From T(h)e(e)ology to Evolution: The Typological Legacy and the Darwinian Possibility of Economic Theorizing

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From T(h)e(le)ology to Evolution: The Typological Legacy and the Darwinian Possibility of Economic Theorizing

Manuel R. Souza Luz and Paulo S. Fracalanza

Abstract: The characterization of neoclassical economics as a “taxonomic science” and the understanding of the evolutionary possibilities of economic theorizing are central aspects of Thorstein Veblen’s institutional thought. This paper seeks to provide elements for a contemporary resumption of such Veblenian elaborations. Thus, we aim to re-establish the dialogue between economics and biology, focusing on the historical and methodological spheres of the conversation. The first part of the paper demonstrates that evolutionary biology’s analysis of the pre-Darwinian past relies on the same principles that Veblen used to build his criticism of neoclassical economics — namely, the principles of typology. The paper also shows how this approach had a negative impact on the theoretical elaborations of pre-Darwinian biology, and how it contributed to the problematic foundations of neoclassical economics. The paper further focuses on the key methodological principles of Charles Darwin’s works, highlighting their importance beyond the field of biology, and pointing out that a Darwinian approach constitutes an ontological perspective, premised on what Geoffrey Hodgson and Thorbjørn Knudsen denote as “generalized Darwinism.” Finally, the paper discusses certain concepts in the general theoretical debate of Darwinian ontology to stress the revolutionary role of Charles Darwin as a founder of this perspective and to explore the relationship between the ontological perspective and biological analogy.

Keywords: generalized Darwinism, neoclassical economics, pre-Darwinian biology, typology

JEL Classification Codes: B-history of economic thought, methodology, heterodox approaches, B40, B52

The possibility of adopting a Darwinian approach as a feasible alternative to neoclassical orthodoxy has catalyzed recurring debates in international journals dedicated to evolutionary and institutional economics. Geoffrey Hodgson and
Thorbjørn Knudsen appear as the main proponents of the Darwinian project through what they have termed “generalized Darwinism.”

As Hodgson (2008) points out, the idea of a Darwinian perspective for the understanding of economic phenomena is not new, but marks a return to the approach first deployed in the writings of original institutionalism, specifically, in the works of Thorstein Veblen. The view that economics had followed inappropriate philosophical and methodological paths was the essence of Veblen’s critique. According to Veblen, it was only by adopting an evolutionary perspective following Darwinian principles that economics could be better equipped to understand the processes of the socioeconomic world.

Although one finds the roots of the Darwinian perspective in Veblen’s writings, it was only after Hodgson’s (2002) work that this specific evolutionary conception was reclaimed by economists in a more systematic manner. This development simultaneously improved the currency of Veblen’s critique and articulated a “post-Darwinian” interpretation of economic phenomena.

The purpose of this paper is to provide an interpretation of the Veblenian critique from the standpoint of the history of evolutionary thought in biology and to explain the content, scope, and limits of a Darwinian theory of economic changes in the context of Hodgson and Knudsen’s proposition. Our explanatory effort proceeds on two fronts. The first uncovers the methodological and philosophical points of contact between the Veblenian critique and modern biology’s interpretation of its (biology’s) own pre-Darwinian past. The second front surveys the elements mobilized by the Darwinian alternative and crystallized in the idea of “generalized Darwinism.” Thus, I focus on the progressive description of those requirements and mechanisms that comprise this proposal for theorizing, referencing in the process the recent works of Hodgson and Knudsen, as well as Darwin ([1859] 1903).

The direction of our study will inevitably raise the question: What is the relationship between economics and biology? After all, Darwin’s thought singularly targeted the processes of biological change. We certainly do not avoid this question in the present study. In fact, we address it in a detailed explanation that, first, seeks to verify the similarities of the repercussions of “typological thought” concerning biological and economic ideas, and which, second, understands how the Darwinian conception constitutes a metatheory or ontology. In other words, Darwinian thought affords a perspective applicable to both the economic and biological fields, not just by turning away from being a mere analogy, but actually presenting itself as a tool to control and analyze biological analogies.

We divide the paper into four parts. In the first part, we endeavor to explain the philosophical foundations of the typological pre-Darwinian thought, as well as its implications for the idea of science. In the second part, we illustrate how this approach is improper for constructing consistent economic and biological theories. At this point, we make use of the elements mobilized by the Veblenian critique to analyze the foundations of neoclassical economics, as well as of the works of renowned biological scientists who were able to understand the historical movements of their own specialized sub-fields. In the third part, we analyze the Darwinian
alternative as an ontological perspective, explaining in the process its methodological principles and the dynamics of its internal mechanisms. Consequently, we uncover the philosophical foundations of the Darwinian approach, showing how they position themselves in a diametrically opposite manner from the foundations that sustain the typological approach. In the fourth part, we discuss some points of controversy regarding this ontological proposal with the view to demonstrating how a broader understanding of the revolutionary character of Darwin’s thought could help resolve some of these controversies. Our concluding remarks follow.

**In the Beginning Was Type**

The history of ideas in evolutionary biology has been an important topic of study to many leading researchers in this scientific field. Two important aspects repeatedly call the attention to these studies. The first point is the attempt to understand the ways in which the natural sciences sought to perceive the living world prior to the scientific canonization of the “natural selection” concept of Charles Darwin ([1859] 1903). The second point is the realization that the Darwinian viewpoint certainly possesses unique and revolutionary features that set it apart from the physical or chemical sciences. The present section of this paper directly concerns the first of these aspects. Here, we describe prevalent modes of thought among biologists in the pre-Darwinian era. According to the famous German biologist Ernst Mayr (1904–2005), the most striking feature of the pre-Darwinian thought was its strong typological feature. In his many works on this subject matter, Mayr invariably returned to classical Greek philosophy for an explanation of how the typological — or essentialist — idea about living beings emerged and became hegemonic.

Mayr (1982) traced typological thinking back to Platonic and Aristotelian dualism. For Plato, according to the biologist, everything that exists in the world of humans corresponds to an essence, a perfect and eternal type (eydos), which inhabits the world of ideas. Platonic thought interprets essences as stable, perfect, and eternal, not inhabiting space and time, for they are not born and thus do not degenerate. On the opposite end are things of the sensible world which are the imperfect or decadent materializations of their corresponding eternal and immutable types. As Daniel C. Dennett ([1995] 1996, 36) puts it, according to this doctrine, “every earthly thing is a sort of imperfect copy or reflection of an ideal exemplar or Form that existed timelessly in the Platonic realm of Ideas, reigned over by God.” Indeed, the sensible is, from the Platonic perspective, imperfect and faulty. R.C. Lewotin (1974, 5), too, underscores this notable characteristic of the Platonic thought: “[T]he failure of individual cases to match the ideal was a measure of the imperfection of nature.”

Aristotle restructured the idea of **type** in his famous “Taxonomy of Causes.” He identified four types of causes that would respond to the “whys” of any phenomenon. The four types of causes then are: the material, formal, efficient, and final causes. Aristotle understood material cause as the identification of components, or the matter of which something is made — that is, the thing from which something appears or through which something can be perceived. For its part, Aristotle’s formal cause seeks
to answer the question about the form or structure this matter (thing) assumes. On the other hand, when one understands the immediate reasons for movement, including through investigating how something changes or was transformed, one seeks its Aristotelian efficient cause. As José Ferrater Mora (1982, 57) synthetically understood it, efficient is the cause that analyzes “the principle of change.” Finally, when one investigates the purpose, goal, or teleological end of something, one searches for a final cause, or sufficient reason for that phenomenon.

Although, in some circumstances, the primary cause(s) of an event could be explained with the efficient cause alone – for example, an eclipse, the result of the moon’s inter-positioning between Earth and the sun – many natural phenomena, especially those involving regularities that prove beneficial to living beings, should involve an explanation of their final causes, too. Thus, for Aristotle (2007), the regularity of tooth arrangement in one’s mouth – “front teeth sharp, fitted for tearing, the molars broad and useful for grinding down the food” – could not be satisfactorily explained by a simple coincidence. Rather, it requires an investigation of the final cause (telos) – namely, what precisely accounts for the regularity of tooth arrangement. The final cause, in Aristotle’s terms, would be the definitive answer to all “whys” involved in fully explaining the regularity of tooth arrangement (37).

The idea of teleological type as final cause dominated the pre-Darwinian biological thought (Buican 2008, 53). The prevalent view was that all living beings were fully defined from the embryo stage, so that the life process was an unfolding or fulfillment of a pre-established plan (preformation). This Mayr (1991a) gave as a striking example of the teleological orientation in the biological field. “Already it was known to the Greek philosophers and Physicians,” he wrote, “many processes in nature seemed to be goal-directed. The development of an individual from the fertilized egg to adult stage was the example quoted most often” (Mayr 1991a, 129). The teleological interpretation informed the nineteenth century theories and was advanced by the works of Karl Ernst von Baer, Ernst Haeckel, and Herbert Spencer, among others. Thus, the possibility of a modern evolutionary thinking has been excluded from this perspective because, as Mayr ([1963]1970, 4) asserted, this approach to evolution “does not produce genuine change, but consists merely in the maturation of immanent potentialities” ([1963] 1970, 4).

Pre-Darwinian thinkers understood the biological world as a collection of discrete types that embody distinctive teleological purposes inscribed in their development. The typological teleological mode of thinking is, therefore, the decisive quality that biological historians identify as characteristic of pre-Darwinian biology. The emphasis here is important because it was exactly this kind of conception of the living world that Darwin ([1859] 1902) came to challenge.

Before we move on to the central aspects of Darwinian thinking, however, it is crucial to show to what extent typological design proved to be inadequate for the understanding of biological phenomena. Similarly, it is important to explain how Thorstein Veblen was able to critically position himself in the field of institutional economics against neoclassical thought through identifying the typology that associated this “taxonomic science” to a “pre-Darwinian” worldview.
The "Ceremonial Inadequacy" of Biology and Economics

This section of the paper describes the channels through which typology manifested itself in biological and economic thought. To that end, we identify the repercussions of typology on studies of pre-Darwinian biology by surveying the works of important philosophers of science. Moreover, we attempt to establish the influence this vision had on shaping the contours of neoclassical economics, relying heavily on Veblen’s critique.

As already pointed out, typology was what guided pre-Darwinian biological ideas. Until the mid-nineteenth century, the idea that species represented a reflection of a fixed essence was the established view in every scientific circle of the Western world. The domination of Christian theology supported this perspective since its notion of creation embodied this essentialist conception. Thus, Mayr (1991b) pointed out the dominion of typological thought in the nineteenth century under the veil of Christianity: “In all the writings of the naturalists, geologists and philosophers of the period, God played a dominant role. They saw nothing peculiar in explaining otherwise puzzling phenomena as being caused by God, and that included the question of how species originate” (Mayr 1991b, 13).

Pre-Darwinian essentialist biology manifested itself mainly through fixism—that is, the conception that living beings were immutable and a reflection of a superior type, created by God. This way, in the Aristotelian mold, species were considered natural types that—alogous to an essential triangle which differs radically from any other polygon—had unalterable characteristics and non-overlapping traits differentiating them. The idea of a natural state for each of the species was clear-cut: All living things were to be ordered in accordance with their specific natural states. Thus, biology devolved to a mere taxonomic science, dedicated to the classification of living beings in the same way chemical elements were classified.

However, variations among species classified under the same taxonomic category were often very pronounced. This led Aristotle to create the term “terrata,” or monsters, to denominate beings whose paths of development digressed from their natural states as a result of the intervention of various forces. Pre-Darwinian biology had room for this approach, because the beings that deviated from their type were studied as aberrations. A whole discipline, called teratology and founded by Isidore Geoffroy Saint-Hilaire, came into being to study these variations (Buican 2008, 52). According to Elliott Sober (1980), teratology developed as a result of the typological thinking of that time. “All assumed that there is a real difference between natural states and states caused by interfering forces. The study of monstrosity—teratology—which in this period made the transition from unbridled speculation to encyclopedic catalogues of experimental oddities, is an especially revealing example of the power exerted by the Natural State Model” (Sober 1980, 363-364).

In the pre-Darwinian world, the reality of the biological sphere was understood in its natural state, or type, whereas the material world was only an imperfect manifestation. In this sense, Mayr (1982, 93) gave a strong example of the limits this view had reached when applied to the study of living beings: “When an argument
arose as to how many teeth the horse has, one looked it up in Aristotle rather than in the mouth of a horse” (Mayr 1982, 93). In other words, typological thought, in Mayr’s view, proved quite unfit for understanding the complexity of the living world precisely because it ignored its most essential characteristic: the variation intrinsic to its material nature.

Likewise, in economics, Thorstein Veblen realized that the same ideas governing pre-Darwinian biology also apply to neoclassical theorizing. Accordingly, Veblen assumed the mode of an evolutionary thinker once having identified the Aristotelian *final cause* as an impediment to the development of a “post-Darwinian” evolutionary science.

According to Veblen, the methods used by neoclassical economics to interpret the socioeconomic world were not suited to its object of study. Just as scientists today understand that comprehending the biological sphere is not possible using tools developed by a science of the typological kind, so did Thorstein Veblen, without expressly using the term “typology,” see the incompatibility between the theoretical tools of neoclassical economics and the complexity of social dynamics.

To Veblen, economics was strongly reminiscent of classical natural sciences, as evidenced by his profuse reference to terms from this current of thought, including such notions as “naturalness,” “normality,” “equilibrium,” “controlling principles,” and/or “causes of disorder.” Indeed, Veblen tried to demonstrate that the science of economics was confined within strict methodological limits, being unable to adopt a consistent approach toward understanding phenomena of the socioeconomic world. That Veblen’s critique bears contemporary relevance is propped up by Hodgson’s (1992, 326) observation that, despite the important developments of modern evolutionary economics, “the principal influence on economics from natural sciences is still that of nineteenth-century physics.”

In his effort to concretize the method of neoclassical economics, Veblen (1900) established two great canons of truth via this economic approach. The first canon is the conception of an associative hedonistic psychology (utilitarian), while the second one is the a-critical and teleological conviction about a tendency towards equilibrium over the course of events. Thus, the neoclassical perspective, in Veblen’s view, was characterized by “spiritualizing” individuals — that is, by mapping their pre-established and universal behavior onto its object of study. This “spiritualized” individual then, associated with a balanced teleological conception, “embodies the general metaphysical ground of the classical political economy” (Veblen 1900, 243).

In general, Veblen’s writings harshly criticized the utilitarian view of neoclassical economics (Veblen 1909, 622-623). He accused utilitarian economists of espousing hedonistic psychology as the starting point for the construction of an individual. This approach, he charged, conceives of human nature as passive and substantially inert, projecting the individual as a rational calculator who uses utility metrics mainly to maximize his/her satisfaction. “The hedonistic conception of man is that of a lightning calculator of pleasures and pains, who oscillates like a homogeneous globule of desire of happiness under the impulse of stimuli that shift him about the area, but leave him intact. ... Spiritually, the hedonistic man is not a
prime mover. He is not the seat of a process of living, except in the sense that he is subject to a series of permutations enforced upon him by circumstances external and alien to him” (Veblen 1898, 389-390).

In Veblen’s view (1909), classical economics characterizes rationality as the human propensity to seek pleasure and avoid pain. This characterization then leaves no room for social conventions, traditions, and norms as determinants of human action. Therefore, Veblen rejected this “spiritualized” hedonistic model of human behavior since it did not furnish a plausible explanation as to the origins of the behavior tendencies this theory assumes (Hodgson 2001, 141). For Veblen (1909) then, economics is not prepared to understand human action in a consistent manner because it uses an inadequate theoretical tool and explains human action in terms of final cause. This only takes humans “out of the sequence of cause and effect and [places them] instead under the rule of sufficient reason. By virtue of this rational faculty in man, the connection between stimulus and response is teleological instead of causal” (Veblen 1909, 623).

Thus, Veblen was categorical in deconstructing the idea of the neoclassical economic man, which identified final cause as the fundamental basis of utilitarian economics. Neoclassical economics, moreover, conceived of humans as recipients of a “God-given notation of the hedonistic calculus” (Veblen 1909, 631).

But it is the equilibrium teleology of neoclassical economics that is the main focus of Veblen’s critique. An individual’s decisions and strategies, he argued, have no final repercussions defined ex ante at the aggregate level. However, by “spiritualizing” the individual, neoclassical economics was able to define the final result of the individuals’ joint actions: equilibrium. Veblen termed this neoclassical precept “spiritual legitimation.” He indicated that, for neoclassical economics, market equilibrium is a “legitimate” result stemming from the “spiritualization” of individuals and firms. In other words, equilibrium is justified by the maximizing behavior imputed to agents.

Through the teleological/equilibrium approach, Veblen (1898) asserted, the neoclassical economists constructed a method by which it was possible to transform the corporeal world’s socioeconomic phenomena into typology. This included what Veblen provocatively termed “ceremonial adequacy.” “The standpoint of the classical economist, in their higher or definitive syntheses and generalizations,” he wrote, “may not inaptly be called the standpoint of ceremonial adequacy. The ultimate laws and principles which they formulated were laws of the normal or the natural, according to a preconception regarding the ends to which, in the nature of things, all things tend” (Veblen 1898, 382).

Thus, the method of constructing laws that point to a determined end Veblen defined as an ex-ante tendency to ceremonial adequacy. This could be accomplished by a unique conceptualization of telos — equilibrium as the final end. In Veblen’s terms ([1904] 1932, 319), “ceremonial adequacy” could be understood as “the endeavor ... to make facts conform to law, not to make the law or general rule conform to facts.”

The individual, as a “hedonistic calculator,” and his/her congener, the maximizing firm, were the prerequisites of “ceremonial adequacy” needed to reach the
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teleological end of equilibrium. Veblen dealt his hardest blow to economic typology by arguing that the neoclassical market is built on relations of “spiritualized” agents, a necessary condition for “ceremonial adequacy” to occur. It is through the relations of the “spiritualized” neoclassical market that the idea of cosmic perfection of economic theory is revealed. In it, the heavens literally descend to Earth, dictating their divine objective: equilibrium.

Veblen’s (1898, 1900) provocative characterization of economics as a “taxonomic science” stems from the way he understood the process of “ceremonial adequacy.” In this process, the method is a body of consistent propositions representing “normal relations,” of “pure” things, where the variations between elements should not be taken into account. That is, “the science is ... a theory of the normal case, a discussion of the concrete facts of life in respect of their degree of approximation to the normal case” (Veblen 1900, 255).

The Veblenian critique is revealing since it provides the possibility to understand how economics, in its neoclassical approach, maintained the same problematic code of science that commanded the typological interpretation of pre-Darwinian biology. Typological thought indeed had as much vital influence on pre-Darwinian biology as on neoclassical economics. One can trace this assimilating influence on both scientific fields in at least three ways: First, both sciences adopted a view separating the sensible (material) from the type (idea). Second, they both took cosmic teleology, or final cause, as a tool to explain all phenomena — that is, presupposing that everything has an end defined ex ante. Third, they a priori assumed the insignificance of both the time factor and the variations between elements.

This problematic ontological idea of the typological perspective — that is, the view that this approach could be generalized for any scientific fields — came under severe attacks following the mid-nineteenth (until about the early twentieth) century, especially as a result of the publication of Darwin’s *The Origin of Species* ([1859] 1902) and the diffusion of its revolutionary ideas. In other words, with Darwin’s “evolutionary” thought emerged a feasible alternative to typology in social sciences. Darwinian evolutionary thought proved to be broadly useful not only for understanding the living world, but also for realizing that it offered a rich metatheory suitable for economic theorizing.

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**From *The Origin* to Generalized Darwinism**

**Generalized Darwinism and Its Ontological Features**

The great importance of *The Origin of the Species* for modern scientific thought is indisputable. In this work, Charles Darwin ([1859] 1902) synthesized a scientifically cogent theory that would explain the dynamics and complexity of the living world. Darwin’s theoretical elaboration quickly became a feasible alternative to the dominating typological approach, thereafter generating important results in various scientific fields where typology had proven inadequate.
According to Julian Huxley (1939), Darwin’s Theory of Evolution by Natural Selection would have the same scientific structure and rigor today as the most important natural laws. “The Theory of Evolution is without any doubt the most important generalization made in the field of biology, worthy to rank with the great generalizations of the physical sciences, such as conservation and degradation of energy, the modern theory of the atom, or Newton’s theory of gravitation” (Huxley 1939, 131).

Indeed, Mayr (1991b) supported Huxley’s (1939) proposition, further positing that Darwin’s thesis today is an established scientific theory. “The basic theory of evolution has been confirmed so completely that modern biologists consider evolution simply a fact” (Mayr 1991b, 162). Thus, in a simple, yet revolutionizing way, Charles Darwin ([1859] 1902) pointed to the most important factor which the predominant intellectual zeitgeist of his day had thoroughly neglected: the diversity of the living world. In this sense, the Theory of Evolution was not just a new theory, but rather a new form of theory. Darwin’s emphasis on variation as an object of analysis, organizing his idea of the causal and cumulative process, transformed the way natural sciences understood the world altogether. Not surprisingly, Elliot Sober (1980, 351) metaphorically suggests that Darwin was able to bring “people down to earth by rubbing their nose in the diversity of nature.”

Darwin’s evolutionary perspective has become the keystone of modern biology. To a large degree, it encompasses what is today understood as “evolutionary” or “population” thought. Therefore, understanding Darwin ([1859] 1902) only as a naturalist thinker who was able to sweep away fixism in biology is – in many scholars’ opinion (including ours) – restricting the reach of his theory. The Darwinian perspective, with its philosophical and methodological foundations, proves to be an ample and useful metatheory – that is, a theory capable of dissemination to different fields of study. Thus, the Theory of Evolution should be considered beyond its biological perspective as it has become a de facto evolutionary perspective, an alternative completely separated from the dictates of old typological views.

For the remainder of this paper, we analyze the Theory of Evolution as a work offering an ample perspective, not restricted to the biological field, but appropriate for understanding the socioeconomic realm as a whole. In addition to discussing Darwinian thought, we also use as a general explanatory pillar the concept of “generalized Darwinism,” considered to be the most current and faithful evolutionary perspective on Darwin’s teachings in economics.9

We believe that the evolutionary conception of processes inherent to the living world can be analytically divided into two interdependent explanatory spheres. The first sphere concerns the methodological principles, while the second one comprises the philosophical foundations. In this sense, the explanatory route we use here starts from a progressive description of the methodological principles of evolutionary thought (first sphere), including its capacity for generalization. Following this, we seek to observe how the functioning of these general principles puts into evidence its subjacent philosophical foundations (second sphere), illustrating how the Darwinian perspective is resistant to typological interpretation.
The first step towards understanding Darwinian thought resides in delimiting the fields in which it can be usefully employed. An initial requirement for the application of Darwinian principles is the existence of “complex population systems.” “Complex population systems” should be understood as populations that feature a specific type of interaction among their constituent elements. Hodgson and Knudsen (Hodgson and Knudsen 2006, 2010; Hodgson 2007) define population in a synthetic manner as “members of a type that are similar in key respects, but within each type, there is some degree of variation, due to genesis or circumstances” (Hodgson 2007, 266). According to both authors, the specification of a set of elements that differ from one another is the central idea of the concept of population. Yet, when turning to J.S. Metcalfe (2005), one finds out that this definition should not be so reductionist. Metcalfe explains that what varies between elements must be a relevant feature for the selection process. “What matters in defining the members of the population is not their characteristics per se but that they are subjected to common environment and selective pressure. ... The consequence of this is that neither the relevant population nor the relevant characteristics can be identified unless the relevant selection environment is also specified” (Metcalfe 2005, 398-399).

Thus, one can understand “population” as a set of elements that not only have certain characteristics in common, but also display variation based on these features. Even more critically, these variations are the object of the selection process. In Darwin ([1859] 1902), one observes pronounced emphasis on the differences between individuals of the same species and on the relationship of differentiating features to natural selection. Thus, according to Darwin, “[n]o one supposes that all the individuals of the same species are cast in the very same mould. These individual differences are highly important to us, as they afford materials for natural selection to accumulate (Darwin [1859] 1902, 43).

Furthermore, for a “complex population system” to exist, the respective population needs to fulfill the following minimum requirements: First, the population must be comprised of potentially perceivable elements that are capable of consuming materials and energy from their environment to survive or minimize degradation. Second, these elements must be able to process information coming from the environment in which they are inserted through some sensorial mechanism. Third, the elements that comprise the population must be able to generate solutions to problems of adaptation in order to avoid degradation and increase their chances of survival. Finally, the population in question must be able to retain and pass on the solution-generated information from element to element as well as from the elements to other entities within the group. “In sum,” Hodgson and Knudsen (2010; Hodgson 2007, 266) write, “a complex population system involves populations of non-identical (intentional or non-intentional) entities that face locally scarce resources and problems of survival. Some adaptive solutions to such problems are retained through time and may be passed to other entities” (Hodgson and Knudsen 2010, 34).

Clearly, the definition of “complex population systems” is a broad one and it does not require any more restrictive specifications about the nature of the elements.
that constitute a population. Indeed, the idea of a “complex population system” was meant to be as flexible and encompassing as possible so it could include any sets of elements that meet the minimum requirements (listed above). Hodgson and Knudsen (2006), too, stress the broad nature of “complex population systems.” These systems, they posit, “include every biological species, from amoebas to humans. They would include self-replicating automata, of the type discussed by [John] von Neumann (1996). In addition, and importantly for the social scientist, they include human institutions, as long as institutions may be regarded as cohesive entities having some capacity for the retention and replication of problem solutions. Such institutions would include business firms” (Hodgson and Knudsen 2006, 4-5).

The inherent dynamics of a “complex population system” must be understood through certain “Darwinian” principles. The application of these principles encompasses the mechanisms for our specific evolutionary perspective. Thus, it is of utmost importance here that we conduct an analysis of the properties of these principles.

As we have shown, a “complex population system” comprises non-identical units because it is fundamentally a population. The understanding of the paths through which this variability projects itself shapes one of the pillars of the evolutionary process, since the very concept of evolution would be irrelevant if the elements to interact were identical. Thus, variation emerges as the first indispensable principle of the Darwinian approach. Beyond variability, the “complex population system” requires mechanisms that permit the exchange of knowledge about adaptive solutions from member to member within the population over time. This requirement forms the second “principle of inheritance,” (second to variability), which makes it possible to replicate the “beneficial” variations of some elements, thus propagating population’s adaptive solutions over time.12

The third principle includes the idea of selection. As Darwin ([1859] 1902) himself pointed out, the selective view relates to the perspective of population growth in the face of insufficient food resources and it may have originated with Thomas R. Malthus (1798).13 This principle posits that it is through a dynamic and temporal process of elimination and survival of the elements of a given population, in a specific environment, that the change in this population’s composition takes place. This process Hodgson and Knudsen (2010, 98) classify as “successor selection” — that is, the selection which occurs within a cycle of replication, variation, and environmental iteration.14

These three principles then — variation, inheritance, and selection — comprise the core of the Darwinian approach. Darwin ([1859] 1902) described how the integrated manner of interaction between these principles guides the evolutionary process. “This is the doctrine of Malthus, applied to the whole animal and vegetable kingdoms. As many more individuals are born than 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. From the strong principle of inheritance, any selected
variety will tend to propagate its new and modified form” (Darwin [1859] 1902, 4, emphasis in original).

This is Darwin’s ([1859] 1902) ground-breaking idea of evolutionary process, which leads the current design of generalized Darwinism. Thus, the phenomena that occur in “complex population systems” must be understood based on the Darwinian principles of variation, selection, and inheritance. For Darwin, the continuous and cumulative process generated by these principles over extensive periods of time would explain the existence of the simplest and, at the same time, most complex relations of the living world.\(^\text{15}\)

Using Lewotin (1974, 6) as inspiration, we conduct a small formalization in an effort to synthetically explain the functioning of the Darwinian perspective.\(^\text{16}\) Thus, the phenomena in any “complex population system” could be represented through the following evolutionary explanatory model:

**Explanatory Model 1:**

\[
P(t) \xrightarrow{T(v, h, s)} P'(t + \Delta t)
\]

The above explanatory model shows that a population (P) at a moment (t) has a certain defined configuration. When this population is under the “laws of transformation” (T), consubstantiated in the principles of variation, inheritance, and selection (v, h, s), at a moment (t + \Delta t), there would be a different population configuration (P’). P’ \(_{t+\Delta t}\) differs from P \(_t\) and it is this change in the make-up of the population, occurring over time, that evolutionary thought tries to explain.

As already noted, this Darwinian perspective has an all-encompassing nature, which Hodgson and Knudsen (2006) effectively call “generalized Darwinism.” Hodgson (2002) defends generalized Darwinism not as a biological analogy, but as evidence of an ontology that could be used by biology or economics, or by any other field studying population configurations that are classifiable as “complex population systems” (Hodgson 2002, 266).\(^\text{17}\)

In this sense, it is important to note that these principles, laying the foundation for the Darwinian metatheory, do not explain the actual functioning of population systems. While the principles of variation, inheritance, and selection describe how the dynamics of the evolutionary process occur in these systems, they fail to account for how they organize themselves in their specific “complex population system.” As Hodgson (2007) puts it, “[t]hese abstract principles do not themselves provide all the necessary details, but nevertheless they must be honored” (Hodgson 2007, 266). Moreover, he (Hodgson 2003) points out that the concept of generalized Darwinism is not hermetic, but rather open to absorbing complementary theories on what we called the laws of Darwinian transformation. This is so, because the theory “encompasses a wide range of possible mechanisms. But they would share the common features of variation, inheritance and selection” (Hodgson 2003, 368).
Similarly, each “complex population system” demands an individual analysis in order to understand exactly which Darwinian principles have combined and are at work in that system’s internal dynamics. It is, thus, obvious that generalized Darwinism is not a sufficient theory to describe in a coherent manner the totality of all evolutionary processes. Rather, it serves as a general framework that necessitates the incorporation of auxiliary theories to be able to generate a more comprehensive knowledge of the evolutionary process (Hodgson and Knudsen 2010, 39).

What truly unifies the socioeconomic and biological spheres in this perspective is only the fact that the objects of study for both fields can be classified through the concept of “complex population systems.” The internal mechanisms for these systems — governed by the principles of variation, selection, and inheritance — do not keep (nor need to keep) any relation of equivalence to each other or consistency from system to system. In other words, variation, inheritance, and selection manifest themselves differently in different population systems.

Therefore, the principles of generalized Darwinism do not point to any type of reductionism, explanatory sufficiency, or “biological imperialism” similar to the “economic imperialism” put forward by neoclassical economics (Hodgson 2003, 368). Generalized Darwinism is an open-end theory that requires researchers to actively pursue theories, explaining given phenomena within their own specific “complex population system,” thus, only being guided by the general framework of Darwinian principles.

Eva Jablonka and Marion Lamb’s (2005) perspective also points to the “generality” of the Darwinian approach, explaining that the modern scientist could very well be a good Darwinian without believing in the laws of Mendel, mutant genes, or DNA codes (Jablonka and Lamb 2005, 12). Darwinian ontology goes beyond the specificities of biological sciences and that is why it is applicable to any type of population configurable as a “complex population system.”

Richard Dawkins (1983) further underscores the broad range of applicability of Darwinian ontology, while also pointing out the metatheory’s incomplete and open nature. By how the replication process occurs in generalized Darwinism, Dawkins (1983) specifies that “[t]he replicating entities do not have to be DNA or RNA. They do not have to be organic molecules at all ... A full science of Universal Darwinism might consider aspects of replicators transcending their detailed nature and the time-scale over which they are copied” (Dawkins 1983, 422).

Biological sciences were successful in constructing complementary theories that effectively explained the relations within “biological population systems.” In this respect, the Mendelian genetics serves as a complementary theory to general Darwinian principles, enabling the modern scientist to understand the complexity of evolutionary biological processes. The evolutionary construction in biological sciences, therefore, shapes exclusively complementary theories for the biological realm. There is no property in the idea of generalized Darwinism indicating that complementary theories (such as genetics) applicable to “complex population systems” are different from those of the organic sphere. In this sense, the use of analogies derived from auxiliary theories, transferred from the biological realm to the
socioeconomic (or from any other complex system), could compromise the development of an evolutionary economic theory and may actually function as a theoretical straightjacket.\textsuperscript{20} Hodgson (2002), therefore, believes that evolutionary economists should construct their own complementary theories within their specific population realm, but within the context of Darwinian ontology. “Darwinism offers a theoretical framework and ontological precepts, rather than a detailed set of theoretical explanations for all phenomena. ... The evolutionary economist has to provide more specific, extensive, auxiliary theories to fit inside, and be guided by, a more general Darwinian framework” (Hodgson 2002, 277).

In short, one could say that the principles of variation, inheritance, and selection form a superior analytical layer than that of the operational mechanisms of each “complex population system.” On their own level, these operational mechanisms should explain how Darwinian principles act within their specific system.

In a synthetic manner, it is possible to schematically understand the ontological relation as well as the necessary separation that generalized Darwinism establishes between different “complex population systems.” Figure 1 explains this perspective using the metatheoretical connection, the separation of evolutionary biology, and the potential Darwinian economic perspective at the level of specific complementary theories.\textsuperscript{21}

**Figure 1. An Analytical Perspective on Generalized Darwinism**
As evident, Figure 1 uses the aforementioned evolutionary model of transformation for “complex population systems.” This explanatory model can be understood as the fundamental synthesis of those processes forming the theoretical framework of generalized Darwinism. Figure 1 explains the generality of explanatory model 1, putting it at an ontological level that can be shared as a method for analyzing any “complex population system.” In this sense, the evolutionary Darwinian model is the fundamental point of contact between different evolutionary perspectives — a true metatheory (see upper part of the dotted line).

Furthermore, Figure 1 exemplifies the sphere where the analytical differences between the “complex population systems” are found, and indicates that there is no necessary connection between the complementary theories of each population system (lower part of the dotted line). Generally, Figure 1 is able to delimit the explanatory structure of modern evolutionary biology (solid-line shape) in relation to our proposal for adopting generalized Darwinism to analyze the socioeconomic world (dashed-line shape). At the same time, Figure 1 shows the point of contact between different “complex population systems” and its independent nature.

At this point, it is important to emphasize two aspects of this broad interpretation of Darwinian theory. The first aspect is that the theory’s applicability is restricted to what we define as “complex population systems,” That is, it is not a universal theory. The second aspect is that Darwinian ontology is insufficiently structured and, therefore, open-ended, requiring the construction of complementary theories for a fuller analysis of any given population system. Overall, the Darwinian perspective presents itself as a feasible alternative to understanding the dynamics of complex population systems without the typological paradigm’s limitations. In this sense, it is of great value to conducting a small analysis of the philosophical foundations of the Darwinian perspective, explaining in the process how the principles of Darwinism conflict with those of typology.

Moving the Philosophical Bases

The philosophical underpinnings of Darwinian thought obey two basic principles: efficient cause and cumulativeness. These two philosophical principles then serve as the foundation of the entire “complex population systems” analysis (discussed above) and form the revolutionary aspect of Darwin’s ([1859] 1902) conception of change. It was through these philosophical foundations that the scientist-naturalist was able to do away with fixism, and to replace it with a strictly material interpretation. Hodgson (2002) summarizes this core aspect of Darwinian thought accordingly: “Darwin upheld that complex outcomes could be explained in terms of a detailed succession and accumulation of step-by-step causal mechanisms” (Hodgson 2002, 180).

Darwin found that science had to be understood as a force capable of uncovering the efficient causes behind natural phenomena. Thus, the pursuit of a teleological explanation would make no sense for attempting to understand the organic world. The regularities observable in the natural world, and even the
transitory adequacy of living beings to the environment (fitness), could only be understood as the consequence of a long evolutionary and cumulative process of mutations, inheritance, and selection in the natural environment. As Mayr (1991b) appropriately understood it, the logic of Darwinism dealt a heavy blow to any teleological explanation of progress and perfection in biological processes. “Victorian notions of progress and perfectibility were seriously undermined by Darwin’s demonstration that evolution brings about change and adaptation, but it does not lead to progress and it never leads to perfection” (Mayr 1991b, 2).

Daniel C. Dennett (2006), for his part, emphasizes the opposition between typology (founded on the idea of final cause) and Darwinism (founded on the idea of efficient cause). Moreover, he argues, the construction of a new conception, thoroughly divorced from teleology, was one of the main contributions of Darwin’s approach to scientific thought. “The imagined ‘essence of life’ has to be approached by one imaginable chain or another of simple agents or agencies stretching from the clearly non-living to the clearly living, and only a lexicographical decision is going to ‘draw the line’” (Dennett 2006, 107).

Darwinian cumulativeness holds that complex results can be explained in terms of a detailed succession of events and as an accumulation of efficient causal mechanisms. Thus, cumulativeness appears as a core element, because it reveals the sequence of efficient causal relations as a historical process. Consequently, the evolutionary explanation of living things is fundamentally a historical narrative of how efficient causes accumulated over time. This concept of cumulativeness in the philosophy of science, as Darwin introduced it, is the mechanism through which evolutionary thought embraces history. “Darwin introduced historicity into science,” Mayr stipulated. “Evolutionary biology, in contrast with physics and chemistry, is a historical science — the evolutionist attempts to explain events and process that have already taken place” (Mayr 2000, 80).

In the same vein, Veblen ([1904] 1932) posited that Darwin’s theory was the scientific counterpart to the industrial revolution, enabling the naturalist to understand life in terms of the factory — that is, as a causal and cumulative process. “Modern Science fell into the lines marked out by technological thinking and began to formulate its theories in terms of process rather than in terms of prime cause ... [T]he striking and decisive move this direction was taken toward the middle of the century by Darwin and his contemporaries” (Veblen ([1904] 1932, 369).

Thus, for Veblen (1906), evolutionary modern science, deriving its concepts from Darwin, conducted investigations and reached results in the same terms as those employed by mechanical engineers — that is, in terms of the causal and cumulative production process (1906, 599). Likewise, Mayr (1991b) pointed out that Darwin’s innovative mechanical approach was the pioneering element responsible for the success of his evolutionary perspective. “Darwin’s theory was unique; there was nothing like it in the whole of philosophical literature from pre-Socratics to Descartes, Leibniz, or Kant. It replaced teleology in nature with an essentially mechanical explanation” (Mayr 1991b, 68).
In addition, Veblen (1898) argued that any science calling itself evolutionary must be founded on this new Darwinian conception of a non-teleological process. “Any evolutionary science ... is a close-knit body of theory. It is a theory of a process, of an unfolding sequence” (Veblen 1898, 165). Hodgson (2002) shares Veblen’s (1898) view, emphasizing the fundamental components of an evolutionary scientific approach in Darwinian terms: “The prime postulate of evolutionary science, the preconception constantly underlying the inquiry, is the notion of a cumulative causal sequence” (Hodgson 2002, 277).

Darwin ([1859] 1902) sounded the death knell for the sufficient reason of scientific thought, replacing it with the unprecedented idea of the accumulation of efficient causes. In addition to having its universality questioned, typology now had a scientifically feasible alternative. Darwin successfully demonstrated that to understand life, in all its aspects, it was no longer necessary to construct it as a type. For Darwin, the time factor, previously rejected as insensible, now shaped the concept of change in the natural world, transforming the notion from “faulty” to factual.

Some Contributions to a Debate

The generalized-Darwinism proposition has generated numerous debates in evolutionary and institutional economics in recent years. While we do not entertain a comprehensive review of this debate herein, we will discuss some points of criticism bearing direct relevance to this approach. Thus, we will address those ideas which J.W. Stoelhorst (2008) termed the “general methodological discussion,” regarding the debate about the scope and limitations of generalized Darwinism as a theoretical guide for institutional and evolutionary economics (Stoelhorst 2008, 416).

Major criticism of generalized Darwinism comes from a group of scholars who categorize it as biological analogy. Such critics of generalized Darwinism are Ulrich Witt (2004), G.S. Levit, Uwe Hossfeld and Ulrich Witt (2010), as well as Christian Cordes (2006, 2007). A fervent detractor, Ulrich Witt (2004) states that generalized Darwinism would not be more than a mere analogy, proclaiming itself as an ontology, should its underlying principles of variation, selection, and inheritance fall on a heuristic rule linked to the synthetic theory of evolution (founded in the mid-twentieth century). Thus, it transpires that the application of these principles is purely domain-specific, because their synthesis is directed specifically to the biological evolution. As Witt points out, “universal Darwinism considers variation, selection, and retention/replication as generic features of evolution. However, these three principles and the relationships between them depend on a heuristic inspired by neo-Darwinian evolutionary biology and, as such, are still domain-specific” (Witt 2004, 130).

G.S. Levit, Uwe Hossfeld, and Ulrich Witt (2010), in combination, seek to reconstruct the history of evolutionary thought in biological sciences to make the argument that the idea of variation, selection, and inheritance had an undefined role in nearly all approaches existing during the last century and a half — this includes
Darwinian, non-Darwinian, and even anti-Darwinian theories (Levit, Hossfeld and Witt 2010, 10). Furthermore, the trio argues that the synthetic-theory-of-evolution approach was the result of a long and controversial “bottom-up” building process in biological sciences. Consequently, it should be understood, according to them, that the principles of variation, inheritance, and selection have nothing specifically “Darwinian” about their nature as they firmly established themselves as principles of synthesis.

The criticism of Witt (2004) as well as Levit, Hossfeld and Witt (2010) has historical and methodological features. In historical terms, their detr action describes flawlessly the defiance of evolutionary thought, beginning with *The Origins of Species* to the *Synthetic Theory*, and beyond. In methodological terms, however, these authors’ criticism reduces the importance of generalized Darwinism, devaluing in the process the avant-garde role of Charles Darwin ([1859] 1902).

As Levit, Hossfeld and Witt (2010) demonstrate, many thinkers of the biological sciences show that, before the *Synthetic Theory*, there was a great dilemma about the mechanisms of evolution. Despite this, Mayr, as one of the proponents of the synthetic theory, pointed out that the synthesis should not be understood as a scientific revolution, because it was just a process of unification of the fields of evolutionary studies under a common language. Such unification was marked “not so much by any revolutionary new concepts as by a process of house cleaning, by the final rejection of various erroneous theories and beliefs that had been responsible for previous dissension” (Mayr 1991b, 135).

The central idea of the synthesis combines August Weismann’s ultra-Darwinism and Gregor Mendel’s genetics, adopting gene as the unit of hereditary information (Jablonka and Lamb 2005, 24). Accordingly, Geoffrey Hodgson (1998) delineates the main theoretical contribution of the synthesis: “Only then did the Mendelian gene become fully incorporated into the theory of evolution, giving a plausible explanation of the variation of presumed offspring and the selection of species. This had not been achieved by Darwin or any other nineteenth century biologist” (Hodgson 1998, xxi).

While the synthetic theory did not present any new ideas, their innovative features rested on the combinations of concepts already being used. Therefore, contrary to what Levit, Hossfeld and Witt (2010) and Witt (2004) say about it, we believe that generalized Darwinism is not directly related to the synthetic theory of evolution. Even though the synthesis promulgated that evolution by natural selection was the primary mechanism of change in biological populations, it did not generate this concept. Darwin did ([1859] 1902).

Accordingly, we argue that the synthesis, espousing the concept of natural selection, brings an auxiliary “gene” hypothesis into generalized Darwinism, thus facilitating the biological world’s understanding. In a different perspective, one could interpret the synthesis as a joint effort of elaborating complementary hypotheses within an ontological Darwinian perspective. This line of reasoning establishes that variations in the living world arise from accidental changes in genes due to lack of precision in the genes’ basic property of self-reproduction (thus rejecting Lamarckism), with these same genes seen as the physical substrate of heredity.
Julian Huxley (1954) was quite clear in separating the concept of natural selection from the idea of genetic mechanism. “[A] single basic mechanism,” he wrote, “underlies the whole of organic evolution — Darwinian selection acting upon the genetic mechanism. Darwinian selection is an old principle, but the way it works depends on the nature of the genetic mechanism. And modern genetics has established that this consists of unit-particles adjusted to form a unified system — the gene-complex capable of combining constancy and flexibility in a unique manner” (Huxley 1954, 22). Theodosius Dobzhansky (1937), the main geneticist of the synthesis, for his part, commented on the complementary character of the genetic perspective relative to the theory of Darwinian evolution: “Evolution is a process in development of dissimilarities between ancestor and descendant populations. The Mechanisms that determine these Similarities and offspring constitute the subject matter of genetics” (Dobzhansky 1937, 9).

The synthesis approach accepts that Darwinian natural selection drives evolutionary processes and that genes are the central component of this process. Therefore, generalized Darwinism cannot be thought as an analogy of the synthesis because the very concept of natural selection, that organizes all modern biology and generalized Darwinism, comes directly from Darwin’s original idea ([1859] 1902). It is true, however, that Darwin (1859) did not explicitly articulate the principles of variation, inheritance, and selection. Yet, there can be no doubt that these principles are and continue to be the fundaments, driving the population character of his theory, as explicitly established on several occasions in this paper.

Complementary to the critique of Witt (2004) as well as Levit, Hossfled and Witt (2010), Christian Cordes (2006, 2007) offers some practical reasons as to the generalized Darwinism’s inability to explain the socioeconomic world. His criticism coincides with that of Edith Penrose (1952). Like Penrose, Cordes points out that the sources of biological variation are sexual reproduction, mutation, and specialization. However, Cordes cautions, these same mechanisms cannot also apply to the study of economic phenomena since the actions of men include components of intentionality that is nonexistent among other species in the natural world. If principally in nature, the causes of genetic variations are independent of the causes of natural selection to economic phenomena, then that independence could not be assumed. That is, human action is teleological and deliberate, functionally connected to the selection process, which does not occur in nature, including mutation and natural selection. Therefore, it is inappropriate to think about natural selection in the socio-economic sphere. “The environment of economic system is characterized by many variables changing simultaneously, preventing something like natural selection forces to work in a systematic way” (Cordes 2006, 537).

Addressing Cordes, Hodgson (2007) posits that generalized Darwinism is an object of common misunderstanding in the academic world linked to the association of these concepts to a biological analogy (Hodgson 2007, 269). While Cordes (2006) points to the overt differences existing between the biological and socioeconomic systems, this paper notes (as already demonstrated in the previous section) that these systems are connected on an ontological level (despite all differences on the level of
particularities). The issue of volition, selection mechanisms, and mutation resides in the layer of specific theories, so they not need to be totally related. Therefore, following Hodgson (2002, 2007) as well as Hodgson and Knudsen (2006, 2008, 2010), we believe, first, that generalized Darwinism should not be confused with a biological analogy. Furthermore, we also believe that this ontology could be used to assess the application of biological analogies in economics. We further submit that generalized Darwinism necessarily separates the ontological level from the level of complementary theories, thus defining an explanatory framework that spells out commonalities and opens up room for understanding the specifics of these systems. Thereby, the use of a specific biological analogy could be discussed from the two-tier structure of generalized Darwinism that strips the ontological component of its complementary features. In the case of these complementary features, generalized Darwinism still promotes a separation between the principles of variation, selection, and inheritance, further forming an interesting tool of evaluation.

We think if generalized Darwinism could bring some order into the biological analogy, it would follow a three-step process. In the first step, it would be necessary to analyze the biological analogy in an effort to separate the ontological aspect from the complementary theories. In the second step, it would be necessary to analyze the complementary sphere in order to check if its content can be associated with the principles of variation, inheritance, and selection. In the third step, it would be necessary to ask whether the explanation provided by the analogy is valid for understanding a specific evolutionary dynamic. We believe that this simple decomposition could be capable of testing the evidence for a “Darwinian consistency” of the analogy.

Thus, contrary to what Cordes (2006, 2007), Witt (2004), as well as Levit, Hossfeld, and Witt (2010) claim, we can confidently argue two things: First, generalized Darwinism is not an analogy, due to its ontological perspective and two-layer structure. Second, generalized Darwinism furnishes science with an interesting tool of evaluating and constructing biological analogies, which, though imposing limits, also makes room for innovative interpretations.

By a Way of Conclusion: The Updated Veblenian Call

In his famous paper, “Why Economics Is not an Evolutionary Science?,” Veblen (1898) called attention to the way the philosophical and methodological foundations of neoclassical theory impeded its understanding of socioeconomic phenomena. In Veblen’s view, an evolutionary Darwinian perspective would be the only alternative in moving economic theorizing toward a more consistent approach in relation to its object of study. More than a century after publication of his paper, economics is still founded on the same principles Veblen attacked in the paper, except for a few illuminating changes. Today, efficient markets, just as Veblen described, are still bearers of a mysterious force that stabilizes the interests of “spirits” with parametric rationality, and especially, where time is allowed but also “spiritualized,” i.e., just
taken in accordance to probabilistic calculation. As Veblen diagnosed, the telos of equilibrium is still the great goal of pre-Darwinian economics.

This typological atavism of economic theorizing was the starting point of this paper seeking to re-state Veblen’s critique of neoclassical economics analogous to the way, in which evolutionary biology perceived its pre-Darwinian past. We, too, endeavored to draw a synthetic review of typological thought, concluding with its repercussions for science, and its problematic relation with economics and biology. We thus reached the conclusion that these two scientific fields — biology and economics — are similar in the way that they make sense of natural phenomena, something that remains inaccessible to the typological approach.

With this paper, we sought to understand the possibility of retaking Veblen’s evolutionary proposal in accordance with what Hodgson and Knudsen (2006) called “generalized Darwinism.” The Darwinian metatheory, through its fundamental definitions of “complex population systems” and Darwinian principles, could provide an important tool for understanding the dynamics of life, including economic phenomena. Therefore, we drew a second line of comparison between economic and biological thought, arguing that the two fields, despite their differentiating peculiarities, can be understood through the Darwinian perspective, via the concept of “complex population systems,” since both contain apprehensible population arrangements.

In this regard, we discussed two important criticisms to the ontological Darwinian perspective of economics. The first stressed the importance of Darwin ([1959] 1902) as the founder of this metatheoretical approach, while emphasizing the revolutionary nature of his work. The second showed that, in addition to not being a biological analogy, generalized Darwinism may be used as a tool to measure the applicability as well as the scope and limitations of such analogies to economic theory.

As Richard Dawkins ([1976] 2006, xvi) points out, “many exciting and testable theories are born, and unimaginable facts laid bare” with the use of a Darwinian perspective. Likewise, Veblen exhorted economists to work under the aegis of this code of science, an approach recently reclaimed in the studies of such eminent economists as Hodgson and Knudsen. The idea of generalized Darwinism, although relatively new, has increasingly emerged as a consistent metatheory, likely to bear important fruit in the field of economics. Veblen’s (1898) call for a post-Darwinian economics could not be more current. The necessarily incomplete Darwinian structure beckons heterodox economists, inviting them to collaborate in this useful evolutionary thought. We only need to accept.

Notes

1. The Journal of Economic Behavior, the Journal of Economic Issues, the Journal of Economic Methodology, and the Journal of Evolutionary Economics can be considered the main avenues for channeling this debate.

2. Mayr (1982) added that “[f]or Plato, the variable world of phenomena in an analogous manner was nothing but the reflection of a limited number of fixed and unchanging forms, eide (as Plato also
called them), or essences" (Mayr 1982, 38). It is worth recalling the famous passage from Chapter VII of The Republic, commonly known as the “Myth of the Cave.” In it, Plato (2006), through a dialogue between Socrates and Glaucon, creates an allegory, explaining the relationship between the world of ideas and the sensible. In this passage, Socrates tells Glaucon a story in which the shadows of objects are projected on the walls of a cave, and these shadows are the only images prisoners—chained inside the cave—could see. Through this metaphor, Plato exemplifies the separation between the world of ideas (i.e., objects) and the sensible world (i.e., the shadow of the objects projected onto the wall), where humans (i.e., the prisoners) only have direct contact with this imperfect projection of forms.

3. According to Mayr (1982), Plato’s analogy resulted from his studying geometry, which shaped the logical basis of his essentialism. “Plato had a special interest in geometry which powerfully affected his thinking. His observations that a triangle, no matter what combination of angles it has, is always a triangle, discontinuously different from a quadrangle or any other polygon, became the basis for his essentialism” (Mayr 1982, 87). In this same sense, Dennett ([1995] 1996) points out the preponderance of geometry in Platonic thought as an analogy to understand the phenomena of the sensible world. “[J]ust as no earthly circle, no matter how carefully drawn with a compass, or thrown on a potter’s wheel, could actually be one of the perfect circles of Euclidean geometry, so no actual eagle could perfectly manifest the essence of eaglehood, though every eagle strove to do so” (Dennett [1995] 1996, 36).

4. Mayr (1982) says that the concept of teleology can currently be understood in four different ways: as teleonomic activities, teleomatic processes, adapted systems, and cosmic teleology (1982, 48-50). This last concept carries the general meaning of Aristotle’s final-cause idea. Christianity is largely founded on this idea of final cause. On the other hand, the teleological perspective as cosmic teleology is completely rejected by modern science. As Mayr points out, “[i]n due time this concept of cosmic teleology, particularly when combined with Christian dogma, became the prevailing concept of teleology. It is this teleology which modern science rejects without reservation” (Mayr 1982, 50).

5. Identifying creation as an essentialist concept is clearly found in what was called natural theology. This field of study came about during the Renaissance and lasted until the eighteenth century. Largely priests and clerics carried it out, who envisioned nature as a book analogous to the Bible that—just like its paper version—had to be studied in order to be understood. Moreover, nature was God’s message in material form. Natural theology’s most important figure is considered to be St. Thomas of Aquinas (1225–1274). In his Summa Theologica, Aquinas stipulated that God guides the natural world in an organized manner in accordance with His divine purpose. According to Mayr, “[t]he natural theologian studies the works of the creator for the sake of theology. Nature for him was convincing proof for the existence of a supreme being, for how else could one explain the harmony and purposiveness of the creation?” (1982, 105).

6. Yma S. Abreu (1994) points out that the method of typological order was derived from the way Aristotle classified living beings through his Scala Naturae. “Aristotle had this need for order, and from his conception of the world as perfect and immutable, he establishes a systematic method that intends an order of living things with the purpose of obtaining a better understanding of the ‘rules’ of nature for maintaining eternal perfection” (Abreu 1994, 39). Another extremely important taxonomic classification was the Systema Naturae ([1735] 1759), elaborated by Carl von Linné (1707–1778) who, like Aristotle, believed he was revealing the perfect order of the universe. The preface to the last edition of Systema Naturae promulgates this specific view: “Creationis telluris est gloria Dei ex opere Naturae per Hominem solum.” (“The creation of earth is the glory of God, as seen through works carried out in nature for man alone.”)

7. It is important to point out that Veblen’s works did not differentiate the classical from neo-classical economists. As Forest G. Hill puts it, “Veblen was content to lump together classical and neoclassical theorists in his sweeping attack on orthodox theory. Although this procedure tends to blur individual differences among theorists, particularly some of the neoclassicists, Veblen deemed it sufficient for his purpose” (Hill 1958, 137-138).

8. George Argyrous and Rajiv Sethi (1996) point to “spiritual legitimacy” as the fundamental characteristic that differentiates the evolutionary from teleological approach. “The essential difference between the teleological and evolutionary approaches is not the incapacity of the former
to accommodate dynamic analysis, but rather the attitude taken with respect to the ‘spiritual legitimacy’ of the state towards which all motion tends” (Argyrous and Sethi 1996, 476).

9. This topic is guided by the seminal paper of Hodgson and Knudsen (2002), “Darwinism in Economics: From Analogy to Ontology.” Accordingly, it is important to note that the idea of a broad Darwinian perspective was disseminated by other thinkers in the social sciences well before Hodgson and Knudsen. Even Darwin ([1859] 1902) pointed that the evolution of languages follows the same pattern as the evolution of living beings (388-389). However, the first explicit idea of variation, selection, and inheritance as mechanism for evolution in different spheres is found in Donald T. Campbell’s (1965) paper, “Variation, Selection and Retention in Sociocultural Evolution,” as well as in Dawkins’s (1983) famous essay, “Universal Darwinism.” Hodgson and Knudsen (2010) explain that they use the term “generalized” instead of “universal” Darwinism, because Dawkins (1976) suggests that Darwinism covers everything – that is, it has “universal validity.” In opposition, Hodgson and Knudsen stress that Darwinism covers only the dynamics of “population systems” (2010, 10).

10. It is important to underscore the broad meaning of the term “sensorial mechanisms.” “Sensorial mechanisms” can be defined as the way through which an element of one population is able to capture a stimulus from a specific environment. For example, the sense of smell is a sensorial mechanism since it is through it that an animal (and even a human) can absorb information from the environment in which it finds itself. Likewise, a business prospecting department, among others, can also be a type of sensorial mechanism that informs the company of business possibilities within the competitive environment.

11. This requirement constitutes the main foundation of Darwin’s ([1859] 1902) concept of “survival of the fittest.” “I use the expression survival of the fittest in a broad and metaphorical sense,” he wrote, “including in this concept the idea of interdependence of living beings, and also, what is most important, not only the life of an individual, but its capacity for and success in leaving lineage” (Darwin [1859] 1902, 12).

12. We use the term “beneficial” here only in the sense of different ways of survival of individuals who carry these modifications in the evolutionary process.

13. In this aspect, the idea of a food-crisis risk, given the growth in population, would trigger an evolutionary process guided by the idea of “natural selection.” As Mayr (1991b) speculates, Darwin’s reading of Malthus’ Essay on Population (1798) may have influenced the biologist’s thoughts: “If most individuals of every species are unsuccessful in every generation then there must be a colossal competitive struggle for existence among them. It was this conclusion that made Darwin think at once of various other facts that had been slumbering in his subconscious but for which, up to that moment, he had no use” (Mayr 1991b, 79).

14. Hodgson and Knudsen (2010) distinguish this type of selection that occurs in “complex population systems” from the one they call “subset selection” – that is, the withdrawal of elements from a population that does not generate variations in time; the selection that occurs outside the dynamics of “complex population systems” (Hodgson and Knudsen 2010, 95).

15. In this sense, Dennett (1995, 50) points out that the theoretical power of Darwin’s abstract scheme could be synthesized as an algorithmic process, understood as: “a certain sort of formal process that can be counted on – logically – to yield a certain sort of result whenever it is ‘run’ or instantiated.”

16. Although founded in Lewotin’s (1974, 6) ontological model, this paper’s model is specifically tailored to analyzing the “complex population systems” adaptation.

17. Mario Bunge (2006) defines ontology as the “serious version” of metaphysics. This, is “[t]he branch of philosophy that studies the most universal aspects of reality, such as real existence, change, chance, mind and life” (2006, 267). Hodgson’s (2002) ontology, on the other hand, involves the supposition of an identity relationship between processes (2002, 261). We argue that it is precisely the encompassing nature of the “complex population system” idea that serves as a basis for the possibility of generalizing the theory.

18. Seeking to understand the different views of this evolutionary approach, Richard Nelson (2006) points out that there are two types of Darwinian interpretation defined by different methodological convictions. The first is the “open conception,” which shows the ontological connections between “complex population systems.” The second is the “narrow conception,” which provides possibility of
applying any type of generalized biological analogy to the economic field of study. “Generalized Darwinism,” as this paper reveals it, is representative of the “open conception” type.

19. In this sense, understanding the dynamics of DNA was fundamental for explaining how the variation and inheritance processes occur in modern evolutionary biology. For a more in-depth view of the maturation process of evolutionary thought in biology, see Jablonka and Lamb (2005) as well as Richard Lewontin (2007).

20. The idea that the use of biological analogies by economics could constitute a straitjacket for the theory was pioneered by Penrose (1952). We will address this subject matter later on, when we analyze the “generalized Darwinism” debate.

21. We feel free here to speculate about what would be the elements that explain the Darwinian principles of variation, inheritance, and selection when applied to socioeconomic “complex population systems.” Thus, based on the ideas of original institutionalism and on neo-Schumpeterian developments, we isolate some possible elements that could explain the functioning of these Darwinian principles in certain economic populations.

22. Recall that in the first topic of this paper, we analyzed Aristotle’s “causes,” including the “efficient cause” and the “final cause,” the latter of which constitutes the core of Aristotelian essentialism. In this sense, Veblen (1909) highlighted the complete opposition between the efficient and final causes. “The two methods of inference — from sufficient reason and from efficient cause — are out of touch with one another and there is no transition from one to another; no method of converting the procedure or the results of one into these of another” (Veblen 1909, 624-625).

23. Marcelo A. Ferreira (2003) underscores the predominance of efficient cause studying in biological sciences since then: “Evolutionary biology brought replacement of final causes for immediate efficient causes to the study of living beings, where in this sense, it is a final achievement of this revolution” (Ferreira 2003, 186).

24. For Veblen (1906), the habit of thought in terms of “process” is the greatest institutional innovation caused by the industrial revolution. Mechanical technology fostered in individuals a new way of thinking about material reality. Individuals no longer saw material reality in terms of a personified efficient cause, but rather as a sequence of linked (cumulative) efficient causes. “It constructs the life-history of a process in which the distinction between cause and effect need scarcely be observed in an itemized and specific way, but in which the run of causation unfolds itself in an unbroken sequence of cumulative change” (Veblen 1906, 597).

25. All of these authors support the continuity hypothesis as a concept which — they say — contradicts generalized Darwinism. According to Witt (1995, 2004), the continuity hypothesis applies evolutionary-biology explanations regarding human existence in order to determine innate individual preferences. “An important biological result or, more precisely, ethological research is that the most of elementary components of behaviors, the functioning and reaction of the body, on which man’s deliberate higher behavior builds, have genetic basis. ... All of these factors seem responsible for what in economic terminology is called individual preference” (Witt 1985, 383). Witt (2004) clearly seeks to identify key biological elements that guide human behavior under the continuity hypothesis. “Darwinian theory is directly relevant to understanding the origin of economic evolution in human phylogeny and the fact that it has a lasting influence through innate elements of human behavior” (Witt 2004, 132).

26. Stephen J. Gould (1982) notes the antagonism of the various approaches in the late nineteenth century: “Battles of the late nineteenth century had two primary contenders pitted against each other: 1) Darwinian natural selection, with excellent insistence upon the random variation and selection as raw material creative force, and 2) the host of Otherwise nonsense alternatives, including neo-Lamarckism and Various styles of orthogenesis and vitalism, that proposed a creative role for variation itself and relegated natural selection to an executioner’s task the eliminator of the unfit” (Gould 1982, xviii). On the other hand, Mayr (1991b) points out that, in the early twentieth century, two groups carried out the discussion. The first was the naturalistic group (paleontologists and morphologists), which was not sufficiently familiar with the advances in genetics made by the early Mendelian researchers. Observing the environment, representatives of this group stipulated that changes in nature occurred gradually. Unlike the naturalists, however, the early geneticists saw changes as rapid and large-scale processes, having most often degenerative, rather than regenerative, effects on the emergence of new structures. In doing so, the early geneticists largely ignored the rich literature on geographic variation and speciation. The distances between the two groups were
enormous. As Mayr (1991b, 133) puts it, “[w]hen geneticists and paleontologists, or geneticists and taxonomists had joint meetings in that period, their respective backgrounds were so different that they were seemingly unable to communicate with each other.”

27. According to Gould (1982), the following researchers were the key players of the synthesis: Theodosius Dobzhansky (genetics), Ernst Mayr (systematics), George G. Simpson (paleontology), Bernhard Rensch (morphology) and George L. Stebbins (botany).

References


