tries to eliminate from his works, as far as possible, expressions that can be misinterpreted by the most critical readers. This, however, does not mean that his conception of nature suffers an also progressive change from a teleological conception of nature to a quasi-teleological conception. Darwin includes from the third edition of OS (1861) some explanatory lines, which we will refer to shortly, to show his dissatisfaction with the misinterpretations made by experts of metaphors like "Natural Selection." Sloan, however, argues that it is perhaps a feeling of reverence towards nature, forged under the initial Humboldtian influence, that would have prevented Darwin's complete abandonment of a philo-Romantic conception of nature.

Accepting Natural Selection, Refuting Teleology

In my view, once the conceptual implications of an explanatory mechanism such as Natural Selection are assumed the belief in the presence of teleological content in Darwin's work should vanish. And Darwin's lexicon in OS stands for this assumption. It is Darwin himself who includes an explanatory note (Darwin 1861, 84–85) in the third edition of OS (present until the 6th and final edition), – with a noticeable tone of profound irritation – on the way of conceiving Natural

Selection, as a result of the incorrect interpretations from experts that Darwin receives in the form of objections. As Darwin highlights in the explanatory note, one of the misconceptions is associated with the power of Natural Selection and the production of variability within species. Darwin makes clear that variability is not the consequence of the effects of Natural Selection, but the necessary condition for it to preserve the variations. However, there are no objections to the artificial selection performed by farmers, which needs pre-existing qualitative differences in the species so that artificial selection can be carried out. On the other hand, the Darwinian proposed application of Natural Selection to plants is rejected because these have no will, but the critics do not seem to accuse chemists who manipulate chemical elements (without will) of *elective* affinity. Finally, Darwin notes a misinterpretation of Natural Selection as a divine power and emphasizes the fact that the attractive force of gravity acting on the planets has not been attributed to divine powers.

Darwin recognizes that the term *Natural Selection* can cause some confusion, given the difficulty to dispense with the personification of nature. However, its inevitably occasional use and the need to refer, at times, to these mechanisms using metaphorical terminology because of issues on lexical brevity, have to be noted. It would not take more than a minimal familiarity with the Darwinian arguments to dispel any kind of misunderstanding, as those that presuppose an agent force, active and with intentions of its own. Darwin does not claim common sense with regard to his theory, after all, the counterintuitive character of the arguments exposed in OS is truly powerful. However, it does seem to require common sense regarding the use of language in the work, as an essential requirement to maintaining proper attention and the correct understanding of the reasoning process, from the first to the last argument.

Darwin proposes an inversion of the perception and cognition of the natural landscape, well founded with arguments, supported by ideas that bring together the organic and inorganic worlds in a theory showing their mutual connection and the lack of a need to resort to an external intelligence to explain design in nature.

One of the biggest changes in the perception of nature that is present in the work of Darwin is relative to geology. The way the different geological landscapes are described in OS shows a consideration of geological time⁸ as an essential factor for the transformation of the rocky landscape. In fact, this consideration has to be taken seriously: “He who [...] does not admit how

8 On the perception of geological time in OS see Section III “Time and Imagination” of Chapter 4 “Design and Disorder: The Origin of Species” in Dear (2006).

incomprehensibly vast have been the past periods of time, may at once close this volume” (Darwin 1859, 282).

The assimilation of geological time, however, does not apply only to the field of geology, but, similarly, can be extended to the understanding of the species, as the organic evolutionary result that takes place through long periods of time. Darwin records a new way to “read,” to understand nature. According to Levine (2011), the Naturalist recognises the past history and predicts the future of geological forms (p. 61). Rocks speak, tell stories (p. 67) and Darwin understands the message through inferences, analogies and scientific imagination. In Levine’s words, “the world is a written story, and one needs only the experience and power to read the language” (p. 59). Darwin’s experience as a Naturalist allows him to read geological signals and make non-teleological sense of the rocky landscape: “*I look at the natural geological record, as a history of the world imperfectly kept, and written in a changing dialect; of this history we possess the last volume alone, relating only to two or three countries. Of this volume, only here and there a short chapter has been preserved; and of each page, only here and there a few lines*” (Darwin 1859, 310–311).

World history is printed on the rocky mass in chapters and in dialects that vary over time and which show the influence of constant change on the landscape. Darwin understands each line of the geological book and tries to establish affinities, to find no explicit relationships between different dialects, that is, between the different layers and geological strata. The inferences about past events must be deduced by reading between the lines of valuable geological content, though absent to mere visual perception. The findings of fossils in the geological field complement Darwin’s readings of the landscape and support his assertions about the variability of the species. In the final paragraph to the introductory part of OS, Darwin combines an explicit consideration of what still remains unexplained and dark about the origin of the species with a strong affirmation of what is safe to assume as proven knowledge:

No one ought to feel surprise at much remaining as yet unexplained in regard to the origin of species and varieties, if he makes due allowance for our *profound ignorance* in regard to the mutual relations of all the beings which live around us. *Who can explain why one species ranges widely and is very numerous, and why another allied species has a narrow range and is rare? Although much remains obscure, and will long remain obscure, I can entertain no doubt, after the most deliberate study and dispassionate judgment of which I am capable, that the view which most Naturalists entertain, and which I formerly entertained – namely, that each species has been independently created – is erroneous. I am fully convinced that species are not immutable; but that those belonging to what are called the same genera are lineal descendants of some other and generally extinct species, in the*

same manner as the acknowledged varieties of any one species are the descendants of that species. Furthermore, *I am convinced that Natural Selection has been the main but not exclusive means of modification* (Darwin 1859, 6).

One of Darwin's main theoretical difficulties is to explain the cause for a great expansion in the organic space of a specific species, and the reduced expansion of a related species. This cognitive conflict, however, is complemented by his complete conviction in the mutability of species, modified according to Natural Selection, and his rejection of the theory that advocates the independent creation of the species.

The claims "I am fully convinced that species are not immutable" and "I am convinced that Natural Selection has been the main but not exclusive means of modification" not only confirm Darwin's absolute rejection of any explanation of a teleological nature on the diversity of animal species, but also reveal a deliberate use of emphatic language. This type of language lends a sense of consistency to the exposition of Darwin's certainties in OS and interacts with the use of expressions that emphasize his theoretical insecurities.

The Language of Certainties and Uncertainties: Questioning as an Expository Instrument

The language Darwin uses is manifestly honest and clear. On the one hand, there are terms and expressions that bring to light the most problematic aspects of Darwinian arguments: "much remains obscure, and will long remain obscure;" "much remaining as yet unexplained;" "profound ignorance;" "Who can explain;" "why;" "Still less do we know;" "much remains obscure, and will long remain obscure." On the other, there are expressions denoting absolute certainty: "I can entertain no doubt;" "is erroneous;" "I am fully convinced;" "I am convinced."

The presentation in the works of difficult, dark or still unexplained matters does not solely correspond to the introduction of the work but is a fundamental part of its argumentative structure. The deployment of theoretical difficulties brings greater consistency to Darwin's assertions against teleological conception of species. It is also clear that Darwin is aware of all the theoretical opposition. One of the fragments that best displays a narrative development of the most important and widespread confrontations that the Theory of Evolution could be faced with, presents a breakdown of four points of dispute, albeit with the greatest possible expressive determination:

Firstly, *why*, if species have descended from other species by insensibly fine gradations, do we not everywhere see innumerable transitional forms? *Why* is not all nature in confusion instead of the species being, as we see them, well defined?

Secondly, *is it possible* that an animal having, for instance, the structure and habits of a bat, could have been formed by the modification of some animal with wholly different habits? *Can we believe that* natural selection could produce, on the one hand, organs of trifling importance, such as the tail of a giraffe, which serves as a fly-flapper, and, on the other hand, organs of such wonderful structure, as the eye, of which we hardly as yet fully understand the inimitable perfection?

Thirdly, *can instincts be acquired* and modified through natural selection? *What shall we say* to so marvelous an instinct as that which leads the bee to make cells, which have practically anticipated the discoveries of profound mathematicians?

Fourthly, *how* can we account for species, when crossed, being sterile and producing sterile offspring, whereas, when varieties are crossed, their fertility is unimpaired? (Darwin 1859, 171–172).

The Darwinian lexicon accompanies the questioning nature of the content, that is presented with expressions and terms like “why” (2 times); “is it possible that ... ;” “Can we believe that ... ;” “can instincts be acquired and modified ... ;” “What shall we say ... ;” “how can we account for species” The notable hesitant overtones of Darwin’s expressions – hesitant exclusively because of its interrogative nature (“why,” “is it,” “Can we,” “can instincts,” “What,” “how”), not because of theoretical weakness of what Darwin sustains – support other type of claims of categorical and conclusive character.

Another relevant example shows an explicit display of problematic issues around the internalization of a nature that does not leap from a vital structure to another, but makes this change gradually:

nature is prodigal in variety, but niggard in innovation. *Why*, on the theory of Creation, should this be so? *Why* should all the parts and organs of many independent beings, each supposed to have been separately created for its proper place in nature, be so invariably linked together by graduated steps? *Why* should not Nature have taken a leap from structure to structure? *On the theory of natural selection, we can clearly understand why she should not; for natural selection can act only by taking advantage of slight successive variations; she can never take a leap, but must advance by the shortest and slowest steps* (Darwin 1859, 194).

Darwin presents, as is usual in OS, the theoretical content difficult to assimilate, through the use of reiterated questions (“why” (3 times)). But next he includes a prelude of a declarative nature (“On the theory of natural selection, we can clearly understand why she should not”), using a language that portrays absolute certainty on the statements given (“we can clearly understand *why she should not*,” “natural selection *can act only by ... ;*” “she *can never take a leap*,

but *must* advance by ... "), of what will be an explanation for the cognitive contradiction that appears when observing gradual links between species that were allegedly created individually. This explanation is precisely the main theoretical core of OS, which is developed progressively through its pages, with an evolution of the ideas that is extremely cautious, unhurried, educational. Exactly 277 pages of reasoning later, Darwin takes issue with a lexicon of an even more categorical nature. He outlines the solution he had previously advanced, with the purpose of summarising the ideas and clearly establishing which parts of the argument must be considered cognitively clear, and which parts obscure: "As natural selection *acts* solely by accumulating slight, successive, favourable variations, it *can* produce no great or sudden modification; it *can* act *only* by very short and slow steps. Hence the canon of "Natura non facit saltum," which every fresh addition to our knowledge tends to make more *strictly correct*, is on this theory *simply intelligible*. We *can plainly see* why nature is prodigal in variety, though niggard in innovation. But why this should be a law of nature if each species has been independently created, no man can explain" (Darwin 1859, 471).

The determinant character of the language used by Darwin is suggesting: "natural selection *acts*;" "it *can* produce;" "it *can* act only by ... ;" "strictly correct;" "simply intelligible;" "we can plainly see." The only difficult, or hard to assimilative part that remains obscure to Darwin is that which concerns the insoluble contradiction between the conception of species as fixed creations, without mutual relation, and the observation in the physiology of the species of a cumulative character of favourable variations for each organic being. The expressive power of Darwin's claims also varies depending on the stability that is given to the argument. One of Darwin's greatest narrative skills is the refutation of ideas that are more intuitive:

When we look at the plants and bushes clothing an entangled bank, we are tempted to attribute their proportional numbers and kinds to what we call chance. *But how false a view is this! Every one has heard* that when an American forest is cut down, a very different vegetation springs up; but it has been observed that the trees now growing on the ancient Indian mounds, in the Southern United States, *display the same beautiful diversity and proportion of kinds* as in the surrounding virgin forests [...] Throw up a handful of feathers, and all must fall to the ground according to definite laws; but how simple is this problem compared to *the action and reaction of the innumerable plants and animals* which have determined, in the course of centuries, the proportional numbers and kinds of trees now growing on the old Indian ruins! (Darwin 1859, 74–75).

Darwin's argumentative strategy is based on firstly approaching what is intuitable to human perception, namely, that the proportion of variability of different types of vegetation depends on chance, only to then proceed to note

how wrong this statement is (“But how false a view is this!”). To prove the falsity of the belief, Darwin suggests a more specific and widespread version (“Every one has heard”) of the perceptual problem. Darwin presents the common belief that after cutting down a forest a new type of vegetation emerges, and then he rejects it. He claims that the new growing vegetation can display – and he says this can be verified in the southern lands of the United States – the same beautiful diversity and proportion of the original types (“display the same beautiful diversity and proportion of kinds”). These examples are relevant in OS to emphasize the intellectual vigour of a theory like Natural Selection and further its indispensability in the refutation of the ideas outlined: the intense activity of vegetation and animal species interacting in nature (“the action and reaction of the innumerable plants and animals”) in a constant struggle to impose themselves on weaker types and species is a fact that dispels the idea of the contingency of the variability and dispersion of vegetation in a specific natural space. This struggle has determined the presence and absence of different plant types. Thus, in this way, Darwin demonstrates the argumentative effectiveness of Natural Selection and indicates that the belief that affirms the casual character of the proportionality of plants is false. However, as far as examples on the prominence of Natural Selection is concerned, the following fragment is perhaps one of the most relevant in OS:

How inexplicable are these facts on the ordinary view of creation! Why should the brain be enclosed in a box composed of such numerous and such extraordinarily shaped pieces of bone? [...] Why should similar bones have been created in the formation of the wing and leg of a bat, used as they are for such totally different purposes? Why should one crustacean, which has an extremely complex mouth formed of many parts, consequently always have fewer legs; or conversely, those with many legs have simpler mouths? Why should the sepals, petals, stamens, and pistils in any individual flower, though fitted for such widely different purposes, be all constructed on the same pattern?

On the theory of natural selection, we can satisfactorily answer these questions (Darwin 1859, 437).

The interrogative character of the language (“How inexplicable;” “Why” (4 times)) floods the lines preceding the statement of the most relevant proposition in OS against causality in nature and in favour of the mechanism of Natural Selection: “On the theory of natural selection, we can satisfactorily answer these questions.” In the same way that Darwin is aware of the ideas that might oppose his theory, and those that could pose major difficulties of assimilation, he also shows a complete competence in respect of what the theory of Natural Selection can indeed embrace and how to relate it to the struggle for existence:

But the mere existence of individual variability and of some few well-marked varieties, though necessary as the foundation for the work, helps us but little in understanding how species arise in nature. How have all those exquisite adaptations of one part of the organization to another part, and to the conditions of life, and of one distinct organic being to another being, been perfected? We see these beautiful co-adaptations most plainly in the woodpecker and mistletoe; and only a little less plainly in the humblest parasite which clings to the hairs of a quadruped or feathers of a bird; in the structure of the beetle which dives through the water; in the plumed seed which is wafted by the gentlest breeze; in short, we see beautiful adaptations everywhere and in every part of the organic world (Darwin 1859, 60–61).

The tactic of Darwin's explanation follows, steadily, the same descriptive pattern of questions and answers. Darwin raises the most pertinent questions ("how the struggle for existence bears on Natural Selection;" "How have all those exquisite adaptations ... ") in order to later appropriately develop their corresponding explanations. Knowing that there is variability in species or sub-species is not enough to understand how species appear in nature and the way the "exquisite adaptations" and the "beautiful co-adaptations" have been perfected over time. Spread across nature there are, according to Darwin, "beautiful adaptations," whose existence could not be understood without the introduction of his hypothesis on the influence that the struggle for existence has on the species.

The adaptations and co-adaptations are beautiful and exquisite to Darwin because he knows what mechanisms operate behind organic beings. He intuitively knows how an inexhaustible source of life has spread across the earth's surface as if it was a tree with many branches, with the ability to extend them out for an indefinite time. The comment in the text about the beauty and exquisiteness of adaptations and co-adaptations is not merely a sentimental description at the beauty of the magnificence of life that nature holds. If Darwin perceives vital richness and adjectivates it just as beautifully, it is because he has enough epistemic adequacy to enhance his aesthetic view of nature. The beauty of adaptations and co-adaptations, in short, lies in their complexity and, of course, in the aesthetic grandeur manifested in the richness of the organic world.

Conclusions

The persistent interrogative forms present in the text, exposed as expository strategies, show that, beyond the possible teleological traces that can inevitably arise in any text of a scientific nature, the acceptance of Darwin's Theory of Evolution in itself implies the refutation of any idea that considers the persistence in Darwin of a teleological way of conceiving nature plausible.

Darwin's scientific maturation of knowledge gained from the observation of nature allows a new way of perceiving it, a way that involves the extraction of knowledge about nature, not necessarily about the observer's subjective impression. Nature has its own way of being referenced in OS: a terminology that is scientifically explanatory, free from teleological expressions reflecting the end of a finalist conception of nature.⁹

The Darwinian lexicon in OS shows more characteristics than the ones that would commonly be expected from scientific explanations. It is a discreet, moderate, hardly perceptible display of enthusiasm for the findings that his constant study in the field of zoology allows him to obtain. An abstract concept like "adaptation," whose adaptive course cannot be perceived visually, but only as a result of a long process of change and a struggle for existence favourable to a member of a particular species, acquires remarkable importance.

Darwin's use of language shows that he conceives adaptations as a result of long periods of time; he is able to deduce what occurs in the span of time prior to the moment of considering a specific adaptation as prosperous for its thriving to remain in nature. Conversely, Darwin does not perceive nor understand these adaptations as fixed products, as a work of special creation, but explains how they managed to be as they are, in terms of physical and anatomical appearance, and what factors they might be subject to in future times of struggle for existence and Natural Selection. It is precisely this exact knowledge of the circumstances to which the adapted species have been exposed that generates in Darwin an intense feeling of admiration for them.

Furthermore, Darwin's use of language in OS shows that his explanations that are devoid of teleological arguments about the functioning of nature are closely linked to the experience of an enhanced perception of natural beauty ("the beautiful hinge of a bivalve shell," "beautiful diversity and proportion of kinds," "beautiful adaptations," "beautiful co-adaptations," "exquisite co-adaptations"). An analysis of the lexicon in OS has enabled us to verify that allusions to the beauty of a deteleologized nature are frequent in Darwin's exposition of theoretical certainties. As a result, the aesthetic-sentimental appreciation of nature found in Darwin's OS is characterised as being more mature, increasingly intense, and closer to the natural landscape.

Scientific knowledge allows the observation of nature from new perspectives, and a specialized analysis, focused both on the individual elements that make up the natural landscape as well as on the whole in itself, enables an

⁹ One might consider here the distinction between teleology from the strictly adaptive point of view and historical teleology, within which one would wonder about whether natural evolution would progress towards human species. But this question goes beyond the focus of my work.

aesthetically empowered perception of certain aspects of nature that would not emerge through a mere aesthetic-contemplative observation devoid of such knowledge. To the extent that it is accepted that science is a specifically symbolically human activity, integrating its contents in the perception and description of the beauty of natural landscapes should make that aspect of the experience of the world more symbolically human.

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