

DIRECTED EVOLUTION? PHILOSOPHICAL SYSTEMIC REFLECTIONS

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ABSTRACT

The Evolution is commonly referred to the biological levels of development caused by the dynamism of the Biosphere of the planet earth. The scientist Charles Darwin carried out the discovery of the successive states from lowly developed entities until highly-developed entities, whose maximum exponent is the human being in all its current complexities, in the XIX century. Other scientists as Boulding, Chardin, Capra, Le Moigne, etc. have considered the concept beyond those biological limits to embrace the development of all the existing things. This extension of the evolution concept is to be called Systemic Evolution.

In this work it is sought to show that the systemic evolution has always had a direction the one which, following a natural transformation process, starts with simple lifeless entities and continues up to highly developed living entities with reflexive conscience.

This investigation work has been carried out based on the theory of the biological evolution, the current theories on energy and matter and some system concepts. The obtained results show the potentiality of the Systemic Thought to advantageously searching out on this type of subjects, regarding other approaches. Indeed, some concepts of systems can help to understand the process of the systemic evolution.

THE SYSTEMIC EVOLUTION

Natural laws

There exist fundamental fields in the nature, as the gravitation field, the electromagnetic field, etc. They serve, as a solid framework to give existence to all that is and will be in the whole universe. The conformity and operability of those fields follow exact laws to maintain in perfect harmony all the existent things. These laws belong to the group of Universal Laws of the nature itself.

Some laws, belonging to the group of the Universal Laws, refer to energy (energy keeps from change, it just transforms), to matter (matter is not created, neither destroyed) and to the species evolution (harmonization of species with its environment).

Purpose

The purpose of this work is to present arguments that lead to the hypothesis that the systemic evolution is not given at random, but rather it is directed toward levels of more advanced development following a natural law: the law of the Systemic Evolution.

Assumptions

From observations, reflections and experiments carried out by scientists, philosophers and scholars , the following assumptions have been postulated:

- a) All that exists in the universe is in permanent dynamism, that is, all entities are in continuous change.
- b) The existent things are subject, by virtue of that dynamism, to a process of systemic evolution.
- c) All changes that happen in the universe are related with energy changes.

It is necessary to consider for the aim pursued in this work, that the concepts of change and evolution are linked to the concepts of state and stage. Change is to pass from a state to another state within the same evolutionary stage and, evolution is to pass from an evolutionary stage to the next one, exhibiting new emergent attributes. The process of change can be reversible or irreversible, while the evolutionary process is always irreversible.

In accordance with the previously enunciated assumptions, all entities of the universe are in continuous dynamism and have possibilities of experiencing changes in the parameters that define their state. Also, based on the same assumptions, it is affirmed dynamism is caused by the energy presence in the whole universe, thus changes are the result of entering or leaving energy into a certain entity. This energy movement gives place to another different entity .

Law of the evolution

One of the greatest discoveries made by Karl Ludwing von Bertalanffy was concerned with biological organisms as open systems. Open systems are those that exchange matter and energy with the environment to their survival and development.

Further investigations showed that nonliving entities are open systems as well, and consequently they interact with their own environment. Thus, it might be said that most of the entities found in nature are subjected to continuos changing processes. It is the fact that leads to initiate a systems evolution theory.

Firstly recognized by Darwin, the evolution of the biological species expresses that some species of a given stage can experience, under specific circumstances, certain transformation in passing from one level to the next in the evolutionary process . In the new stage, the species acquire different and more advanced attributes, regarding those that it possessed before the transformation took place.

The evolution is a process of change in which several stages or levels are distinguished. In each one of the stages distinctive characteristic properties and own laws govern the behavior of all the species that compose it. A fundamental property of the evolutionary process is the irreversible change, or the impossibility of the inverse transformation, i. e. the impossibility for the evolved species to return to the previous stage.

In order to have a better understanding of the process of the evolution, let it consider any stage, for example the stage corresponding to animals where all the individuals included in it possess own attributes such as locomotion, reproduction and certain degree of knowledge of the environment. They experience changes in a thousand ways but only within their own stage and all this within a framework of specific natural laws concerning that stage. None of these transformations is deep enough to allow the animal species to

go into the man stage. When the enough and necessary changes are given, the species passes into the man stage, where new attributes emerge for the members of that stage in addition to those that they had in the previous stage. Also, new laws emerge to regulating the behavior, development, reproduction, etc of the members of such a group. In other words, in the new stage a new natural order of the evolutionary process emerges.

From the observations made by Darwin and other scientists as Boulding and Chardin and, in accordance with the universal dynamism settled down previously, it could be inferred that all existing entities tend to evolve. As an extension, it is possible to deduce that all things which formed part of the terrestrial globe in its very origin also evolved, and in the same way, new evolutionary stages could be expected, following the current man stage, even though their own nature cannot be imagined . This whole evolutionary process might be called Systemic Evolution to differentiate it from biological evolution.

All these reflections lead to the idea that such a process indeed began at the genesis of the universe, and continues up to the present days by following a non well defined law: the systemic evolution law. In this process three well-differentiated main stages can be observed: stage of the non-living entities, stage of the living entities and, the stage of the conscient living entities.

Directed evolution

The evolution process perceived by scientists and philosophers such as Chardin, Boulding and Prigogine , and also by meticulous and meticulous observers, points out that everything began with things or inanimate structures (entities without life) and it continued until the appearance of the living structures (entities with life). This process is easily observed in the terrestrial environment but maybe it could have validity to universal scale. It would seem that everything was transforming (adapting) toward an environment where human life were possible.

The man possesses, besides the characteristic attributes belonging to all living beings, others that place him in a more developed level of the evolutions scale, such as to look for, love, decide, design himself, perceive, recognize, apprehend and meditate upon all beings and phenomena that surround him. In this way, he has carried out changes or adaptations to his environment and to himself, he has reached meaningful discoveries and he has made many actions against nature, as well. Also, these attributes or qualities enable him to meditate about some queries concerning his own nature, including his role in the natural processes. One thing that man has learnt from his years of experience is that only reaching higher levels of knowledge, he will be able to answer much of such questions which have been disturbing human generations of all times.

Based on the above reflections, it can be affirmed that the evolutionary process is a natural directed one, from non-living entities to conscient entities and it is regulated in accordance with the systemic evolution law. Observe, that in no way, it is saying the evolutionary process has reached its end, but it has arrived at a point where all kind of conditions has converged so that the conscious life took place.

Consider a hypothetical case to back the affirmation aforementioned, in the sense that evolution is a natural directed process, which initiated in the beginning of the universe with very simple entities without life up to reach very complex conscient-living entities.

Let us suppose an objective observer whom has enough intellectual capacity, i.e., a human being endowed with a high reflective conscience and enough knowledge about the evolution law, as well. If such an observer could contemplate the whole evolutionary process up to our days, he surely would claim that the evolutionary process has a clear aim: the apparition of highly developed entities, or in other words, the evolution has a purposeful direction. Likewise the objective observer could assume that the evolutionary process has not concluded.

The upper limit of the evolutionary process has a real meaning, since in this level it has achieved a great understanding of many of the entities that exist in the terrestrial physical reality, including the quantum reality and of some of the entities that populate the macrocosms. Likewise, in this stage some interventions have been achieved in many natural processes, besides that has been possible to develop entities man made exclusively or entities in combination with the nature.

The hypothetical case aids to sustain the thesis settled down in a principle that the evolutionary process is a directed process but, by no means, this process has arrived at its end.

THE EVOLUTION AND THE SYSTEMS

The term of Systemic Evolution is employed to extrapolate the concept of biological evolution to all objective physical entities that are in nature and, also, to relate such an evolution with systems since there are some important similarities among them. Indeed, by comparing entity and system, it is observed both of them are structured with parts, be already elementary parts or not, interrelated to each other, and that both are subject to transformation processes that run always, from the simple to the complex. Under the previous considerations, it is perceived the feasibility of using the Systems Thinking to assist in the explanation of some specific questions of the process of the systemic evolution.

The evolutionary systemic process (systemic evolution) refers to concrete physical entities only. Another class of entities, such as the abstract ones (languages, thoughts, cultures, etc.) and the artificial entities (created by the man only or together with the nature), are entities that reflect the development of the humanity's conscience, and consequently, their evolution depends on that development . In contrast the domain of the systems extends to all the concrete and abstract entities that satisfy the system definition.

To better understanding the existing relationship between evolution and systems, it is necessary to mention some ideas concerning both concepts, since it is here where the biggest coincidence between both scientific approaches is found:

Entity

In accordance with the dictionary, entity is everything that has real existence. Thus, there exist concrete and abstract entities, non-living and living entities, elementary and compound entities. By combining elementary entities or elementary and compound entities other more complex compound entities are formed. The evolutionary process is related with the concrete, compound, living and non-living entities.

The entity is constituted by a group of properly structured and harmonized elements and/or sub-entities, which give to it a certain reason of being within its environment or inside a bigger entity that contains it. Take the case of a fish, as a biological entity, constituted by a number of organs, bones, flakes, etc. which are smaller entities structured in a harmonic whole to give existence and functionality to the fish. In the same way, each one of these sub-entities is also made up of smaller entities (for example an organ is made up of cells).

Each entity possesses its own attributes that, among other things, determine its functionality and make possible the union and disunion with other entities to form entities of bigger or of smaller size, and in both cases with different functions and attributes. The entity exists in an environment with that is related in different forms to be able to subsist, develop and transform.

System

A system, in its most elementary form, can be considered as an arrangement of parts (elements, members, devices, organs, etc.) keeping relationships of some type between each other. Such relationships grant the system with attributes (or properties) , and ability to carry out one or several functions. In agreement with this definition, there are natural and artificial systems, concrete and abstract systems, and living and not living systems.

The parts or elements of the system, in an immense majority, are subsystems (a subsystem is also a system), whose attributes are combined to generate the attributes, emergent attributes, for the system of which they are part. An organ of an animal is a subsystem of the system identified as that animal. It can be said that the complexity of a system is related to the number of subsystems, the nature of the relationships and/or interactions between them, the number and values of their own emerged attributes.

The fact of adding or diminishing one or several elements (or subsystems) to or from a system transforms it into a new totally different system, and therefore, it has different properties (attributes) in comparison against the previous system, which are usually called emergent properties of the new system. This process of addition/diminution - transformation - emergency is undertaken in concrete systems, as follows: some part of the nearest environment is integrated to the system or some part of the system goes to the environment, changing it into another system with own emerged properties. And this process is recursive.

According to Von Bertalanffy's concept on open systems , the concrete system exists in an environment from which takes all the necessary resources for its development. And to carry out its own corresponding functions, regarding the complexity of its structure and of its reason of being, in connection with such an environment. Then, such a system has the capacity to interact with its environment to carry out its functions and the transformations that might take place. The interaction system - environment brings, as consequence, the possible modification of both.

Take the same fish, mentioned previously as example of biological physical entity. In this time, the fish is seen as a system (without conscience) composed by a number of parts, as organs, bones. flakes, etc., related all them to each other. The environment is the water from which the fish takes his nutrients and it allows his displacements, reproduction, etc. On the other hand, the fish modifies his environment by contaminating it with his own waste (in a fishbowl it is clearly observed this phenomenon of contamination). When the

water reaches a certain level of pollution, the fish has to adapt to the new water conditions that houses him, emigrate to other areas whenever possible or ultimately perish.

The environment of a concrete system (reference system) is another bigger system that contains among its constituents to such a reference system, consequently, there are relationships and interactions, based on matter, energy and information between both system and environment (due to definition of system). This way, if the system is always defined inside a given environment, that system can only grow to expense of such an environment. That assertion allows affirming that in the process of growth of a concrete system the environment diminishes in the same proportion that the system increases. The contrary case is also true, i.e. if the reference system is transformed into a new smaller system, its environment increases because it has received elements from the reference system.

On the other hand, it is necessary to meditate on the fact that the environment, as a big system that includes a number of subsystems, begins its domain at the vicinity of the reference system and it extends indefinitely. Therefore, it is convenient to divide the environment into two: the nearest environment, next to the reference system, to which it strongly interacts and the far environment that generally has very little interaction with that same referred system. Under the acceptance of the infinity of the environment, it is inferred that in the limit, a unique system formed by the whole universe only exists and that consequently any other concrete system, either natural or artificial, is only a subsystem of the great universal system.

Between both conceptual ends: a universal system in constant transformation or a multitude of subsystems in constant interaction, the process of the systemic evolution tends to impulse certain emergent attributes. For the time being, these emergent attributes are concerned with the reflexive conscience found in the human stage.

The previous descriptions clearly point out the existent parallelism between entity and system, in such a way that taking advantage of such a fact, some phenomena of one can be explained when understanding similar phenomena that happen in the other one. In this way, under the Systemic Thinking it can be established the following postulates concerning the field of the systemic evolution:

- The changes in the entities are carried out for aggregation or disintegration of elements or for other entities that are either in the nearest surrounding environment or in the far environment.
- The systemic evolution is a continuous unconcluded process that begins in the birth of the universe and has to end in a point of maximum convergence of the emergent attributes and reflexive conscience .

PROVISIONAL CONCLUSIONS

1. - The evolution is a natural process that cannot arise without having a structure that grants harmony and sense to the universe as a dynamic entity.
2. - In accordance with the process of the universal systemic evolution, in which it settles down that everything is in continuous dynamism. It is not surprising that this dynamism determines that the systemic evolution is an intrinsic characteristic of the universe, which

could be perceived as an ordered and conscious process due to its multiple manifestations.

Within such a process, two changes are equally important: one inside the same stage and another that involves two stages. In the former, the changes are reversible ones, while in the second changes, the characteristics that emerge in the new stage are different from those of the previous stage and, beings, entities and systems that emerge in the new stage, are irreversible ones.

3. - The evolution is directed toward a point of maximum convergence of emerged human attributes. This has been established by the observations and experiments, which have been carried out through the years, in which some humanistic scientists have been able to meditate about the systemic evolution.

4. - The process of the systemic evolution, once the man is conscious of it, is impelled by himself with the desire of causing the emergency of his typically human attributes (for example, to know more about his own human nature and his roll in the universe). One can expect then the evolution that is present in the future will be guided by the man's desire to satisfy its curiosity of having a deeper knowledge of himself and of all that surrounds him. The limit of that knowledge might be the knowledge of the man's roll inside the great unique universal system that contains all of the natural and artificial systems (perceived and designed by man).

5. - On the other hand when considering the existent similarity between entity and system, it is observed that to explaining some concepts of one, it can be based on concepts of the other and viceversa. Thus the systemic evolution is understood, in many of its aspects, considering the system concept and of its interactions with the environment.

6. - If it departs from the idea that all of the existent systems, be natural or artificial, are inside a framework settled down by the nature. Then the best way of classifying systems in the field of the General Systems Theory, it should be formulated under such a natural framework: non-living, living and conscious living systems.

In fact, within the systemic evolution like a natural process, three perfectly defined stages are contemplated, mainly: the pre - life, the life and the conscious life. These three stages can extend toward the systems to observe three clearly distinguishable divisions (categories) of systems: non-living (that correspond to pre-life - physical), living (that correspond to life - biological) and conscious living (that correspond to conscious life – reflexive conscience) .

7. - The previous conclusions can serve as foundation to elaborate a formal theory of the systems, as well as to base pertinent methodologies to each stage of the systemic evolutionary process.

For example the methodologies to designing or improving human activity systems should have, as main objective, to cause the emergency of attributes which might diminish the entropy of relevant subsystems. As well as to cause the emergency of typical human attributes such as solidarity, complementarity of weltanschauungen (worldviews), wisdom, pertinence, freedom for designing the own essence, etc.

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