

## A CRITICAL APPROACH REGARDING TYPES OF REASONING IN EVOLUTIONARY BIOLOGY AND CREATIONISM

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**Abstract.** *In this study we investigated the epistemological presuppositions both of evolutionary biology and of creationism from the perspective of the teleological argument implicit in the concept of function (in the case of biology) and explicit (in the case of creationism). The hypothesis of the necessity of a philosophical-epistemological investigation is proof by means of employing comparative explanation following Kuhn's model of scientific revolution in order to test the claims of scientific character of the biologist theory. Instead of confirming the claims about the "revolutionary scientific character" of Darwinian Theory and denying the validity of Kuhn's theory we have found a systematic redefining of concepts and epistemological claims within the modern evolutionary biology. In turn, in the case of scientist creationism, by adopting and emphasizing the "strong" form of the anthropic Principle conceived as scientific ground for the ideology of modern creationism, we found a theoretical-methodological ambiguity.*

**Keywords:** evolution, teleology argument, function, natural selection.

### 1. Introduction

An approach of the man-nature relationship requires in the first place, as we shall see, to lay special emphasis on the precise definitions of both man and nature that are to be taken into consideration. Although the fact that definitions are related with their grounds and, therefore, they are based on the pertinence of the presuppositions and on the accurate character of the deduction, may seem self-evident, it is still necessary to investigate, in the frame of this relationship, the epistemic presuppositions of the theories sustaining various definitions—that we shall discuss further-of these concepts related in the shape of the man-nature relationships. Obviously, we are offering here neither an exhaustive, nor a holistic account, although the nature of the subject itself requires recourse to wide and different realms of understanding and interpretation.

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Hence, our analysis will be narrowed to the following coordinates: the particularity of this relationship (although it may represent the generality itself!) implies an approach that underlies both a view perspective and an overall theoretical position in respect of nature coherently interrelated; thereby, this analysis will be focused on the biological-evolutionary theory as opposed to creationism—the most authorized positions, we believe, in the matter of the relationship under examination. Therefore, from the multiplicity of (potentially in exhaustible) approaches of a theme that involves almost “everything”, it is necessary to focus on some definitions of the concepts that we are taken into account. We have chosen the criterion of relevance because the two perspectives satisfy at their most both the gnoseologic account and the social-human account, in general. We shall analyse the “truth” claims of the biological-evolutionary theory and of the creationism, by (means of) investigating this relationship between these two perspectives on the world.

We shall discover that these two accounts, in (the) terms of this opposition that determinates (each of) them, hit the same fundamental element in respect to which they could be discussed also from the point of view of the strictly internal relationship with the “truth” that each perspective pretends to detain. The approach of the antithetic relationship of these two accounts will be narrowed to their contrastive analysis in the framework of Kuhn’s theory on the structure of the scientific revolutions. We will focus on the issue regarding whether to consider or not the Darwinian theory in respect to creationism and traditional naturalism as a model for “paradigm changing” in the framework of the Kuhnian concept of “scientific revolution”; namely, at what extent Darwinism theory has produced a paradigm changing in respect creationism in terms of Kuhnian scientific revolution. We shall investigate whether the presuppositions of the answer to this matter are (or aren’t) related to their internal troubles for grounding its own account.

We shall refer mainly to two studies analysing the strong position within the philosophy of biology related to the concept of “function” in the shape of the teleological reasoning (the first) and the Darwinian theory in the frame of the Kuhnian paradigm of scientific revolution (the second). We shall see that one fundamental element the two accounts (the evolutionary biology and the creationism) do share is the teleological reasoning. The investigation of those relationships will lead to an answer to the questions whether the Darwinian theory has satisfied or not the criteria occurring in the Kuhnian framework for “passing” from one paradigm (creationism) to another (evolutionism) and which are its possible reasons and its epistemological consequences.

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## **2. The problem of defining the “man” and “nature” concepts and how can the two perspectives receive it in Kuhnian terms**

From the beginning, we draw the distinctions (J. Arnould, in D. Lecourt (coord.), 2005, p. 384) between traditional and modern (the second half of XIX<sup>th</sup> century) creationism: for the former, God created the world, man and every living entity from scratch; both nature and human being are God’s creation whose purpose is man, made by resemblance with God himself. Prayer, faith and revelation are the fundamental tools that help the Christian to find his place in nature and to live among his fellows men. The modern creationists refuse the evolutionary theory of the world, elaborated by Charles Darwin and his followers, until today evolutionary biology. Emerged in the Presbyterian and evangelic media from North America, the anti-evolutionary movements distinguished themselves from the former supporters of biblical creationism by claiming the scientific character of their arguments. For the moment, we will refer precisely to the teleological core of the creationist perspective: in the Bible itself occurs the idea of man as the “goal” of entire creation. From this point of view, all that follows, whether is in terms of revelation and preaching or in terms of reasoned arguments, is meant to “ground” what is postulated in the first place: man as goal, purpose of the whole creation.

For evolutionists, man (and “consciousness”) is the higher level of the natural evolutionary process; man and nature are different ways of manifestation of the some unique reality, the actual cosmos, which is only a stage of the Universe continuously expanding itself from the Big-Bang. Until the end of the 18<sup>th</sup> century, the science had a immobile conception about living species, including man, compatible with Christian beliefs; at 1737 Linné (*apud* J. Arnould, in D. Lecourt (coord.), 2005, p. 384) was writing: “all the species descend from their ancestors and, at the beginning, from the very hands of God Almighty, for the author of nature, when he created the species, he imposed upon them an eternal law of reproduction and breeding within the limits proper to each of them”. With P. de Maupertuis and J.-B. Lamarck was questioned the fixedness of species, and with Ch. Darwin we get over the compatibility between post-Lamarckian “natural science”, on one hand, and naturalist tradition and Christian creationism, on the other (hand). In total divergence with tradition, the two fundamental thesis of Darwinism theory stipulate that “the natural selection represents the major meaning, but not the only one, of all the change within the living world” (Ch. Darwin, *apud* P. Kitcher, 2003, p. 399); and that the “tree of life” is able to explain the fact that all the actually living organisms on the earth descend from a common ancestor.

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The novelty of Darwinian theory is contrasted by David N. Stamos (2007, pp. 187–205) with both creationism and especially ante-Lamarckian naturalist tradition. The author claims that, even it doesn't fit the Kuhnian concept of "scientific revolution", the change from traditional concepts of both naturalism and creationism accomplished by Darwinian Theory do represent such a revolution and, therefore, the Kuhnian model is the inadequate one to evaluating this kind of change. Briefly, with Kuhn, a scientific revolution occurs only when the "official" theory, after various improvements, is no longer able to englobe the new experimental results and is replaced by another theory able to accomplish this task. The criteria for having such a revolution consist essentially in the incommensurability of the fundamental cores of the competing theories: according to Kuhn, during a scientific revolution, the scientist may find themselves responding to the same stimulus with incompatible descriptions responding to the same stimulus with incompatible descriptions and generalizations.

This problem is not a merely linguistic one, so that it cannot be solved simply by defining the troublesome terms. In fact, what Stamos claims is that elements as natural selection, variability, adaptability as consequence of natural selection by maintaining the most useful features in order to increase the capacity of surviving, reproduction and perpetuation of species and especially the fact that (the second Darwinian thesis) all actually living organisms on earth are descending from on unique ancestor represent the content of the Darwinian revolution.

The essential argument is that the divorce from both creationism and ante-Lamarckian naturalism is accomplished by means of providing an "objective" explanation for the diversity and the cycle of life, without recourse to supernatural forces of entities. The invalidation of Kuhnian model of "scientific revolutions", which would have failed in recognizing what Stamos and other authors consider to be the "Darwinian revolution", consists in contesting Kuhn's very criteria: incommensurability is not relevant, because in its absence we have the Darwinian revolution; Darwin himself would have recognized the *fully commensurability* of his own theory (Sullway, 1996, *apud* Stamos 2007, p. 193) for *Origin of species* was one long argument comparing how well the available biological evidence could be interpreted by creationism and evolution.

Darwin would have sought to demonstrate point by point that rational criteria consistently sustained the evolutionary alternative. Stamos even claims that Darwin's argument is an excellent example of what is known in philosophy of science as *inference to the best explanations* that contains, in its very core, the

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contrastive explanation. Our point of view is quite different and will be further developed.

### **3. A summary account for the semantic plurality of the concept of “function” in evolutionary biology**

From what we have previously said it follows that the Darwinian evolutionary model might be superior or more adequate for explaining the variability and the diversity of species.

The success of the Darwinian theory and also one of the arguments offered by the authors mentioned above in favour of considering it a “(scientific) revolution” consist in the fact that—as we anticipated at the beginning of this paper—a perspective on the origin of species (including man) entails an ontology which, in turn, provides a way of understanding our being. The fundamental evolutionary concepts as natural selection, variability, adaptability rest on the concept of “function”. It is well-known the expression (that we shall take the liberty of revisiting at the end of our paper) saying that “the function creates the organ”.

The concept of “function” in biology and evolutionary biology may be considered as essential for the very meaning and significance of the idea of evolution in the living world. Recently, J. Garson (2007) approaches the “function” issue within the realm of biology in relation with the underlying teleological argument.

Function theory argument is used throughout the biological disciplines, with both a theoretic and practical significance. The “function” argument has two important properties: explanatory and normative, both of them troublesome. As we have already put it, the concept of function entails, in respect to its explanatory property, a type of teleological explanation (Justin Garson, 2007, p. 525). Justifying the conditions of possibility that enables an effect to function as cause it would be a kind of “backwards causation”.

The functional explanation is troublesome not only because it has to explain something that hasn’t yet occurred as something that should occur in order to produce the function that it has to accomplish for ensuring the existence of the entity that expressed the need for this function; but also because it violates one of the most important tenets of the modern scientific worldview: the absence of final causes in nature and the illegitimacy of appealing to divine creation or supernatural intervention.

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As we can observe, the teleological argument in the realm of biology uses the effect of entity (for example, the heart's capacity to pump blood) as cause for the very existence of that entity. (the heart); in other words, the heart's capacity to pump blood into organism and, in doing so, to maintain the organism alive, explains and justifies the existence of the heart itself (Justin Garson, 2007, p. 526).

Although these two properties (explanatory and normative) of the function statements seem to violate a fundamental principle of science, they are routinely appealed to throughout the biological disciplines. The *purpose* or *telos* for which something exists cannot be eliminated from the majority of (the) biological explanations regarding the existence or the shape of some feature.

Whether they are of a special type or not, whether they have a special ontological status, the finalist causal explanations are to be taken into consideration especially because the functional language will not be eliminated from biology in the near future.

Therefore, this suggests that they either ought to be eliminated from biology or analyzed in such a way that the appeal to final causes or supernatural entities is shown to be unnecessary; or even that this way of understanding "function" ought to be essentially revisited so it would become compatible with the basic scientific exigencies of any scientific theory. Any interpretation of the function theory presupposes a final cause irreducible to other causal relations (in that sense, the Aristotelian model of "final cause" is perfectly suggestive (significant)).

Within evolutionary biology have occurred two types of answers to that authentic crisis: the *etiological* view and the *consequential* view. The first approach finds that an answer to the question of how it is possible for an effect of an entity to have causal relevance over the very existence of the entity itself is (still) necessary.

The second approach tries to surpass the misunderstanding concerning that function attributes are also causal explanations.

According to the etiological view, what distinguishes the function from a mere effect is that the capacity of the entity to perform that function explains "why it is there", in that system (for example, it is the capacity of the heart to pump blood that explains why heart currently exists).

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According to the consequential view, the function of the heart is to teat, rather than to make noise, because the heart's beating typically contributes to some important activity of the system within which it is contained, namely to pump blood in order to ensure the survival of the organism. From this point of view, the function of an entity is a consequence produced by that entity.

One of the main versions of the etiological approach, namely the representational theories of function, attempts to answer to a fundamental critical argument focused on the fact that, according to (the) teleological reasoning, the normal, temporal order of causation is surpassed.

The representational version of the etiological theories o function attempts to explain the sense in which intelligent creatures act for the sake of the future. It is not the case that the future effect of one's action causes the person to act; rather, it is the person's mental representation of the future effect, together with her other beliefs and desires, that causes her to act as she does.

Thus an *indirect* and *mediated* reference to the future effect is preserved within the causal explanation for the purposeful action, and hence there is no violation of the normal temporal order of causation. So, in order for such a "representation" to exist, it must exist within a mind or have been created by a mind. Thus *mentalist* (Bedau 1990, *apud* Justin Garson, 2007, p. 529) view softens the universalness claims of a "cause-effect" type of argument.

The assumption that functions are based on mental representations leads to two opposing views: the theological view and the eliminative (analogical) view. On the one hand, the theological view considers that even mindless biological entities have purposes and that all natural things are directed to their end by some intelligent being (God himself). On the other hand, the eliminative view considers that functions are based on prior representations and therefore if anything in nature has a function it must have been created for that purpose by an intelligent being; but arguing that appeals to supernatural creation have no place in the context of *scientific explanations*.

Here occurs a distinction between artificial (lab mode) functions and natural functions (without any conscious intervention). If functions are related to an intelligent being, one can argue that animals do not have functions since they are not typically designed with "purposes in mind". However, accepting this position does not imply that the concept of function should be eliminated, that scientists should never ascribe functions to biological entities or that it is illegitimate or counterproductive to do so.

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They may legitimate by continue to do so, as long as they recognize that such usage of the concept of function is not a strong teleological one, but a merely metaphorical one, involving explaining biological forms “as if” they were created for a purpose, for accomplishing a specific function. We discover here a softer manner of conceiving “function” than (ever) before in evolutionary biology. Moreover, “teleonomy”, that does not explain further his use of “end-directed” (Pittendrigh, 1958, *apud* Justin Garson, 2007, p. 529), but where this end-directedness does not rely on the problematic metaphysical assumptions associated with teleology, such as final causation or divine creation. Pittendrigh (1958, *apud* Justin Garson, 2007, p. 529) does not explain further his use of “end-directedness”; therefore, Mayr (1961, 1974, *apud* Justin Garson, 2007, p. 529) should be credited with developing the concept of “teleonomy”. According to him, a process or behaviour is teleonomic if it is controlled by an internal program (“program”=“coded or prearranged information that controls a process or behaviour leading it toward a given end”).

Mayr does not eliminate appeal to teleological concepts, such as “being led toward an end.” Therefore, we could suggest that “being led toward a given end” may be equivalent with *being firstly represented*. If it is so, than a teleonomic process may be equivalent to one that it is controlled, in fact, by a non-mentalist representation of that trajectory or form along in which it tends to develop. If functions are much more widespread in nature than representations for example the heart has the representations have the function of leading behaviour, then defining representation in terms of function seem more likely to succeed than the other way around.

Whereas representational theories resolve the problem of backwards causation by seeking the origin of the functional entities in a prior mental representation, non-representational theories seek to explain why such entities currently exist by virtue of producing the effect in question, were able to persist over time or to reproduce their kind of entities.

On thus view, the definition of function may be as follows: the function of an entity is that effect that entities of its kind produced in the past, which, in turn, contributed to the persistence or reproduction of that entity or type of entity. Thus, these theories solve the problem of “backwards causation” by invoking a cyclical dimension.

Some biologists explicitly consider that natural selection (NS) is an example of process that generates *etiological consequences*: the reproduction of heritable traits that have higher relative fitness than alternate traits explains the maintenance of the former within a population of reproducing entities.

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Several biologists of the twentieth century saw a connection between teleological statements and natural selection, in the sense that the existence of natural selection can justify the use of teleology in biology. However, none of these accounts explain why theories based on natural selection fit the pattern of teleological argument; they simply express a self-evident intuition, without further reasoning.

The first attempt to define the *teleological explanation* belong to the evolutionary biologist Ayala: “in a selectionist explanation, an effect that an entity produces figures into an explanation of why that type of entity currently exists, and thus, by definition, constitutes a teleological explanation” (Ayala, 1968, *apud*, Justin Garson, 2007, p. 531). Wimsatt approaches the philosophical analysis of the logical structure of function theories as it follows: “as teleological explanation, the function theory can be justified only by means of «selection processes» (Wimsatt 1972, *apud* Justin Garson 2007, p. 532).

The operation of selection processes is not special only in biology but appears to be at the core of teleology and purposeful activity, wherever they occur. However, the relative soft character persists, for Wimsatt does not claim that necessary or sufficient conditions that could be accomplished in a conceptual analysis of “function” would really exist.

Nander’s approach of natural selection focuses rather on the possibility of having a necessary condition for a function, than on the task of finding the persistence conditions for a specific state. But the most widespread theory among philosophers is the theory replacing natural selection (NS) with *selected effect* (SE).

According to this account, it is no longer the case that a function necessary at a specific moment, in virtue of whose necessity an entity finds its reason of being by developing that necessary function; but simply the effect of an entity *becomes* or *is* the very function which, by the effects produced, accomplishes a specific useful role.

More recently, Schwartz (2004, *apud* Justin Garson 2007, p. 534) emphasizes the constructive and attributive roles of philosophical definitions of function, arguing that such definitions constitute *explanations* of biological usage, rather than conceptual analysis of theoretical definitions. Carnap (1950, *apud* Justin Garson 2007, p. 535) considers, on pragmatic grounds, that philosophical explanation involves the replacement of a vague concept by a precise one.

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Hence, it entails making distinctions that did not previously exist in the scientific context in question. Such an attempt has the character of a proposal, to be accepted or rejected on pragmatic grounds.

There are some different meanings for “function” in biology, for example function considered as *structure*: the function characterizes a whole area of activities that a part of a system is able to exercise (many examples in anatomy, comparative morphology and physiology).

Therefore, it entails that the term “function” depends upon the view of the user; moreover for it doesn't and it cannot exist a pragmatically defined limit in respect to the usage of the function theory. Potentially, any structure of natural life could be considered as “having a function”. From this variety of usages of the term “function” in biology, the most responsible approach of all appears to be the pluralist one.

#### **4. Conclusion**

According to the third part of our paper, we are observing a “relativization” of the usage of (the term) “function”, in evolutionary biology. As a teleological argument, throughout its history of biology and philosophical reflection on it and under the pressure of critics and counterexamples impossible to surpass, the *explicative* property of a function theory has progressively restrained its realm of initial generality and its universality claims provided by the prior *etiologist* concept.

From this point of view, we can observe that the reason Kuhn hesitated to treat Darwinian view and its consequences as an event of a “scientific revolution” type is simply that Darwinian Theory could not qualify as a scientific theory compatible with Kuhnian paradigm and in respect to the criteria of tent paradigm.

The fact that, as we have shown in the second part of the paper, there was a issue of commensurability between Darwinian theory and the traditional naturalist worldview (compatible with the creationist worldview) does not represent an argument in favour of a “Darwinian revolution” unfitting and invalidating the Kuhnian paradigm. On the contrary, the Darwinian Theory never was a Kuhn-type scientific theory, as well as the ante-Lamarckian naturalist view or the creationist one (compatible and commensurable with Darwinian view) could never claim this status.

Concepts as “natural selection”, “variability”, “adaptability”, “selection of the most capable” in order to perpetuate and reproducing etc., concepts refined

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and softened through the (short) evolutionary biology are statistical concepts, empirical generalizations proper to a causal incomplete “science”. The fact that the dynamics of evolutionary biology is based on concepts grounded on “function” theories that use teleological arguments (as we have seen in the third part of our paper) explains the reason why both naturalist scientism and (modern) creationism cannot claim the desired “scientific” character.

Returning to the theme of our paper, we may add that a view on man and nature (whether it belongs to evolutionary biology or to scientologist creationism) that uses illegitimately presuppositions and arguments epistemologically inadequate fails eventually to accomplish its very task, namely, the most adequate approach to a reality construed as accurate as possible.

The modern ideological view of (especially north-American) creationism, by the “strong” sense of the anthropic principle as epistemological source for grounding the idea of a creator-designer of the world, life and man, fails to approach the very essence of (the) religious attitude: an irrefutable scientific argument (impossible in principle) in favour of religious creationism ruins the very essence of *faith*, the significance of religious man’s relation with both nature and himself.

Although, as we have already seen, a certain plurality related with theories supporters of the teleological character of “function” within evolutionary biology can be detected, the persistence of ambiguities in respect to their epistemological presuppositions postpones their real progress and their methodological clarifications.

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