

## The Neo-Darwinian ideology

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### Abstract

When it comes to evolutionism, the common belief holds that Neo-Darwinism is still the best evolutionist explanation, because it contains the Darwinist explanation, improved through adjustments and additions provided by the current scientific research, which wouldn't be but thorough, objective, and completely non-ideological. In fact, throughout its existence, Neo-Darwinism has failed in maintaining a clear line of thinking, oriented by pure facts. At some point, it became obvious that, by following its original paradigm, the problem of evolution could not be resolved; thus, during the second half of the 20<sup>th</sup> century, a few attempts were made in order to improve Neo-Darwinism, without the expected results. The failure can be explained through one of the current's drawbacks: the inflexible and arrogant rejection of the Lamarckian position on the matter of evolution. Recent research, as well as logical deductions issued from the observation of what Nature produces urge the revision of paradigms and the repeal of any dogma. The gain would be that of the science and of the human knowledge.

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*"The problem with intellectual revolutions is that they often harden into suffocating dogma—and at their apogee tend to be guarded by the holders almost as a sacred mantra. For a while the dogma is useful, but then an 'establishment' inevitably forms, the individuals of which find it almost impossible to break ranks, because if they do their careers and financial livelihood are put in great risks."*  
(E.J. Steele, R.A. Lindley, R.V. Blanden)

**Preliminaries.** The current belief in the evolutionism is that the Neo-Darwinian is the best evolutionary explanation<sup>1</sup>, as it contains the Darwinian one, improved by adjustments and additions supplied by the ongoing scientific research. At the same time, it is believed that its position is rightly dominant, its authority deriving from the scientificity, objectivity and avoidance of any ideological tentacles or unscientific stakes.

Occurring one anthropological generation after the *Origins of Species*, the Neo-Darwinism is named as such by Darwin's sole student—Georges Romanes, who preserved his master's line constructing a Lamarckian-Darwinian system. He lucidly noticed that the Neo-Darwinism might be imagined as the effect of a dynamic process of continuously accommodating the Darwinism to the new discoveries, but its conception and realization make it seriously deform the essence of Darwinism, whom, in fact, it denies, abolishes

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<sup>1</sup>"It is customary to talk about the «theory of evolution» challenging the deceptive suggestion that this "theory" would be but one of the countless «hypotheses» used by the scientific method as tools of research and which it removes when, well-worn they may be replaced by better ones. (...) The notion of evolution is neither hypothesis nor theory, it is a matter of fact, it is one of the most secure and fundamental requirements of science and constitutes, alongside the principle of energy preservation,

and replaces.

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Upon occurrence, Darwinism firmly eructates, its conceptual photons crossing the Occidental thinking, somehow prepared to understand the new perspective and explanation of the evolution of the living<sup>2</sup>. Nevertheless, we may ask ourselves: Why, in the cases of the Neo-Lamarckism and of the Neo-Darwinism, does the value of the prefixoid differ, which should only indicate a natural *aggiornamento*? Why in the first case are we dealing with a process through which the young man becomes an adult, and in the other one we come across a parricide that takes the place of the parent, changing the canons and the entire social mentality, preserving only the appearances granted by the noble garments? Then what was to be done so that even during Darwin's lifetime his contemporaries might bring major and profound changes to some ideas that both scholars and non-specialized but trained public understood, accepted, and had learned to extend to the field of biology, to the social one and even to that of the Universe?<sup>3</sup> On the other hand, what could make the Father of the natural selection explanation to accept and, sporadically, participate in the complex process of the mutilating and modifying rewriting of his own explanation?

**Lamarckian Transformism.** Half a century before the *Origin of Species*, while Darwin was barely born, in 1809, the father of Modern Evolution, Lamarck, just published *Philosophie zoologique*, a work that encompasses observation, experiment and description, avoids anthropocentric speculation and integrates biology into the philosophy of science. Thus, biology is born as a science capable of becoming a system generating trustworthy research.

In Lamarck's time it was already understood that the living entities are derived from random combinations, they know accidental variations—having their sources in the environment, in organisms and in their interaction—and can have survival and reproductive capacities in relation to their adaptability and with the ability to take advantage of the favourable variations<sup>4</sup>. It was also understood that a combination might be compatible with the state and dynamics of an environment, but may suffer to death in another, and a drastic change of environment may turn a compatible combination into a less-favoured combination, and vice versa<sup>5</sup>.

The idea Lamarck starts with is that having matter, space, and time, Nature, the great laboratory

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the most valuable treasure of the hardly scraped dowry of today's humanity" (E. Racoviță, *Evoluția și problemele ei*, 1929; our translation, F.G. & A.C., here and henceforth).

<sup>2</sup>Initially, the *Origin of Species* appears in 1 250 copies sold in the day of its release, and a new edition of 3 000 copies is released in less than over a month which sells rapidly. The situation does not change more in the following years. Darwin's other books were welcomed.

"Scarcely at the beginning of the past century had the true incrustation of evolution in human thinking begun, as the first scientific «theory» applied by Lamarck to the origin of beings, conception used by some of his contemporary and fellows. On such prepared ground, we can see that Darwin's book, the *Origin of Species*, appeared in November 1859, causes a true «revolution» in the naturalists' spirits" (Racoviță, *quoted work*).

<sup>3</sup>"Stars are suns and it has been found that these celestial bodies are all in various stages of evolution which leads them with infinite fatality from birth, through young, then adult, to old age and to death. But evolution does not lead only the components of the heavenly world on the endless path of transformation (...). Nebulæ of all ages have been discovered, although these infinite worlds are led relentlessly on the uninterrupted journey that leads from birth to death to other births and other deaths (...). The tiny planet, the humble servant of the sun, we snap on, the «kings of creation,» is also subjected to an evolution whose pace may be sometimes slow, sometimes more hurried, but whose work without rest has left indelible traces whichever the distance in the past the geologists' researches manage to get to" (Racoviță, *quoted work*).

<sup>4</sup>Of course, *adaptable, adapted, effective, favourable*, and other such attributes are not associated and understand in absolute terms, but only in relation to the environment, heredity and functionality.

"Adaptation is the tendency of the living creatures, never fully accomplished (sic; and sub.), to reach the perfect compensatory balance between the action of the external environment and the consecutive reaction of their organism, a tendency combined with that of completely circumventing from the influence of the external environment, by isolating the internal environment and creating an artificial environment" (Racoviță, *quoted work*).

<sup>5</sup>"The current world of creatures is the result of continuous evolution. This evolution is due directly to the influence of the living conditions. These living conditions vary continuously over time, they are diverse in space as well, though never and nowhere identical. To the action of these variations correspond as reaction the variations of the creatures, variations that

acted in such a way that, by virtue of the properties of the matter and of some fundamental principles, atoms have interacted and aggregated, the results gaining self-organizing and then self-catalytic capacities. Thus, the atom then the molecule and the cell appeared. The face of this model is manifested at the level of the living, which appears from an undifferentiated protoplasmic mass which, due to sensitivity and responsiveness—and by virtue of internal tendencies—may respond proportionally, efficiently and adaptively to the requirements of the environment it exercises its existence in, as well as to its own needs. This property allows the priming of the existential and development processes whose exercise generates adaptive complexity and evolutionary potential<sup>6</sup>.

Lamarck shows that each such outcome—consistent and efficient in relation to the environmental requirements and with the internal needs and trends—brings about changes likely to somehow determine functional structures, which may determine the aspect of the new outcomes—more and more elaborate while the entire exercise deploys. The coevolutionary spiral generated as such brings along the attribute of the internal dynamics and generates successive forms of structural-functional and adaptive-evolutionary complexity. Consequently, the French scientist concludes that Nature's products are consequences of successive and gradual historical processes, subject to adaptive transformation and becoming, in accordance with the ruling actions of the environment and of the organisms.

He further notes that although the laws governing the entire process complex are of universal character and uniform action, the effects of the action of the environmental factors are differentiated – in the concrete existential and environment manifestation frames. This generates different forms, whose capacity to become—again—expresses itself in differentiated faces and ways. The fact that the concrete existential environments exert their particular actions on the individual and collective bodies—capable of becoming and impressed by those environments—develops the possibility of the structural and functional differentiations occurrence. As a result, the exercise oriented by the concrete environment has among its effects, the consolidation of the functional structures used, the decline of the passive or unused ones, the adaptive modification of the existing ones – all by virtue of efficientizing structures and processes<sup>7</sup>.

Under unchanged conditions, those traits consolidate as a result of the environmental pressures in the same direction and of their increasingly specialized satisfaction. If the results are beneficial and common

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are fixed by heredity and spread among members of the same kin through panmixia, that is, crossing. (...) The result of the transformation is either the direct adaptation to the environment or the opposition to the influence of the environment by improving the internal environment and the artificial environment. The need for continuous adaptation draws on an ever-closer specialization, which can cause the extinction of the spokes, as evolution is irreversible. The transformation of the spokes is made orthogenetically under the influence of impulses directed in the same sense or, otherwise, by natural selection. (...) The act of using and not using the organs plays a major role in the transformation of the species but it does not create new organs, but it adapts old organs to new functions" (Racoviță, *quoted work*).

<sup>6</sup>Subsequently, science confirmed Lamarck's observations and extended them to the processes that rule the appearance and functioning of the Universe.

<sup>7</sup>"One of the greatest discoveries of Lamarck, the founder of evolutionary biology, is the elevation of the public finding that exercise increases the power of organs to the rank of general biological law. (...) The organs used, to the extent and size of their use, are strengthening, developing, changing and adapting their function more and more (orthogenetically as well, we believe); the unused organs are reduced, stunted, vary (fluctuating and in very different directions, we believe) and finally disappear more or less completely, for they often take the form of inform corpses, the so-called «rudimentary organs» (...). This Lamarckian law is called the law of use and non-use, and the actual facts it started from are not and nor can they be challenged by anyone. But Lamarck gave this law a meaning and an extension that is vividly fought by the Neo-Darwinists. He claimed that these progressive changes are inherited and that, therefore, the use and non-use are the source of variations that cause the transformation of the species. The examples given by the great naturalist to prove his conception were poorly chosen, that it was not difficult for the Neo-Darwinists to demonstrate their lack of convincing power; from here, however, the above-mentioned opponents wrongly concluded that the very law is a mistake. The modern Neo-Lamarckian school has proven the lawfulness of the law through the very well- distinct history of some spokes, such as that of our beautiful slave, the horse, a wonderful story that I told you in part, but sufficient, I reckon in order remind you that the evolution of the multidigitate foot in a unidigitated foot is a decisive example of the result of the ever more exclusive use of the middle finger (3<sup>rd</sup>) until it was the only one used and for this reason, the only one enormously big and strengthened, as well as the result of not using the other fingers, now stunted or disappeared.

However, the Neo-Darwinists deny everything; for them, the history of the horse foot is also the effect of natural selection

to both sexes, then they have their chances to be passed on to the offspring, who will be more appropriately equipped, in relation to the real demands of the concrete living conditions to the members of the species.

Lamarck shows that this generates changes in the way of action and new skills appear, emerging new equilibria; after which he points out that the single action of the environmental requirements is not sufficient, the response of the organism being vital: after the organism's own reaction, by which it self-adapts to the internal needs, there follows an appropriate and effective response by which it accommodates to the external requirements. The response is adaptive and constitutes the expression of the internal tendency to adaptation, being part of the process of rendering more complex the structures and functions<sup>8</sup>—under certain conditions the results being stored and passed to the offspring.

Thus, Lamarck shows that: a) life itself is a result of the living adapting to the conditions of reality (new, changing, fluctuating, etc.) and a form of making more complex; b) the adaptive processes and changes—determined by the capacities of the organism developed in relation to the environment and the environmental requirements—may be acquired, modified and accumulated both ontogenetically and phylogenetically.

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Generally, Lamarck's contemporaries understood his explanation and accepted his conception. There was a lot to clarify, but this is the natural and evolutionary way science evolves. Even so, some of his contemporaries were less receptive to the French scientist's conception. Perhaps small variables contributed to this. Some of what Lamarck showed and sustained were common ideas and consumed by the social mind – they had contributed latently or obviously to. But that time's society had no interest in this direction. Then the form in which Lamarck presented his ideas had enough defects of construction, organization and discourse. This made the elements the audience was familiar with to generate the impression of redundancy, while the elements of novelty – some not being sufficiently distinct, others having a level of complexity difficult to assimilate – did not have enough ideational transitivity. To these current difficulties there were added the rebellious and even the acerebral opposition of Lamarck's fierce enemy, who was Cuvier. He easily managed to scatter his often-erroneous theories (different from Lamarck's) and acted relentlessly to discredit Lamarck and his entire intellectual being.

**Darwinian Evolutionism.** Emerged by default and by polygenesis, the evolutionist explanation appeared, structured, developed, adapted, and transformed itself gradually, as a result of the confrontations with the elements of its own subject and with those of the social and mental universe it penetrated. The directed exercise strengthened it, some of its parts were successively retained and transmitted—with or without changes—always adding new, temporary or lasting acquisitions.

When Darwin appeared, the cellular theory, the research on the homologous and analogous organs, as well as on organogenesis—which demonstrate the unity of structure of plants and animals, the correlation between function and structure, the kin between creatures and between various groups of organisms—had reached scientific substantiation. Along these and other acquisitions in the field of biology, geology, physics, chemistry, and the sciences of thought and social science, the remarkably meticulous and thoughtful observations and experiments practiced by Darwin with pedantic and devoted attention will lead him to the elaboration of an evolutionist explanation which will have the natural selection in its center – conceived as factor and mechanism.

In essence, any evolutionary explanation must clarify the process of the becoming of the living and the process of its perpetuation. Understanding that reality that encompasses everything – that is, the

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on a heterogeneous variation, that is in all directions; they believe that from a sludge of variations born out of chance, but all hereditary, only those that led to the reduction of the many-toe foot to the unidigitated foot have remained. Those innumerable variations required by this theory exist only in the Neo-Darwinist imagination, for they are not found in the palæontological museums" (Racoviță, *quoted work*).

<sup>8</sup>Even the intra- and inter-species interactions are subtle forms of adaptation, which contribute to maintaining the natural balance, any disorder and mess being only apparent and eventually competing with general order. Within certain limits,

environment – is not static and immutable, and that the environmental factors are various, dynamic and interactional, Darwin considers variability as a rule and a property of the environment and of its products<sup>9</sup>. The environment variability stems from that of the environmental factors and affects organisms (directly or indirectly). The variability of organisms stems from their relationship with the environment and with themselves and affects the organisms and, possibly, the environment. In relation to itself, variability arises as a consequence of: a) the use or non-use of organs (with transmissible results to the offspring); b) state of organ development (which may be structurally and/or functionally correlated) in relation to the organism and of to the organism with the environment; and c) cross-breeding. When it has its sources in the organism, variability may occur regardless of the environment<sup>10</sup>. It emerges that as the environment (intrinsically: pressure, temperature, humidity etc.,; extrinsically: from mineral to organic, the relationships between them and their results)<sup>11</sup> is variable, both the environment and the organisms are subjected to the changes that affect their structural, functional and behavior features, any imbalance could induce imbalances at all levels<sup>12</sup>.

The second rule that Darwin holds is heredity: parents transmit to their offspring both the traits they possess as representatives of the species (innate) as well as the traits acquired as a result of the effects of the interacting relationship with the environment (acquired). As a result of the intersection with action and the effects of variability, heredity has deviations, its mechanisms are not simple<sup>13</sup>.

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imbalances exercise the state of balance, overcoming limits, prompting at seeking a new state of balance.

<sup>9</sup>“Variation is the law of the universe without exceptions; there are no accomplishments that are the same in all. Perfect identity is only mentioned in the imaginary world of mathematicians, and its fundamental formula  $a = a$  is an absolute inexactness” (Racoviță, *quoted work*).

<sup>10</sup>In this respect, Darwin states as clearly and explicitly as possible that everything has a causal precedent, nothing is accidental, everything is due (indirectly) to the ways in which the matter and the laws governing it exist and operate. Therefore, since the level of human knowledge is terribly low, we call *by chance* all that is still unknown or inexplicable.

<sup>11</sup>E. Racoviță identifies natural factors (physical, chemical, geological, meteorological, nutritive), biological (the effects of the existence of the other living creatures and secondary elements in the environment) and interactional (the effects of interactions between the elements of the vital environment).

Since “creatures are permeable to the influence of the external environment,” towards this, organisms have developed through an adaptive-evolutionary reaction an internal environment, “which all beings have gathered with great toil and terrible suffering through the millennia, under the impulse of external environment factors and as a reaction more or less successful against the influence of the primary and biological factors”, thus aiming to free themselves from the influence of the external environment and gaining “an increasingly complete freedom of action and an increasing power to conquer new places for its kins”. Finally, more evolved creatures have developed an artificial environment as well. The latter produce variations that arise both from their intrinsic functioning and from their existence and functioning in the external environment. First and foremost, the dominant environment is the external environment. Unlike the Neo-Darwinists who “have come to completely deny the possibility that the influence of the external environment produce important variations and transmissible to posterity; and the fact that they did not understand the purpose full of decisive consequences of the existence of an internal environment led them to the temptation to put these variations unrelated directly to the external environment, on the account of the “Hazard” god and of the saint “Happening,” idolatry which was thought to have long been erased from the naturalists’ bad habits. E. Racoviță argues that: “We have to say, however: all variations originate in the variations of the external environment, either directly by the action of the primary (physical) and secondary (biological) factors, either indirectly by the action of the internal and artificial media factors, these two secondary environments being themselves the mere product of the influence of the external environment” (Racoviță, *quoted work*).

<sup>12</sup>“Thus, the evolution of the living creatures is manifested by a variable rigout adaptation to their living environment; this adaptation is possible only because all creatures are variable and because the adaptation-favorable variations are passed on as inheritance to the descendants. From the finding of the dependence of the being on the environment they exist in, it emerges that the explanation of the impulse to the variation, that the origin of the transformations must be sought in the attributes of this environment (...). Adaptation is never perfect, no matter how narrow it is. (...) In all spokes one can see «adaptive disharmonies» that is, compositions, bad habits and instincts that have no purpose or no use, or show less, more or even very harmful. If, however, the spoke lives or even flourishes, it because the sum of the harmonic adaptations exceeds that of the adaptive disharmonies in a certain amount; when the proportion is reversed, the spoke is longing and gets extinguished” (Racoviță, *quoted work*).

<sup>13</sup>Naturally, individuals better equipped in relation to the specific environment they live in—that is, adapted or easily and efficiently adaptable to its conditions—have a greater chance of surviving and reproducing passing on their hereditary material. In this way the offspring have the chances of getting the genes that have ensured the adaptation and survival of their parents.

Observing that although it is subject to certain principles and follows certain physical, chemical and biological laws, the action of the first two factors cannot ensure the evolutionary results occurring in reality, then, given that the natural breeding of the animals (in geometric progression) would lead to overpopulation—the solution nature found is the struggle for existence<sup>14</sup> (intra- and interspecific)—, Darwin considered that the action of variability and of heredity is ordered by a selective factor by means of a precise mechanism. Thus, he understood that: a) natural selection does not create variations but retains the useful ones and eliminates the harmful ones—thus improving organisms and populations—; and b) natural selection acts upon traits, parts, individuals, and in this mediated way, could affect the group, the population, the species or even larger units.

Due to the fact that, under changed, fluctuating and demanding in some directions environmental conditions, inequalities between individuals and populations may become advantageous or disadvantageous, it is obvious that natural selection actually acts as a sort of sieve that sieves out organisms: those that efficiently respond to the environment requirements and the persisting internal needs (including through the offspring to which they transmitted their innate and acquired traits), the others die (directly from reproductive incapacity or leaving offspring without any chance of survival and / or reproduction). If the demands of the environment remain the same, acting constantly in the same direction, in the same way and with the same intensity, the acquired traits can be transmitted, a fact that may also be recorded when they are effective solutions to major crisis situations.

Although it appears to be a disruptive factor, variability challenges the environment and the living to exercise, being a requirement that generates adaptive opportunities. In its turn, heredity is the stability factor that ensures the transmission of the species traits and the endowment with the right solutions for survival. Eventually, selection is the ordering factor and mechanism, which ensures the survival and the reproduction of the living, under the conditions of environmental adequacy. Each of the three factors is the result of the existence and the manifestation of the environment (physical, chemical, biological, social, technological, mental, etc.), contains the traits of others—variability is perpetuated and subject to selection, heredity holds variability and is subject to selection, selection knows variability and stability—and operates under the environment conditions, possessing variability, constancy and selectivity, being both oriented (under unchanging environmental conditions) and adaptive (under the conditions of a demanding environment through the number, direction, speed etc. of the changes).

All this shows that the environment is not only a framework, but also a factor whose physical, chemical and biological existence generates factors and mechanisms of operation—in the environment and of the products of the environment. Initially a product of an environment, the biological organism adapts itself to its state and dynamics conditions, thus enhancing the potential for variability, heredity and selectivity. This fact may affect equilibria, the adaptive movements (of the elements of the physical, chemical, biological environment, etc.) being only forms of manifestation of the rebalancing tendencies determined by the fundamental properties of the matter and by the effects of the functioning of the structures generated by it. Furthermore, as variability causes and generates the change of the conditions, the processes of adaptation must be in relation to the new state and to the new dynamics, therefore survival requires a new balance *echilibru*<sup>15</sup>. It is understood that although the environment encompasses all, just like an organism is not omnipotent and immune to the interactions of its own factors, the simple functional activity of the organisms (part of the environment in its entirety) being able to contribute to the variability of the

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But their perpetuation has not been ensured for a long time, because the action of variability can modify various environmental or biological parameters so that the equilibria of the matches may unfavourably change for that spoke.

<sup>14</sup>“It was a mistake to have used the word «battle» for this biological phenomenon; only the expression «vital competition» which better reflects its true meaning (...) should be used (...). its main result is the establishment of biological balance” (Racoviță, *quoted work*).

<sup>15</sup>Although it is clear that the environment shapes organisms through the mechanism of natural selection, in their turn, organisms that persist and multiply can influence the environmental conditions—firstly through their mere existence.

“The transformations due to use are directed in the sense of the impulse that produces this use, that is, in a unique sense (...). Here is a creature living in its native vital environment, supposedly normal, but generalized, that is, an environment that

environment. Such changes may require again the adaptation mechanisms of the environment and of creatures in order to reach balance—at the level of the whole environment—that shall configure a balanced environment to enable the survival and multiplication of organisms in the new environmental paradigm. Its journey is spiraling and cumulative, nothing ever coming back to revoluted stages<sup>16</sup>.

The Darwinian explanation resembles almost to identity that of Lamarck's, as Ch. Lyell himself noticed, who considered that the former emerges from the alteration of the latter. Both understand the share of influence of the environment on modeling its own components (physical, chemical, biological, etc.), as well as the fact that the relationships between the factors and the components of the environment generate dynamics and transformability at the level of all components and of the whole. Both consider that the use and non-use of organs has an important share in shaping the organisms, and the transmission of the acquired traits is a reality that contributes to the becoming of the living<sup>17</sup>. Although Darwin moves the focus and produces his own theory, the two are compatible also at the level of the apparent differences. Conquered by Malthus's<sup>18</sup> discourse, Darwin gets convinced of the obvious fact of overpopulation, and sees in the struggle for existence the natural way of preserving balance, with the result of the survival of the most adapted—a natural fact which is not a non-truth. Lamarck did not emphasize it because, in Nature, there is both competition and collaboration, whose actions and effects conjugate, none of the faces can be raised to the rank of independent principle. The effects of the immeasurable resources of matter and the usual behavior of the living matter, reveal the dialectic nature of the relationship between stability and variability, collaboration and competition, each factor taking its strength from the synergic couple effect, and not from itself. Lamarck was not interested in the aspect whose salience would have rendered his explanation unique, making it memorable, but in the mere research which encompasses the human cognitive possibilities, for the understanding of reality.

Eventually, the concept that made Darwin famous, the “natural selection,” is loomed by Lamarck, but it is ignored, as, again, the French scholar was not interested in mechanisms—either important or

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does not require its inhabitants a very strict specialization. (...) the impulses received from its vital environment (...) (internal, external, artificial) are those who decided the adaptation, that is those that can be called normal, and therefore their organs will also be in a functional balance with the activities to be conducted. However, one or all of the factors of the external environment change (the forest turns into plain, the plain into swamp, the swamp into lake, etc.); the impulsion of the media will differ, the functional balance of the organs will turn into imbalance, some organs, more and differently used, will take the supremacy and will change, while those the least or not at all used will be stunted or reduced. A new functional organ balance will be established, a new adaptation, more or less perfect, will result for that creature, and so on. Thus, the history and the transformation of the spoke will continuously unfold, gradually, step by step, sometimes relatively faster, others slower, until the spoke will be extinguished by a too narrow specialization of its structure at environments that are not possible to remain invariable and which, anyway, must change at a certain time, strongly enough to cause the destruction of livings that are no longer adaptable” (Racoviță, *quoted work*).

<sup>16</sup>One of the implications is that at higher speed, adaptations can lead to high specializations – creating very effective organisms under those conditions, but vulnerable under some different or fluctuating conditions.

“Everything that is a phenomenon in the universe is the product of evolution, of a gradual transformation which of was, has done what is today and which will create only of what is today, those that will be tomorrow; and what was will never rise the same again, and will be eternally different from the future (...). The law of irreversibility is the generalization of the factual findings that an organ, once transformed, can never return to its primitive state, that a very specialized structure can never return to a very generalized state, that a spoke that has lost an organ cannot regain an identical organ. The being once on the path of life is destined to go all the way through ever-changing landscapes, to destinies of misery or glory, to long becoming or to hasty death, as will the power of the inherited and the indulgence of the vital environments; but it can never go back on the same path (...). And in order to clarify the core of those said, I use the next simplistic parable: from a tree trunk you can carve anything, let's say one made a boat and then a table from the boat; from the table one can make certain varieties of chairs and from the chair one has enough wood to make a box. From the box one started making a whistle and sing a blue heart and then the flood comes! Well, make a boat out of a whistle if you can! Is it true that one is drowned and erased from the world of creatures just like those spokes?” (Racoviță, *quoted work*).

<sup>17</sup>In fact, Darwin uses a lot—in the explanations in all its works—the influence of the environment, the use and non-use of organs and the transmission of the acquired features, especially in cases where natural selection has failed to explain them in any way.

<sup>18</sup>The overpopulation potential and the existence of several balance-keeping mechanisms, some selective ones are described

remarkable, but in any case limited and without universal action—but in what drives them, in the force traits of the environment.

In fact, the only thing that profoundly distinguishes the two resides in the accentuation by Lamarck of the organisms' tendency towards complexity.

**Darwinian Rhetoric.** The Darwinian explanation is devoid of the generality and depth of the Lamarckian one, but it compensates by its nuanced and acute specificity. Using concrete, certifiable or verifiable cases, Darwin amasses his forces in the area where there is a possibility of a convincing explanation of the familiar processes and effects (but still erroneously, insufficiently or not at all clarified). In a discursive canvas that releases the strong impression of a complex and dedicated research process, whose only purpose is the accurate awareness of reality, Darwin runs in plain sight a wide search for solutions, highlighting even the possible counter-arguments. At the same time, the construction of his debates avoids the temptation of reflexive digressions that attract toward philosophy or propose (or only to guide towards) overly general conclusions and abstractions. Even when it gives the impression that he only uses concrete examples to climb the steps of narration to the general plan, Darwin connects facts into a well-thought argumentative construction, and does not explicitly and preferentially aim at obtaining deductive reasoning. He avoids any possibility of leaving the visual and concrete-referring discourse and tries to construct an easy-to-follow story, with clear argumentation, sprinkled with conclusive, well-balanced woven evidence in the canvas of matter. He perpetually seeks revealing and solid evidence—whose validity is severely tested—to instantly conquer, the goal being to clarify the reader and gain their adhesion.

Without knowing Lamarck's written work—but aware of its content and of the failure suffered both by Lamarck and its explanation—Darwin will avoid with terrible tenacity any potentially unclear statement, inadequately argued, and hard to detect for the common mind and the potential in there, or which

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by Lamarck in Volume I of *Philosophie Zoologique*, but it is also contained in Darwin's other precursors.

<sup>19</sup>It was not by hazard that he hesitated a lot before publishing his masterpiece, constantly looking for convincing evidence—not only from his perspective—many important proofs being added to the subsequent editions and to the *Origin of Man*.

<sup>20</sup>Lamarck defines species as collections of similar individuals that perpetuate under the same conditions as long as their environment does not change to generate variation in the habits, traits and forms of individuals. In this way, it is pointed out that the species are not given and immutable, but they are only a transient expression of the response—with historical-process related characteristic biological—to defined requests from the environmental and biological factors. By appropriately and adaptively responding to these factors, similar individuals can subsist and perpetuate as such as long as environmental conditions do not affect their *status quo* in such a way that changes occur affecting their structural and functional integrity and capabilities to respond to requests (internal and external). In this case, the species can be modified accordingly, slowly and without leaps. Without being misled, Lamarck thought that such classifications belonged to the human mind, Nature, not creating species, genres, families, orders, classes, but only related individuals.

<sup>21</sup>“Since neither variation nor heredity is infinite, on the contrary, because they are very accurate and often tightly constrained, it results that beings are naturally divided into consanguineous groups, in categories of beings who are all drawn from the same origin, who have inherited the same inheritance of traits and who, although different, cannot go in apartness beyond the limits of their «specific characters»; I say specific characters, because we reserve the name of the *species* (of strain) of the groups thus sketched” (Racoviță, *quoted work*).

“There are so many and varied definitions of the notion of species that we can say that in reality there is none, for defining is to isolate a certain size with an enclosure, but to claim to define a single unit by isolating a lot of different units is a job that I better give to others. Indeed, I claim that the notion of a species cannot be defined by giving the term ‘defining’ the meaning it has in philosophy, mathematics and other logics. How to get in the same box of human imagination countless puzzles of things all more or less, but always different! As we have seen, there are no two identical creatures in the world; hey, how could their grouping give birth to equivalent categories? The species nowadays established by specialists, by taxonomists or by systematists, as their nickname is, differ completely by the value of their specific characters, by the age of their geological history, by the breadth of the variation limit, by the number of sub-specific colonies that swarmed from them, by the distance of kinship from the neighboring species and many more. There are not two larger groups of species, such as families, orders, classes, in which species are perfectly equivalent units of measurement; I argue that even for the primary grouping of species, for gender, one can say the same (...). What better proof that species is a relative reality, as there are, by the way, and as they cannot be otherwise, all other natural realities, for if the so-called mathematical or logical relationships can be absolute, this is because they are artificial, invented on purpose to be so” (Racoviță, *quoted work*).



may appear in ways hard to admit in the current logics<sup>19</sup>. That is why the construction of his speech abounds in elements and modalities of rhetoric of the prudence and of conciliation.

Either his well-known fear of any form of conflict (from disapproval to censure), either the long-term observation of transformism—with its striking effect—made Darwin choose a title not very suitable for his first major writing. In fact, he does not even manage to rigorously define ‘the species’ (unsolved even today, except for the common and non-specialized use; the most suitable definition is that of Lamarck’s, precisely because it is shadeless<sup>20</sup>), nor to show the origin of the species<sup>21</sup>.

Actually, Darwin: a) finds that species are not given and immutable; b) shows the ways in which an already existing species can evolve generating varieties and possibly other species; c) proposes and explains factors of the evolutionary process, then a mechanism that participates in the evolution, and d) presents some transformational processes the living goes through. Following such a process and aiming at such a persuasive objective, Darwin succeeds in producing an evolutionary explanation which synthesizes and valorizes many of the ideas before him, but especially which interprets, highlights and restructures those ideas, the particular conjuncture he reaches to by providing a new perspective. Cohesively constructed and thoroughly augmented, the Darwinian theory has as shortcomings only the inherent ones, with which the level of knowledge of that age could burden any theory in any field.

When his explanation was attacked, Darwin and his supporters searched for ways to constructively respond to objections, tinting explanations and seeking supporting evidence. When his explanation was in danger of being confused with the Lamarckism, Darwin did his best to distinguish himself from him, often formally denying things he had not just claimed, but which his explanation was organically built on and without which it would have become just a hypothesis.

On one hand, the two explanations are ways of saying the same thing, but pointing out, once, the origins, the universal framework and the profound mechanisms (Lamarck), other time, the apparent and noticeable situation, along with its traits and mechanisms (Darwin). On the other hand, the two constitute a whole that contains both the essence and the phenomenon. The deficiencies of each one of them are human: the depths explored by the former are so inaccessible that the concrete mechanisms that the mind of the superficial human creature requires as evidence remain unknown, and the specifications that the latter strive to reveal are so nuanced that the effort to explain the infinity of details and particular situations are beyond human powers. The conflict is unsolvable, because without understanding the origin and the deep essences, the observation of the state of appearances lacks understanding, and without the state of the concrete, knowing the origin and the essences remains without evidence<sup>22</sup>.

**Neo-Darwinism.** Even at the time when the Darwinian explanation tended to stability, exaggerations

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“The big issue of the notion of species is that it was conceived from the beginning by applying to a current phenomenon, that is, to one of today’s accomplishment that has nothing to do with the past (...). There are no such phenomena, because they all derive from previous phenomena, and the species have not suddenly come out of nothing either. (...). There is a capital component missing from this concept: the past of the species, its origin, the knowledge of the kins it derives from and the events of its past life. The species, as well as any worldly accomplishments, are not and cannot be current creations but only products of an old and uninterrupted chain of actions and reactions, of past causes and effects that have become new causes of current effects, actions and reactions we do not know the beginning of; in a word, species are historical phenomena and the notion of species is a morphological entity (of form and structure), geographical (of space), and historical (of time). To comprehensively analyze it, we must measure it in the creature of the components in space and time, and only then can we boast that we understand it, and that we can use it for comparative studies, that is, for the only research that can lead us to discovering “laws,” without fear of falling into error. And how could one construct the doctrine of evolution, whose strictly current accomplishments and exertions are infinitely small compared to those accomplished in an immeasurably long past, if you should use only recent phenomena, artificially and abusive separated from their natural past?” (Racoviță, *quoted work*).

<sup>22</sup>“Darwin’s work well established transformation into biology, that is, the doctrine of evolution, and under the Darwinian garment, these ideas have entered the great world. The present state of life on Earth gains through this doctrine a natural explanation, that is, through the enormous long history of uninterrupted chains of spite but for the clarification to be fully satisfactory, we must unravel two fundamental problems; firstly, the origin of variations, without which adaptation and transformism cannot exist, and secondly, the persistence of some of these variations, that is the emergence of new species.

Lamarck’s genius was mastered by the first issue, and in truth, because it is the most important; his solutions being the so-

started appearing (both in the co-founder who tries to nuance and build up the theory in the way he thought it by himself, as well as in the followers, who, in the effort to explain it (to themselves), refine it and incorporate new ideas in it). In essence, fascinated by the mechanism factor highlighted by Darwin, the Neo-Darwinism absolutizes the role of natural selection and rejects any involvement of another factor, basically parting from the Darwinian conception.

As the community of orbit of two similar and close ideas has always been a danger—due to the possibility of one attracting the other to its gravitational zone—and always the instantly triggered solution was the fratricide—in this case the clear rejection of any Lamarckian idea—the Darwinian explanation will be rejected by what the Lamarckian had in it, that is, by its whole essence. For Darwin there were important: the direct and indirect influence of the environment, the use and non-use of organs and the possibility of passing on the acquired traits. For Neo-Darwinists the first two go down a lot in importance—because they are considered temporary and limited to one generation—and they do not have ears for the third. Consequently, Darwin's additions to Lamarck will be retained—but in extreme forms. Thus, for Darwin, the action of the natural selection retains or develops both the traits emerging from the direct adaptation as well as those due to occurrence; the natural selection action is not very strong, often involving other factors (as well); the struggle for existence, with the consequence of survival of the most adapted one, holds a variable weight in the general equation, but other factors always act upon. For Neo-Darwinists, the action of natural selection is exercised only on random traits; natural selection is the only evolutionary mechanism, and the struggle for existence and the survival of the most adapted become crucial. Things are the same as for sexual selection, there, as well, Darwin indicates a factor, not the exclusive factor<sup>23</sup>.

**Wallace.** In a way, the first (neo)Darwinist was A.R. Wallace. Darwin's and Wallace's evolutionary explanations resemble but only in the meaning that two relatively contemporary explorers observe a common reality and conceive it in an imprinted way by the same conceptual and mentalistic universe. Even before knowing Darwin, Wallace spoke fiercely about the struggle for existence and about the survival of the most adapted as the unique factor of evolution. Darwin highlights that the struggle is so intense that each individual's chance of survival can gravitate even around one single and slight variation, but at Wallace varieties are already determined by causes that he does not discuss and in case of an environmental change there will survive only those that are already being adapted to that change. This is a terribly important breach and strikingly reflects the clash between the views and applications of the theories of the two. In fact, this way Wallace manifests himself (once again) as Lamarck's conscious, categorical and programmatic opponent, and as a Weismann's alter ego.

Even after the release of the *Origin of Species*, Wallace retained all his previous views, remaining a rigid, Weismannian supporter of the natural selection that he continued to emphasize in this unique way. Paradoxically, Wallace, in a Weismannian and anti-Lamarckian manner believed on one hand in phrenology, and on the other in orthogenesis and—somehow explicably—he believed in spiritism. His general conception does not come from the deductive acquisition of a demonstrable truth, but from a zealous ideological induction<sup>24</sup>.

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called Lamarckian factors: the influence of the living environment, the inheritance of the acquired qualities, the effects of the use and non-use of organs.

Darwin is concerned with unlocking the other issue, not clarified by Lamarck. He admits the Lamarckian factors as the origin of variations, but to clarify how variations are preserved, that is how new species emerge, he highlights a number of factors: the struggle for living, the natural choice, the protective resemblance, etc., factors grouped in the naturalists' language as Darwinian factors" (Racoviță, *quoted work*).

<sup>23</sup>"We know that Darwin admitted the power of the Lamarckian factors, the influence of the external environment, the inheritance of the acquired characters and the effects of use and non-use; for him, therefore, the secondary sexual characteristics are the product of the action of these factors combined with sexual selection which, however, he believes, plays the role of leader in this combination of factors. But the New-Darwinists admit no other factor than sexual selection, which lured them to invent of all sorts of theories, each one more and more bizarre and more metaphysical" (Racoviță, *quoted work*).

<sup>24</sup>"We, the naturalists, we do not imagine the subject of our research, we simply find it" (Racoviță, *quoted work*).

**Weismannian selectivism.** The plenary expression of the conception of the Neo-Darwinian school, with all the exaggerations in favour of the innate to the detriment of the acquired, of the randomness to the detriment of the deterministic action of the environment, with the extreme schematization of the course of evolution and with the exacerbation of the struggle for existence, appears at August Weismann.

Postulating, in an exclusivist, reductionist and absolute way, the *omnipotent natural selection*, Weismann subordinates to the natural selection all biological phenomena, without exception. He makes out of the natural selection of individual variations, innate and random, the unique factor and the singular mechanism of evolution—although Darwin himself emphasized that although the natural selection is the

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<sup>25</sup>“They claim that variations do not succeed in a unique way, but they manifest in all directions, at random; for them, evolutions in a determined sense, such as those in the quoted examples, are the result of the action of natural selection, that is, of choice and preservation, among many other indifferent or damaging variations, only of the favorable variations. Therefore, they replace orthogenesis by orthoselection, that is, the unilateral choice of variations in a certain sense, variations that occur at random together with all sorts of other variations. (...) But let us understand well: Orthogenesis does not mean that evolution will be accomplished in a spoke given in a unique sense, whatever the influences of the vital, external, internal and artificial environments; claiming this would be a mistake greater than that of the New-Darwinists, it would be a conception of a creative and purely metaphysical category. Under the term orthogenesis one shall simply understand the transformation of a body or of an organ in one single sense or, in other words, the unilateral variation. (...) When vital environments change in one direction, or when any creatures wander from one environment to another, the reaction of organisms will be manifested by orthogenetic variations; if these actions of the environment stop or change sense, and the mentioned variations of the organism stop and change direction” (Racoviță, *quoted work*).

<sup>26</sup>Weismann got the same treatment he himself had applied to Darwin. The Neo-Darwinists who followed him have absolutized some of his sayings and eluded others, which, had they been reiterated and considered, would have probably changed what is commonly recognized today as knowledge in terms of evolution. Thus, the theory of isolation and purity of the germplasm, of the complete separation of the germplasm from the somatoplasm and of the impossibility of any change of the latter to affect the germinal plasma, were almost unanimously considered a given of the living. There was little to the point that, reevaluating his experiments on mice—Weismann gathered his data by cutting the tails of many generations of mice and, noting that, each time, the offspring of a mutilated generation showed normal tails, he deduced that a change in the body does not produce a change in the gametes—the experimenter himself could concede that they had not been properly constructed and that by consequence, they did not validate the belief in the omnipotence of selection. What Weismann’s experiment implied was that the amputation of the tails would make impossible the transmission to the gametes the information (and command) about building a normal tails in the next generation; or the experimental error consists—keeping Weismann’s frame of mind—of the fact that the cutting was applied to a formed and complete tail, which had already sent the information to the germplasm. Eventually, Weismann admitted that from mutilations no conclusions may be drawn regarding the natural evolution – something many contemporaries had repeated to him, and whose understanding would have exempted the carving of hundreds of mice.

In fact, such situations—in which, over time, it will be emphasized as nuanced and evolving thinking of a researcher, it is diverted and brought by posterity to the most convenient and convenient denominator—which are not exceptions in science; on the contrary. Looking from a diachronic perspective, Lamarck observes that missing organs or poorly differentiated, used predominantly to meet certain needs, could gain differentiated structures, the relationship between their form and function becoming effective. This suitability of structure to function was simplified by one of his followers, E. G. de Saint-Hilaire, under the clipped and generalized formula of “function creates the organ,” an affirmation that does not belong to Lamarck, who had actually shown that the function shapes the organ, precisely this continuous accommodating of two conjugated elements being the essence of transformism. This thing was rightly understood by H. Spencer, who showed that structural changes emerge from some functional ones, being some co-adaptations—but Saint-Hilaire’s formula and the association with Lamarck remained indelible.

“From the connection between the cause and effect that exists between function and organ, from the fact that there was found the existence of very different organs at the current spokes, and, I add, from the lack of detailed histories of the origin of kins, which shall allow us to know the real origin of the organs, out of these causes, I say, it was created an «atmosphere» favourable to the idea that the function, as in the old creationist concept, can everything, even create organs out of nothing, can even (the ultimate high!) have action on what does not exist yet, for if this is not the meaning, what would be the interpretation of the formula everywhere today that the function creates the organ?

But how to imagine a function that exists before its organ? How to believe the sight has created the eye when the eye is necessary to have the sight? How to say air breathing has created the lung if before the lung existed there would not have existed other occasionally respiratory organs in which to exert the modifying impulse of oxygen extraction from gaseous mixtures and which shall provide the material support for further transformations? (...). The transformation of creatures does not occur by adding and the conception of new organs besides or instead of the old ones; it results from the mere change of pre-existing organs and organelles that performed more or less different functions. The new function is thus fulfilled by organs that were formerly adapted to a different activity, and these native organs derived themselves from pre-existing organs corresponding to

most important factor, it is not the only one.<sup>25</sup> For Weismann natural selection is infallible because—again<sup>26</sup> unlike Darwin—Weismann and the extremist Neo-Darwinists considered that all specific traits were useful, everything that operates the natural selection is endowed with usefulness<sup>27</sup>.

The evolutionary explanation proposed by Lamarck remains today as well the most coherent of all, but what he did not succeed—and neither will those before and after Mendel, including Darwin—was to explain the mechanism of transmission<sup>28</sup>. Beyond this, however, its coherence threatened the Neo-Darwinist ideology and favored the revival of the Lamarckism.

Therefore, taking over some of the ideas already released before him, Weismann will gradually build up a complex theory whose role was intended to shatter for good the Lamarckian explanation. In essence, this theory argues that the pluricellular organisms have two types of cells: some that structure organs (somatic), others responsible for transmitting the hereditary information (germinal). The germinal cells—which self-replicate in the nucleus of each somatic cell—contain the material which bears the information the somatic cells develop on, a material which contains the necessary determinations for different types of cells that will perform various specific functions. Running through the stages of development and gradually starting to function, the somatic cells acquire more and more specific attributes, some directly owed to the determinations given by the germinal cells, others indirectly through the more specialized exercise of their function. Everything that goes on with the somatic cells becomes increasingly dependent on the connection between their developed structure and the effects of their functioning, without having any retroactive effects on the germinal material. At the same time, the individual, innate, random, and with internal causes variation is present at the smallest cellular component—immediately following the molecule—which knows the struggle for existence. These variations are differentiated according to the type of cell, the germinal ones being hereditary and caused by “unknown” factors, the somatic ones being

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other needs, and so on. The function does not create the organ, as it is wrongly said today; *the function readapts the preexisting organ*. Yes, sight did not create the eye, but sight initially born in organs at first only sensitive to variations of light, through their slow transformation made these organs that were not eyes the perfect organs that we call eye. Yes, air breathing has not created the lungs, but air breathing was born in a non-respiratory organ and then gradually transformed that «foreign» organ in breathing organ in the gaseous environment. This is how things are and come to light whenever the history of a homogenous spoke is looked into” (Racoviță, *quoted work*).

“These laws are not theoretical concepts, but the results of concrete findings, findings deduced from facts sifted by critics and serialized in legitimate generalizations, as well as the following generalization supported by me and which is closely linked to the above: function does not create the organ, as it is usually said and believed; function adapts preexisting organs” (Racoviță, *quoted work*).

Similarly, the expression *survival of the fittest* is the creation of H. Spencer, who deduces it from reading the *Origin of Species*. This time, Darwin takes it over and emphasizes it. What has spread in the public belief, in this case, is that it would be about the strongest, the most adapted, the fittest, in the absolute way—which would be an impossibility for a biological organism. In reality, it is about the most adapted or fit, exclusively in relation to concrete contextual conditions.

<sup>27</sup>Weismann believes that selection not only determines the development of an organ but also maintains it at a certain structural and functional level. When the selection is suppressed, the individuals holding that organ and those who do not hold it have equal chances to survive and leave offspring. Since they all equally participate in reproduction, the average level decreases with each generation, until the organ atrophies or disappears completely. Thus, Weismann reveals his Lamarckian background, ignoring Darwin’s observation, which showed that natural selection appears rather like a weak regulator of the existing adaptations rather than a factor that can create and develop them. Darwin’s observation follows the observation that the utility of a trait appears to be limited to certain degrees of its development: beneath the threshold of utility it is unstable, above the threshold, its development can go too far, often overpassing the utility and even going into its spite.

But for Weismann, who follows his thoughts unabated, there is no structure or function that he cannot get to explain by assuming that utility, which seems to be the most probable. Such interpretations and ways of arguing anything obviously anthropocentrists mark the introduction of the finalist conception there, where the merit of the Darwinian idea was to replace the teleological explanation with the causal one.

“The elementary physical and chemical forces, and especially the simplest mechanical causes, are sufficient to explain the changes in the transformation of creatures. But this we can find out only by examining in details and with undefeated patience the history of homogeneous spokes” (Racoviță, *quoted work*).

<sup>28</sup>Various hypotheses, some coherent and seemingly verifiable in reality, some very close to the conception that the current scientific research validates, were released, among which the theory of pangenesis issued by Darwin and having clearly Lamarckian essence.

determined by the action of the external environment and non-hereditary in any way.

It is understood from the above-mentioned that the germinal cells and the somatic cells have distinct, inalienable and non-transgressive capabilities. That is, the hereditary processes can occur exclusively through and at the level of the germinal cells, which produce both somatic cells and germinal cells, the former bounded to the formation of the somatic component of the organism, the latter to heredity. From the way the reproduction of the germinal substance is imagined, it is understood that virtually this substance is immortal, passing unchanged from one generation to the next. Nevertheless, the separation between the two types of material is so firm that the germinal cells are not affected by what happens to the

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<sup>29</sup>This geocentric conception was developed in the 20<sup>th</sup> century, with the discovery of the DNA structure by J. Watson and Fr. Crick (1953). Referring to the direction of the genetic information flow, Fr. Crick formulates the so-called *central dogma of biology* which claims that the genetic information can be transferred from nucleic acids to nucleic acids or from them to proteins, but not from protein to protein or from protein to nucleic acids. In other words, information can circulate: a) from DNA to DNA; b) from RNA to RNA (by replication); c) from DNA to RNA; d) from RNA to DNA (by synthesis); e) and f) from DNA, respectively RNA to proteins (by synthesis), and from here to proteins, RNA can also be replicated. (As later confessed, Fr. Crick did not know the meaning of the term *dogma*, which he used only for its clipped character. What he meant was “hypothesis”).

In his turn, the coauthor of the DNA structure discovery, J. Watson, issued a slightly different but memorable formulation: the DNA information can pass into RNA and from here to proteins, but from proteins it cannot go back on the path. The Neo-Darwinists deny the reality of this variant of the “central dogma” because it allows the Lamarckian explanation. Furthermore, recent research has shown that there is the possibility for the proteins to transmit information to other proteins (by replication) as well as to RNA and DNA (by synthesis). In this case—which is gathering more and more conclusive evidence—the Neo-Darwinists use the means used by them in serious or out-of-date situations, redefining the terms “by conciliation”, moving the boundaries and giving the impression of maintaining their intact position. Thus, in the field of heredity, the area of epigenetics was created, for the situations where the hereditary manifestations that appear, although effective, do not alter the nucleotide sequences.

This type of sophistry unnaturally shades the content notes or ambiguates them, narrowing the scope of the definition. Creating new notes and nuances, distributing entities to other spheres are easier to operate, not giving the adversary the opportunity of uninterrupted demonstration, but stimulates a contra-demonstration—equally sophisticated—by which it is shown that what only seems to belong to the same sphere, actually it does not belong to another, which is not the subject of the discussion. Thus, the opponent becomes forced to severely self-censure and all the way, which dangerously crumbles its activity and allows a nominal victory. (One of the adverse and ricochet effects—an evolutionist should be instinctively aware of could not ignore it—was that through such procedures the frames of the Neo-Darwinism had become more rigid than the comrades who joined later on no longer had real freedom of thought and action.)

In fact, heredity is not reduced to the genetic dimension, and the genetic heredity does not constitute the type of heredity “by excellence”—others being “weak”—all the more as heredity knows forms of existence, development and evolution... hereditary and non-hereditary.

<sup>30</sup>“Only the changes occurred in the germ are hereditary, because the egg fertilized by the spermatozoid forms exclusively the offspring of creatures, it is the single connection between parents and children, it is immortal, because it is transmitted continuously from father to son as long as there is a spoke. The germ is the hereditary dowry of the species; soma, individuals’ perishable property, a simple shell of defiance, and a faithful feeding slave of this germ, which protecting it from the direct contact with the vital environment, thus suppresses any directives in variations as well, which can manifest themselves in all directions. Adaptations, that is the meeting of the requirements of the vital environment through appropriate variations, Weismann leaves at the expense of natural selection, exaggerating their real power. The independence of the germ in the soma is the lever of the Weismannist doctrine, but also its capital mistake. By creating two metaphysical entities, Weismann took a path that could only lead to sophism.

The distinction between germ and soma is in fact of the same value as the distinction between two different tissues, muscles and bones, for example (...)

Of course, parental inheritance cannot be passed on to children in sexually reproduction but via the microscopic living drop which is the fertilized egg, but this egg is made up of the same substances as the soma, fed and grown by the soma, and it is not possible for the influences suffered by the soma not to be transmitted, more or less intensely and sooner or later. That they are somatic transformations that do not easily penetrate into the germ is a fact, but that they are the ones that penetrate to it, with time, is something else. That at the spokes with well-isolated internal environment, the influence of external factors tends to diminish, and that of internal ones improves it is understood by itself; the fact explains why Weismann’s metaphysical concepts are not needed to understand the non-inheritance of many external influences and the appearance of many seemingly mysterious variations of origin.

The moment one decides to take the germ of the vital environments’ influence, where to find the impulse for variation? There is no other in the world of reality. Weismann sought this impulse in his truly rich and ingenious imagination, construct-

somatic ones, any development or accumulation thereof, during the exercise called *life* getting lost along with the disappearance of the individual organism. Therefore, the genetic information is transmitted only by the germinal cells, from which it passes on to the somatic ones, the reverse being an impossibility: this is the so-called *Weismann barrier*<sup>29</sup>.

Of course, many of Weismann's arguments were not erroneous. In fact, at that time, evolutionism had been practiced enough to begin to achieve trusted results, to create prerequisites that would enable valid judgments and conclusions according to reality, to create a methodology and the instrumentation to facilitate quality research. Although Weismann was a true anti-Lamarckian militant who used some of Darwin's ideas, many of those he supported and—particularly—the profound and unseen substrate of his thinking was of Lamarckian essence, raising on it the ideas about the struggle for existence and natural selection.

The result of his consciously constructed and oriented construction is, however, theistic, ideologically determined and therefore erroneous<sup>30</sup>.

Thus, Weismann's germinal selection theory appears as an effect of his understanding of the limits of natural selection, of its non-omnipotence, of the fact that it is weak. It cannot explain the occurrence of useful variations and the development of neutral ones, nor can it initiate new lines of development and descendance. That is why, trying to use the somatic structure of Darwinism to give aura to his own explanation, the Weismannian mental constructions (anti-Lamarckian and non-Darwinian) begin as a row of speculations that are succeeding replacing one another—intertwined with the results of some experiments in the fields of chemistry and biology—, get to deny and destroy Darwin's Darwinism, eventually generating a form of Lamarckism and practicing the Neo-Lamarckian system of thinking. In this regard, despite what is happening at the declarative level, Weismann supported the Lamarckism and abolished only one of its components: the Darwinism<sup>31</sup>.

Starting with the central stake: combating the possibility of transmitting the acquired traits, Weismann reaches the postulation of the immortality of the germinal substance, that is he denies the selective transmission of an improved material as a result of the adaptive-evolutionary exercise and affirms the immutability and the immortality of the primitive material, always capable of generating increasingly performing forms, but incapable of any evolution. Other themes are just adjacent, arms, fronts, and auxiliary strategies, the Neo-Darwinian construction not being a real one, but only a machine to dismantle the Lamarckian–Darwinian construction.

Significant and relevant, after all, is that the one who has been living in the tension between the religious and the scientific conception, the one that was said to have defeated the Lamarckism definitively, started as the “Orthodox” Lamarckian, after which, equally ardent, took distance looking for his own explanation, then passed through the Darwinian camp that deprived it of its living core, after which he shaped his own form of Lamarckism, at a point of singularity. Although, in fact, thanks to Weismann, the thinking in biology, in some areas of philosophy and from other branches of the sciences of thought and of social ones had wondered in sufferance over one century, the father of the Neo-Darwinian failure remained inexplicably respectful to his descendants of the 20<sup>th</sup> century.

**Weismannian Sophistic.** When he opposes Lamarck and distortingly corrects Darwin, Weismann is not based on previous research or on some trustworthy ones of his own, but he is steadfast in the belief that things should not be as they are presented by the two. That is why the experiments he makes are designed to invalidate the Lamarckian conception along with the massive Lamarckian component of the

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ing a artful structure to the germ, awesomely logical, but in which the «character»-representative «particles», that is purely metaphysical concepts, play the main role” (Racoviță, *quoted work*).

<sup>31</sup>“I am part of the category of naturalists who reached the peace of mind stemmed in the belief that they guide their thoughts and work on the path that leads to understanding the phenomenon, that is to the truth accessible to the human mind. But not all biologists enjoy this state of mind, because some “theoretical cataclysms” have emerged that seemed to shake in the basement the transformational doctrine as Lamarck, Darwin and some of their descendants build it” (...). “My belief is that the

Darwinian explanation. It is possible for Weismann to have understood exactly what the two had argued and not to have unilaterally interpreted some aspects. He is sure that, as a consequence of an ideologically and sinuously encumbered reasoning, he tried to prevent the possible consequences that he himself put on the account of the possible interpretations of others, of the Lamarckian–Darwinian explanation<sup>32</sup>.

For he who analyzes the sophistic discourse, Weismann's technique is fascinating, being thoroughly mastered and practiced by the contemporary and subsequent Neo-Darwinians<sup>33</sup>.

First of all, the opponents are required thorough evidence in support of each assertive sequence, but also for any counter-argument against the supported—without evidence—by Weismann. Insofar opponents bring evidence, they are rejected, not by counter-evidence or by exposing their weakness or their lack of match to the situation, but by a trifling and elusive discourse, built up of discursive sophisms of all kinds (often by an argument, but, most of the times, by technique and conditions of argumentation), all somehow dominated by *ignoratio elenchi*. In this way, any evidence of the transmission of the acquired traits is shattered either by affirming that the experiment was not correctly executed, either by showing that what had happened was the result of natural selection, or by continuously redefining the acquired traits and heredity! All experiments at the end of the 19<sup>th</sup> and early 20<sup>th</sup> centuries<sup>34</sup>—by which there is attempted the mere understanding of heredity and of the possibility of transmitting the acquired traits—are regarded by Weismann and the followers of Neo-Darwinism as unreliable, lacking credibility, rigged, in the best case erroneous; anyway, to be rejected<sup>35</sup>. In this context, one cannot wonder that in its theoretical and mental constructions, the struggle for existence and selection are not understood as factors, mechanisms or processes, but become metaphysical abstractions, a kind of *Deus ex machina*.

The intransigent, exclusivist to contempt behaviour of Weismann and the New-Darwinians towards those who brought them the required explanations and even the explanations themselves, shows, on one hand, that they were not of a scientific but ideological type, that is the meaning of the Weismannian explanations was not to make others understand how things really were, but to attract them to their conception and to consolidate the faith of the followers; on the other hand, the explanations required from others were true acts of *de plano* rejecting of others' conception—not a message to dialogue, but one of discouragement.

In the context in which science is a continuous historical process, constituted by negative judgements and truths, with feeble confirmations, what strikes at Weismann and at the Neo-Darwinists of all times is the firmness and unimpaired security, the unyielding certainty about their own “truths”—traits characteristic rather to the one fuelled by the flame of ideology rather than to the one guided by the pale light of science. Even more disconcerting is the great willingness to eliminate so categorically the data that, like

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Neo-Darwinists will be exterminated after all, as the creationists were turned to dust” (Racoviță, *quoted work*).

<sup>32</sup>Of course, very many theories issued over the history of humanity were judged before having been fully understood—especially in the light of the implications induced by the of the critics' forthcoming minds.

<sup>33</sup>“Weismann's criticism, bright through the qualities of the style, through the energy of persuasion, through the subtlety of dialectics, deeply impressed those biologists who had no personal experience in studying the history of the spokes, that is the vast majority of biologists, and thus a fierce struggle occurred which still exists between the Neo-Lamarckians and Neo-Darwinists, because Darwin admitted the transformational role of the Lamarckian factors, while Weismann and his school formally deny him. (...) I have no time to expose to you this explanatory theory by Weismann which stole the minds of many biologists at the end of the last century, but it is not at all the proper thing for anyone to know it (...). From the entire Weismannism there will remain only the negative, the incisively critical part with which it cleansed the field of transformism of many weeds, of many badly made or badly interpreted observations. Perhaps it will still last for a long time in the disciples' minds, the willful denial of the Lamarckian factors, but the entire positive doctrinal part that had to explain the transformism is already completely collapsed” (Racoviță, *quoted work*).

<sup>34</sup>See V.L. Kellogg, *Darwinismul astăzi*, Iași, 2017, and Y. Delage, M. Goldsmith, *Teoriile evoluției*, Iași, 2015.

<sup>35</sup>For all the situations, the Weismannian explanation was almost invariable: a) the traits of the organisms derive from the manifestation of random variations, natural selection acting upon them – which is omnipotent and infallible; b) the apparent transmission to the offspring of those traits is merely a direct consequence of the reproductive success of the organisms that carry them; c) shall those traits become harmful and disadvantageous to the organism, the chances of survival and reproduction of the carrier body decrease proportionally, and consequently those features; d) the place does not remain free as useful features in the new environment will emerge—randomly as well—at the level of another organism.

any other, could serve science—especially as long as it was not proven their invalid and aberrant nature—and especially in the context in which previous identical rejections were subsequently invalidated by the scientific research.

Knowing that the critical analysis of ideas and solutions is an integral part of science and of the process of finding out the state of reality, being indispensable, the way in which Weismann and the Neo-Darwinists rejected any other solutions makes clear to anyone their partisanship. It may be said that, as Apostle Paul established the indestructible foundations of the Christian argumentative discourse, thus, Weismann set the rhetorical-sophistic methods of rejecting any argument that did not fully conform to the dogma he had founded. Consequently, opposition and contempt will become coercive blame and eliminatory marginalization, the neo-Lamarckians or anyone could have been suspected of wearing an apparent shadow, the Lamarckism being rushed into the inertial areas of the scientific community, the word *Lamarck* itself attracting automatically and viscerally the more isolating attributes from laic ones such as *non-scientific* and *ineptitude*, to the supremely ideological one: *heresy*.

But beyond the shortcomings that accompany the persecution of the (Lamarckian) ideas—which still lasts today—the reactions of the Lamarckian and Darwinian group generated adaptation. Weismann's astute fervor to eliminate any trace of Lamarckism, emptying the whole vital substance of Darwinism, and profoundly altering the concept retained as fundamental of “natural selection,” and the Weismannian attitude of rejection of anything that was or could be different from what he stated, made the researchers seek rigorous evidence by observation and especially by experiment, be more severe in advancing and formulating conclusions, hypotheses and theories.

**Baldwinian Functionalism.** The disorders created by the Weismannian doctrine generated a natural reaction in such situations. In times when only a few audacious have the strength to declare themselves (neo)Lamarckian, one of the subsistence solutions of the biological organism or of the outcast thought is the identification of the prohibited element, the separation from it and the construction of a form that carries the essence of the thought, modified to the limit of its preservation and acceptance by others. Although—in a totally significant and non-casual way—the Lamarckian essence thinkers embraced the authentic Darwinism, due to the fact that it was not a synthesis of the Lamarckian explanation to which Darwin's innovations were added, they could not abandon the French scholar's conception, replacing it with that of Darwin's. Without engaging into programmatic collaborations tight-laced by an ideology—as the 20<sup>th</sup>-century's Neo-Darwinists will do—the late-19<sup>th</sup> century's Lamarckian thinkers (such as J.M. Baldwin, H.F. Osborn, Th. Eimer, E.D. Cope and others) will try independent syntheses and explanations, each of them containing valuable elements, each one having its own shortcomings. Due to the way of combining elements and especially because of the possibility for success that it creates<sup>36</sup>, the explanation we will mention here will be that of Baldwin's.

As an evolutionary psychologist, the American researcher has the opportunity to make some observations—such as the role and importance of exercise, working in the tension between test / error and generates results in the form of creative imitation—that will help him understand reality from a beneficially amplified perspective. Baldwin accepts that organisms have their own variations not determined by the environment (innate). He also claims that organisms can acquire structures and functions as a result of their successive adaptation to the varying conditions of the concrete environments they exist and function in. By agreeing to the influence of both types of variation, he points out that, if these happen (innate variation and adaptation) to compete for the development of the same useful traits, the organism is advantaged in that environment; also, if the two traits are correlated. In this way, the process of transmitting the

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Also, lifting up at the level of dogma the hypothesis of utility of any selected adaptation or the over-rated sexual selection (a rather hermeneutical explanation than becoming from and confirmed by reality) the Weismannians lead the extreme the process by which they demand unquestionable evidence from their opponents, while for their own statements in the matter above, the only explanation is that, having no other way, evidence will appear when the level of knowledge of science reaches them.

<sup>36</sup>Nowadays, the so-called *Baldwin effect* is increasingly used as a starting point and argument not only by Neo-Lamarckians,



innate trait will trigger the transmission of the acquired trait. Living in an environment with requirements constantly directed in one direction can after a number of generations, make the initially ontogenetic adaptation be embedded and acquire a phylogenetic characteristic. Subsequently, the acquired changes may get to influence the innate variations.

Such a selection, in which the natural variability conjugates with the change generated by environmental requirements, is called *organic* or *functional* by Baldwin. Thus, it is shown that on one hand the genetic factors follow their own ways of manifestation, their actions leading to consistent effects, and on the other, the environmental factors exert their own influences. The result of this conjuncture generates the possibility that the epigenetic factors model the genetic ones as selective pressures. Consequently, not only the genome determines its products, but it is possible on the behavioural pathway, under the conditions of intensity and repeatability of the exercise and of constant pressure from a stable environment, the genome to be modeled, reinforcing or debilitating the genetic traits.

**Good intentions and the way to hell.** Starting with 1917 and until mid-20<sup>th</sup> century, a relatively heterogeneous group of researchers (including R. Fischer, J. Huxley, Th. Dobzhansky, R. Haldane, G.L. Stebbins, E. Mayr, G.G. Simpson, G. de Beer, S. Wright)—whose intellectual and moral qualities (exceptional, in many cases) cannot be denied—made an attempt to promote the evolutionist doctrine under the name of *Modern Evolutionary Synthesis* (MES). This was the result of a conscious and enthusiastic effort, which declared that it unified the Mendelian theory of heredity and the neo-Darwinian principles with palæontology, genetics, ecology etc., that is, with the progress made by knowledge in this scope, after Darwin (but which had not reached yet to include chemistry and gene behaviour as well). However, the targeted actions of the various adherents to this idea clearly show that the whole effort was aimed at saving the purified and simplified nucleus of the Weismannism—namely the *mutation–selection theory*—with the tenacious attempt to avoid the Lamarckian “tares”.

The mutation–selection theory deduced from Weismann’s efforts can be summarized in five postulates: 1) the hereditary characters, intergenerationally transmitted, are controlled exclusively by genes; 2) genes may undergo mutations; 3) genetic mutations are not “directed” by the organism or by the environment, but they are accidentally caused by the “accident” that the event that causes the mutation represents; 4) the accidental (random) mutations alter the characteristics of the next generation; 5) the next generation so modified is either favored by natural selection and becomes an important element in the continuation of the population, either dies and exits the stage. In this way, the minor accidental changes in the genes cause a species to gradually slip towards another, which replaces the first one and which is more suitable (adapted) to survive in the new environment. Nothing is preadapted, predetermined, programmed, but it is not chaotic either; nothing is directed towards a goal, but it is only directed on stages, according to the responses of the functional structures to the stimuli and to the adaptive-evolutionary processes, depending on the possibilities thus opened—followed according to the most efficient, at that moment (from the point of view of the state and dynamics of the organism, in its concrete environment).

Based on these postulates, MES protects the idea that natural selection is the crucial factor and mechanism of the evolution of the living (even if there are other factors, they can only be subordinated and, especially of low significance compared to the natural selection that controls any interaction between factors) and that, consequently it can explain by itself the existence and the form of any organism that has ever lived. In the face of the trivial observation that species are still distinct from each other, that they seem

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but also by authentic Darwinists and by other categories of evolutionists.

<sup>37</sup>Considering that the only goal that united the SEM followers referred to the eradication of any trace of Lamarckism—and implicitly of authentic Darwinism—, the various variants that they presented were incoherent in other aspects than that of the anti-Lamarckism and anti-Darwinism. That is why, apart from writing down to the index of the two Lamarckian ideas of force—the transmission of the acquired traits and the internal tendencies of the body, which explained what Darwin had failed to (the hereditary mechanism and the emergence of the evolutionary directions)—from their discourse there completely disappear the *overpopulation* and the *struggle for existence*, defending factors whose existence and influence had not been denied by Darwin but to which he had given them a small and adjacent role (incomparably smaller than the one that he had granted

not to follow the law of a continuous, gradual change over time of the organisms, the prejudice—which nourished a comfortable and flattering consensus on the evolutionary mechanisms—applied the same monodirectional solution to the matter of speciation, thus perfecting the image of force and authority of the synthesis for the following half century<sup>37</sup>.

The sealing movement<sup>38</sup> belonged to Ernst Mayr (in *Systematics and the Origin of Species*, 1942, and *Animal Species and Evolution*, 1963), whose explanation regarding the emergence of a species consists in the occurrence of random mutations in a group of organisms under conditions of geographic isolation from the initial population, mutations which, from one point make it impossible to pair the individuals of the isolated group (and mutant) and the individuals of the original population, even if the geographic isolation is canceled (thus there continue existing in this situation, the temporal isolation between the created species and the mother species). The smallest isolating circumstance triggers the gradual and continuous process of the speciation by placing the groups of organisms on levels that may be described concurrently under the accumulation of variation (Mayr speaks of “speciation stages”) of the solidity of the barrier between them: the actual populations, with weak dividing and yet transgressional barriers; sub-species, with more clearly high barriers; finally, species, separated by strong and complex barriers. Speciation means, therefore, using the Mayr’s terms, diversification, adaptive radiality, and substantial evolutionary progress, and the evolution unit is no longer the individual (as in Darwin’s conception) but the species (population), the process running on the account of the change of genes (alleles) frequency in the genetic pool of the species.

In the decades that followed, it became increasingly obvious that the quantitative genetic equation did not solve the problem of the morphology of the organisms, being neither sufficient nor inclusive. We must also specify that Mayr himself foresaw something of the precariousness of his vision, when he formulated by himself or took over two possible objections from his opponents: there is a considerable number of species without significant geographical variations (monotypic species); there are many cases in nature that do not find a convenient place in the proposed scheme of geographic speciation.

But the scientific objectivity of the German-American biologist is drastically diminishing here, for Mayr responded to them, on one hand (on the first objection), by listing a series of presumptions to which he ignores the perfect possibility of being formulated with a changed sign or of being cancelled by further research: perhaps the studies are not enough, perhaps the habitat is uniform though, perhaps it is about an evolutionary stagnation, perhaps we have to do with a recent expansion of a population until recently thoroughly localized, etc. On the other hand (in the matter of the second objection), by reiterating its own position, reinforcing the scheme and forcing the cases to fit into this premanufactured scheme: despite what nature shows, it is still possible to take all species from one systematic group (birds or butterflies, e.g.) from any region, and to classify them according to the speciation status they belong to.

Ernst Mayr’s working hypothesis becomes a dogma at that moment, for the researcher quickly releases alternative hypotheses and focuses his energy on identifying facts that support or illustrate his idea. The

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to the Lamarckian factors): *the mutations, the size of the population and its structure, the fluctuation of the number of individuals in the population, the duration of generations and their succession rate, the place of the species in the ecosystem, migrations, longevity, intraspecific cooperation, environmental influence, reproductive isolation, hybridization, genetic recombination* and, of course, *natural selection*.

<sup>38</sup> Things seem different in the perspective of Mayr’s late contemporaries, who, in order to instruct themselves, took advantage, at the end of the 20<sup>th</sup> century of the proximity of the man and his books, and—with some exceptions—did not take the road back to his less long-lived predecessors or even to Darwin himself to find there the original hypothesis unencumbered yet by Mayr’s often-precious and artificial jargon. For the occurrence and take-over of the “key innovation” concept (Engl. *key innovation*, *key adaptation* or *adaptive breakthrough*)—key-concept in the theories concerning the emergence of the new species (see *infra*, in text), see Darwin (who did not use the term, still); then A.H. Miller (1949). *Some ecological and morphological considerations in the evolution of higher taxonomic categories*, in E. Mayr & E. Schuzs (eds), *Ornithologie als Biologische Wissenschaft*, Carl Winter, Heidelberg, p. 84–88; G.G. Simpson (1953). *The Major Features of Evolution*, Columbia University Press, New York; G.G. Simpson (1959). *The nature and origin of supra specific taxa*, in “Cold Spring Harbor Symposia on Quantitative Biology”, 24, p. 255–271; finally, E. Mayr (1954). *Change of genetic environment and evolution*, in J. Huxley, A.C. Hardy & E.B. Ford (eds), *Evolution as a Process*, George Allen & Unwin Ltd., London, p. 157–80 and E. Mayr (1960).

elegance of the solution and the simplicity of the explanation<sup>39</sup>—in fact, the aesthetic delight and admiration, therefore, stand for the truth itself and for the real endeavour to reach it, despite the fact that anytime and anywhere in the Western world, after mid-20<sup>th</sup> century, feeble voices opposed the dominant current, thus showing that the issue of evolution was still far from being solved.

Not all of these voices were able to offer consistent and coherent alternatives to Neo-Darwinism; but not finding solutions does not cancel out the reality of the problem so that for he who knew how to look, it became clear that the mechanical causal explanations, substantiated solely on Mendel's observations, could not account for the state and dynamics of the biological reality. And one tried to take a step forward toward opening a door to the past, towards the vision of the blasphemed Lamarck.

A new integrative theory had to be able to explain both the macroevolution and the microevolution events. For this, the researchers brought into discussion the discoveries of three areas of biology, marginalized by MES: embryology, macroevolution and homology, looking more closely at the hypotheses formulated following the reinterpretation of fossil data. There were formulated ideas such as: solving the problems of macroevolution could no longer be left to the genetics of the populations; instead, the evolutionary actions of the genes involved in the cell growth and specification should be considered crucial in the formation of superior animal orders; evolutionary genetics highlights the homologous evolutionary processes at the embryonic level, acting in discrete, morphogenetic regions; these areas (which exemplify the modular nature of embryonic development) seem to link the genotype to the phenotype; as the cell (and not its genome) functions as a unit of the organic structure and of the function, so the morphogenetic field (and not the genes or cells) must be considered the major unity of the ontogeny, whose changes cause evolution changes; etc.

Thus, under the pressure of what could have been observed and what could have been deduced from the logical assessment of the records, some of the very initiators and founders of MES and the biologists who had formed along the way like C.H. Waddington, Ivan I. Schmalhausen, R. Riedl, M. Pigliucci, E. Koonin, S.J. Gould, N. Eldredge, found it appropriate to develop a new explanatory paradigm. The name by which it would be known—the *Extended Evolutionary Synthesis* (EEA)—indicates, antagonistically, both its promoters' ambition to produce explanations where the classical synthesis had failed, as well as their inability to still abandon the pattern of the Neo-Darwinist thinking which had shaken for almost a century the chances of understanding reality.

An essential moment in triggering this ideological reform was the experimental activity of biologist Conrad H. Waddington in 1942 and 1953, on the *Drosophila* embryos, following which it was found the occurrence of new phenotypes—thus, non-innate—under unusual and stressful environmental conditions<sup>40</sup>. As phenotypes reappeared in later generations as well, when the embryos of the new phenotypic lineage had not been exposed themselves to the hostile environment, Waddington concluded that the trait that defined the newly appeared phenotype (e.g., the lack of connection strings in the wings of the fruit flies) had been almost completely genetically assimilated: what had initially been an acquired

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*The emergence of evolutionary novelties*, in S. Tax (ed.), *Evolution after Darwin*, 1. *The Evolution of Life. Its Origin, History, and Future*, University of Chicago Press, p. 349–380.

<sup>39</sup>We quote a fragment of Mayr's *Systematics and the Origin of Species* (1942), because it seems to us symptomatic for a state of facts in which knowledge becomes stagnant (or even trapped in an illusion of itself) born of the self-satisfaction that a researcher can have (we are talking only of the valuable one) while contemplating their work: "Accepting the concept of modern biological species, based on the principle of geographic replacement, resulted in an extraordinary simplification of the system in all the groups it had been constantly applied to" (Harvard University Press, 1999, p. 146). In any success of the human spirit and intelligence, refining and simplification are slow processes, conditioned by the existence of a real and comprehensive solution to any issue; they are futile, so useless to be brought into discussion if the proposed solution fails or does not take into account the nuances and elements behaving in a centrifugal way or do not present a novelty but in relation to the jargon used.

<sup>40</sup>In the 1942 experiment, (see art. *Canalisation of development and the inheritance of acquired characters*, in "Nature", 150, p. 563–564), the embryos were exposed to ether vapors, and a considerable number of specimens subsequently showed a second thorax; the second study (see *Genetic assimilation of an acquired character*, in "Evolution", 7, p. 118–126) supposed the exposure of the embryos to caloric shocks, as a result of which numerous specimens showed wings with modified nervure (*cross-veinless*) compared to the original phenotype. In the first and second case as well, experiments were repeated for several

trait (emerged in an exceptional environment) had become a hereditary trait (manifested in a normal environment by way of non-DNA heredity).

Waddington's Lamarckian appearance is strong at this point—even though he disavowed any association with his French predecessor and denied any resemblance between his theory and that of Baldwin's (although rarely are there higher closeness between the four generations than those between Lamarck, Darwin, Baldwin, and Waddington)—and other later-on followers of the Neo-Darwinist vision insist that what Waddington observed (the essence of his concept, 'genetic assimilation', is that some environmental stimulus reveals a phenotypical character manifesting itself in successive generations even in the absence of the respective stimulus *due to exposing the preexisting genetic variability to the action of the selection...*) is not an inheritance of the acquired traits, but a genotypic response to the environmental stimuli.

However, it is worth noticing, that those who rush to rip Waddington out of his feeble embrace with Lamarck seem to omit that the French naturalist did not formulate a theory that would have benefited from the findings of molecular biology in the 20<sup>th</sup> century. Neither did Darwin! But they behave as if the only possible conclusion of Lamarck's observations and problems, of his resonances, is the image of the evolution included in the animal examples of *Philosophie Zoologique*!

**Another new synthesis.** Waddington's ideas contributed to the reopening of Lamarck's stigmatized case (sometimes silent, always tireless), the last generation of researchers—willing to step out of the limitations of New-Darwinism<sup>41</sup>—recognizing and taking the essence out of it.

In a series of works<sup>42</sup>, appeared especially after entering the 21<sup>st</sup> century, researchers such as the Israeli geneticist Eva Jablonka and her collaborators, then the Australian immunologist R.J. Steele (whose hat Dawkins had not yet eaten, as he had promised himself) and his team<sup>43</sup>, outlines another new synthesis, which attacks both the modern synthesis and the extended synthesis (practically the latest sixty years' Neo-Darwinism) putting into light, as fundamental idea, the so-called *soft inheritance*—which postulates that the variations that occur during the body development and which are regulate, can be passed on to the next generation. This does not annul the truth that natural selection needs a transmissible phenotypic variation to be achieved and that it is genetically offered. But the (re)affirmation does not also mean exclusivism: by highlighting situations that escape the agreed explanation by the gene-based perspective,

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generations, always breeding specimens from the new phenotype, and the results were always the same, increasing, in fact, the percentage of the new phenotype; in the end, the new phenotypes continued to occur even though the unusual and stressful environment that had triggered the changes was no longer created.

<sup>41</sup>One can talk about a "reform of the Neo-Darwinism" but which may be a very good Neo-Lamarckism. Progress in this direction is, however, at the beginning, since the mirage of providing the truth of evolution through the Neo-Darwinist perspective continues being so seductive so that there are not few those who, enjoying the privilege of some discovery—potentially revolutionary—feel obliged to subordinate it to the central dogma, eventually adjusting the theory to the newly revealed fact.

The habit of repudiating any reference to Lamarck generates ridiculous effects when, finding, on one hand, the legitimacy of questioning the narrow framework of modern synthesis and of the serious discussion of the assumption about the transmission of the environment-induced variations, on the other hand, the question arises whether these obvious problems could not be solved... somehow different, without mentioning Lamarck...

<sup>42</sup>See, e.g., E. Jablonka (1994). *Inheritance systems and the evolution of new levels of individuality*, in "Journal of Theoretical Biology", **170**, p. 301–309; idem (2002). *Information: Its interpretation, its inheritance, and its sharing*, in "Philosophy of Science", **69**, p. 578–605; idem (2004a). *From replicators to heritably varying traits: The extended phenotype revisited*, in "Biology and Philosophy", **19**, p. 353–375; idem (2004b). *Epigenetic epidemiology*, in "International Journal of Epidemiology", **33**, p. 929–935; E. Jablonka & M.J. Lamb (1995). *Epigenetic Inheritance and Evolution: The Lamarckian Dimension*, Oxford University Press, Oxford; idem (2005). *Evolution in Four Dimensions. Genetic, Epigenetic, Behavioral, and Symbolic Variation in the History of Life*, Massachusetts Institute of Technology; idem (2008). *Soft inheritance: challenging the modern synthesis*, in "Genetics and Molecular Biology", **31**, nr. 2; E. Jablonka, M.J. Lamb & E. Avital (1998). "*Lamarckian*" mechanisms in darwinian evolution, in "Trends in Ecology and Evolution", **13**, p. 206–210.

<sup>43</sup>Unlike the case of some Neo-Darwinists such as R. Dawkins—whose popularization and media shows, loaded with humoristic aplomb and encumbered of the acquired and inherited trait of the Weismannian mixture of firmness and contempt, lured more souls than the minds convinced of the *Origin of Species*—, their theory is based, as far as possible and absolutely honorable, on observations and interpretations provided by detailed and punctual research on countless species of organisms and types of mechanisms, by which it is attempted the strict description of what Nature allows to be discovered.

the lucid researchers of this new generation oppose some strong statements to the narrow vision of the previous syntheses: that heredity involves more than the DNA; that the phenotypic variations independent from the variations in the DNA sequence and DNA changes oriented by the epigenetic control systems are an important source of hereditary variation; that consequently they can contribute to the evolutive changes; that, some hereditary variations are not random; that, under certain conditions, the mechanisms underlying the epigenetic transmission may lead to bouncing changes that lead to the reorganization of the epigenome; that given the symbiotic nature of the existence of certain organisms (man and its internal parasites, for example) and the passage of the symbionts from one host generation to another, might be beneficial for science to consider the possibility of the selection unit to be this type of communion; that macroevolution may be the result of some specific mechanisms generated by a demanding environment that cause the genome reorganization or systemic mutations; that eventually, the evolutionary change may result from training as well as from selection.

Therefore, nature exercises three alternative pathways—ignored by the neo-Darwinian understanding—by which it obtains the phenotypic variation: the epigenetic pathway, which uses the epimutations, more specifically, modifications in the chromatinic structure that sustainably influence the states of genetic expression; the behavioural / cultural path that takes into account the ways in which various (new) behaviours reach to spread within the groups of individuals and then be transmitted, given the condition of their actual manifestation in the presence of the receptors, thus intergenerationally persisting; and the symbolic path, which refers to the forms elaborated by the cultural heritage, sometimes latent—as the information stored in the unexpressed genes—based on symbolic thought and manifested in language, art, science, etc.

These types of evolution—comprised in a more complex and more convincing theory<sup>44</sup>—depend on one another and interact multi-directionally, and to hierarchize them in terms of importance would be an absurd approach, since each case of evolution may be a special one, and the cases themselves cannot be hierarchized.

**And yet, Lamarck.** For more than 2 000 years, mankind has been educating itself and faithfully awaiting consistent outputs in the intensity of the occurrence of this oriented and conscious process. That is, the human being believes in education, trusting that it has found a law of causality which enables it to control its actions with the help of science that the accumulated experience has granted to it. Although this belief does not take into account the fact that man is but one of the millions of living species—the only one which institutionalized education—nor that the evolutionary explanation is universal and does not only refer to *H. sapiens sapiens*, difficulties do not appear in this direction. They are due to the non-understanding of two strong realities: a) the breadth and depth of the educational outcomes are severely limited by infinitely stronger factors (environmental, genetic and resulting from the conjunctural intersection of the social, mental and behavioural factors); and b) concurrently with operation and product generation, the evolutionary process is structurally and functionally reconfigured, knows adaptations and accumulations, always generating increasingly complex products and continuously overcoming itself.

Lamarck's explanation contained elements that could serve all sorts of deductions (not necessarily coincidental with the French scholar ideas) that highlighted the factors in a volitional, vitalistic, or finalist manner. That of Darwin's—although it did not claim that the living world functioned in stochastic ways, being led purely by chance—contained elements that could enable it to be diverted in this regard and transformed into support of the omnipotent random natural selection, thus becoming an egalitarian symbol. This was the “happening” that made one be rejected and another one selected and subject to processing.

The general context was given by the fact that, especially after H. Spencer and on the background of the exaggeration of the trainable nature of the human being, the Neo-Darwinists needed a scientifically apparent justification by which to reject the exaggerated consequences emerging from the abusive inter-

<sup>44</sup>Sometimes precisely due to the hesitations and reserves expressed by its artisans.

pretation of the Lamarckian and Neo-Lamarckian explanation, derived from the ideas of transmission of the acquired traits and the action of the internal tendencies. (In fact, Lamarck and his authentic descendants did not support the perfectibility of the human being in accordance with any vital principle or with intended and self-propelled finalities, but only that the direction in which the species are transformed is inherently adaptive.) On the other hand, although they considered that the whole civilization lied on the inflexible and genetically nonconvertible foundation of natural selection, they could not simply deny the idea of education, but they could cast it away from the genetic area in one not severely subject to the physical and chemical rules, that is, in the epigenetic one and then in the behavioural derivative. At the same time, not being able to deny that certain traits seemed to be transmitted, the Neo-Darwinists of the second half of the 20<sup>th</sup> century will speak about the epigenetic traits as about some “thin” heredity forms, sending them into an appendix of biology. All this had consequences for science and morality, legislation and social mentality.

Beyond the essence of what Lamarck supported, he sees the universal becoming and reaches an idea that only in the last fifty years began to be researched and deductively understood, namely that life is not a given but a process developed by adaptive exercise and that evolution itself evolves. That is, the living appears as the consequence of the becoming of the living, and the evolution, once primed, can lead not only to the development of organisms but also to that of the evolutionary mechanism. And all this is happening neither randomly nor programmed, neither according to will nor purpose. They happen by virtue of the action of the same laws that put the elements into interaction, generating previously non-existent combinations, adapted structures and functions, always more complex, and thus equipped with capabilities to evolve as a result of the storage and transmission of the existing and acquired information. It is a coherent process, not an incoherent string of happy and statistically valid events.

Darwin observes and explains narrowly-constrained developments in magnitude and depth, from a perspective that suspects complexity, but which he escapes, often by joining synchronies, but without reaching the diachronic *continuum*.

In its turn, in all its forms, Neo-Darwinism is a decadence of Darwinism as it has the attributes of a religion, while the Lamarckism-Darwinism had those of a science. That is why, as a religion, Neo-Darwinism is a local-regional philosophy, valid for a somehow-constituted group, on certain criteria, and which tends to impose on all rather forcefully, while the Lamarckian and genuinely Darwinist explanations, in a truly scientific spirit, are universal, being true regardless of the state, aspirations and fears of any group.

After Lamarck and Darwin having shown somehow in a Promethean manner that the human being possesses capacities that could develop more and more complex and more adapted attributes, Weismannism, somehow Tartuffian, renders man to the Divinity, this time to a fully camouflaged and whenever convertible into any something else one. Although Weismannism and its derivatives ostentatiously show that it wears the outfit of science, the behaviour that is strongly clear is that of an exclusive religion, founded on an intangible dogma which demonizes anything non-adherent and sanctifies any enthusiastic follower, eventually devouring everything.