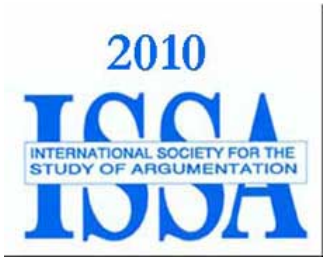
ISSA Proceedings 2010 – Is Natural Selection A Tautology?



1. Introduction

Many people, when I suggest that the Natural Selection theory may be incomplete, look at me in surprise and reproach me for rejecting evolution, believing that I fail to accept that complex forms of life arose out of other simpler ones. I should say, to reassure you, that I am a convinced evolutionist. This reaction, however, shows that both terms, "*evolution*" and "*Natural Selection*", are seemingly mistaken, understandably, since both come from the same theory of evolution by Darwin. But *fact* and *explanation* are different things, and for those people's sake I should stress the difference: evolution is the *fact,* the speciation phenomenon of the variety of species that we find with a common origin, and yes, it is a fact, or at least that is how I see it, after the overwhelming fossil evidence (Foley, 2010; Hunt, 1997). But there are many ways of explaining that fact, and Natural Selection, despite its relevance, is just one of them.

Yes: Natural Selection is just the peculiar and personal explanation that Darwin gave to evolution, which can be condensed in the well-known "struggle for survival" and "survival of the fittest" arguments. In this paper I present a critique to this philosophy of evolution, which does not mean that I question either the evolution or the correctness of Natural Selection.

2. The Clues to the Success of Natural Selection

Natural Selection is an amazingly successful model, still in force after more than a century and a half. This period is very long for any scientific theory, especially these days when knowledge advances so fast.

Several factors have contributed to this success. One is the strange phenomenon of identification that the terms "evolution", "Darwinism" and "Natural Selection" have suffered. They seem to come in one single package, synonymous, which makes it very difficult to separate what is right and what is wrong in them. The amazing discovery that evolution represents, and the appreciation for his author, Darwin, are worth the small price we have to pay in accepting his weak explanation by means of Natural Selection.

A second factor that has contributed to the strength of the Natural Selection model is what I call "scientific inertia": it is hard for a new idea to be accepted, but once it is, it becomes the "established" or "official truth", the "orthodoxy" , and it is difficult to change the scientific mind afterwards. Planck put this very well in one of his most famous quotes:
"A new scientific truth does not triumph by convincing its opponents and making them see the light, but rather because its opponents eventually die, and a new generation grows up that is familiar with it".

This is especially flagrant in Science: despite it being rationally-based, it does not seem to progress on rational grounds, but rather is moved by the same fears and influences that move sensitive human beings, well in tune, for their own good, with the mentality of the time.

This "inertia" affects all scientific theories, and Natural Selection is not an exception. It does, however, have one peculiar advantage over the rest, which makes it even stronger and more difficult to refute. It does not deal with the typical scientific topic, usually mysterious and uninteresting for most people. On the contrary, it deals with a very deep question at the very heart of every human being: the origin of their own existence. It is such a deep question that human beings have had an ancestral necessity to answer it, developing a whole system just to do it. The system was Religion, and the given answer was "life comes from God". In this context, Natural Selection arises, as the first scientific theory that dares to answer the same question. And it does, by taking the prerogative from God, and handing it to Nature. At first, this was highly challenging for traditional thinking. But once religious prejudices are broken, the theory becomes reinforced, after all those unfair attacks it had to endure.
It is so strong that today any criticism of Natural Selection is suspected of being retrograde or primitive. The religious character of the critiques in the past now turns the defence of "Darwinism" into a kind of defence of "science" against "religion": if you attack Darwinism, you are a fanatic, old-fashioned, or even worse: anti-science.**[i]**
These are, in my view, the main factors that have contributed to the dominance of Natural Selection over the rest of evolutionary models. But what does Natural Selection actually mean, what is it about? Some inconsistencies in the meaning of this model are dealt with in the next section.

3. The Principle of Selection

The principle of Selection is the basis of Darwin's evolutionary model for explaining the mutability of species. This principle is the extrapolation to Nature (hence *Natural* Selection) of the artificial procedure performed by the human being, for achieving new and more efficient species. "*Can the principle of selection, which has been so potent in the hands of man, apply in nature?*" Darwin wonders in his book "The Origin of Species", (Darwin, 1968, p.130).

Darwin misses the fact, though, that the artificial selection performed by man, (whether for biological, or any other general purpose) requires necessarily a diverse set of elements, if a single one is to emerge from the set (see fig. 1.a). Therefore, when the human being makes his selection, he needs to choose from among various elements in order to obtain just one (it is then when the act of "selection" makes sense), finding the required variety that allows his choice already at hand.

The phenomenon of evolution, instead, starts from a single cell, which evolves by itself, despite being alone (Poole, 2002). In such a circumstance, no kind of "selection" is possible, while evolution still remains. If we accept that a single principle motivates the whole evolutionary process, that could not be a "selection principle", since we could not explain why the very first cell evolved alone, not to mention why it *arose*, which is the maximum evolutionary leap ever.

In fact, evolution seems to be the opposite process of a selection: the very first cell evolves by itself, with no need for the presence of other elements (see fig. 1.b). A more detailed look into each new element reveals the same pattern of variability repeating itself over and over again, variations upon variations, producing an unimaginable spread of life: kingdoms, phyla, classes, orders, families, genera, species, types, races, individuals, etc. Such variety, all coming from one single cell, filling the gaps of almost any physical habitat, rather than a "selection", seems like an "explosion" of life **[ii]** (fig. 1.c).

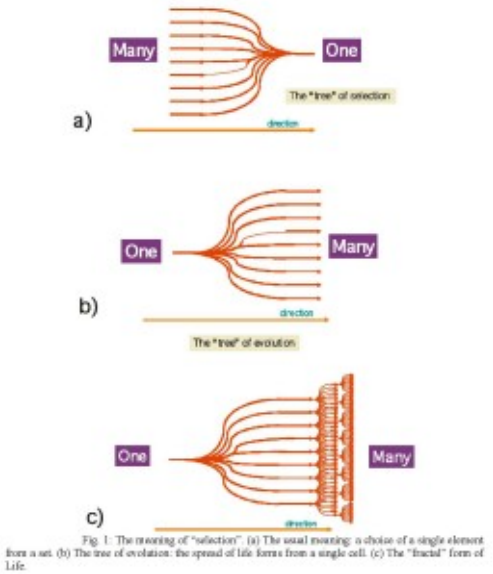


Fig. 1: The meaning of "selection". (a) The usual meaning: a choice of a single element from a set. (b) The tree of evolution: the spread of life forms from a single cell. (c) The "fractal" form of Life.

And the question is inevitable: this explosion of life obviously provokes a "struggle for survival", with species and individuals all struggling against each other, in order to achieve their space. However, Darwin does not say that; again he means exactly the opposite: it is not evolution which causes competition, but competition which causes evolution, meaning it is that fight for life which produces the modification and filtering of the most favourable genetic patterns which lead to improvement. Again, this conclusion collides with the lack of competition in the earliest stages of evolution: in the beginning there was room for them all, no need to "fight" or compete, and yet, they evolved. In fact, the first cell was by itself, and it evolved. It is inevitable to think that the same principle which pushed the first cell to evolve, is the same one that pushed the subsequent forms forward. This should be clarified by any evolutionary model.

4. The philosophy of Natural Selection

The philosophy of Natural Selection is enclosed in the well-known phrases: the "struggle for survival" and the "survival of the fittest". These seem to say that evolution goes on thanks to the fittest, "the winners" of the fight, making this model a kind of "philosophy of success". But what about the "losers", what

happens to them? According to Darwin, the answer is clear (Darwin, 1968, p.147): *"If any one species does not become modified and improved in a corresponding degree with its competitors, it will soon be exterminated".*

If we have a look at our evolution line (see fig. 2), this means that if individual B is fitter than A, B will survive, and A will be extinguished. In the same way, if C is fitter than B, C will survive, and B will be extinguished, and so on. According to this, one could think that we have left behind a trail of extermination. However, this is not the case: many species have escaped evolution, and survived till today, without evolving fortunately for us, otherwise we would be alone at the top of "Mount Evolution", and we could not survive on our own: we need plants, insects to fertilize the plants, birds, mammals, even the bacteria that live in our stomachs.
In fact, in order for a few species to evolve substantially, it is necessary that many others do not. Evolution requires a substrate of more primitive and basic life, to support the progression of subsequent improvements. Thus, there is a limitation to the term "struggle for surviving", and a compromise is required between "survival" and "extinction", "struggle" and "balance", "quality" and "quantity of life" (see fig. 3).

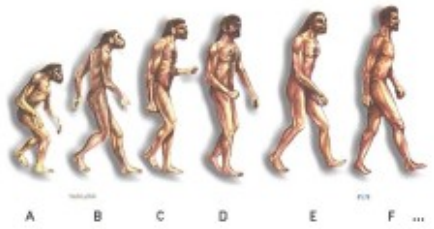


Fig. 2: Our evolution line, illustrating the argument behind the "survival of the fittest".

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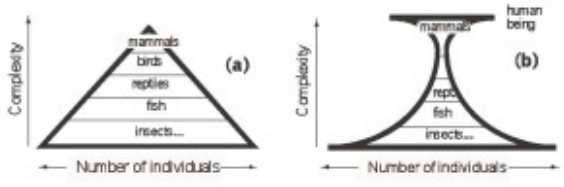

Fig. 3: The pyramid of evolution: The progression of complexity requires a base of primitive life which does not evolve, a necessary compensation between complexity and number of individuals (higher complexity requires a lower number of individuals, and vice versa, in order to keep the quantity & quality life-balance). a) Before the appearance of consciousness. b) After the appearance of consciousness, the pyramid starts to collapse at the apex. Figurative sketch, based on data in (UCM, n.d.).

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5. Is Natural Selection a tautology?

This "survival of the fittest" argument has been described by some authors as almost tautological.**[iii]** Who survives? The fittest. But who are the fittest? Those who survive. And it is very difficult to escape that circle (Haldane, 1935; Popper, 1978; Brady, 1979; Peters, 1976; Hoyle, 1983).

If we organized a contest to cover some work posts, and after some interviews, we published a list of the selected candidates, in which we added as the reason for their selection that "they were the best for the post", probably the rest of the non-selected candidates would be wondering what they did wrong, because there is no clear and specific criteria of why those were the best. In a contest or a game, those who win are always the winners, but that is not the explanation of their victory, it is just a definition, an identification of the victory. In the life race too, those who survive are the best for surviving, but that is not any explanation of their survival. That is why Natural Selection is not an explanation, or an argument or hypothesis: it is just the identification of a factual result.**[iv]**

Note that there is no problem that Natural Selection cannot explain: for instance, the great enigma of dinosaurs. So it can easily explain both their total domination and their sudden extinction, although they are two contradictory phenomena: the

dinosaurs dominated the other species because they were more adapted to the environment, but when the environmental circumstances changed, they died out because they were no longer adapted.

If individuals “A” have survived individuals “B”, that will mean that the “As” are better adapted than the “Bs”. So we can always say, without fear of contradiction, that those who survive are the fittest, (the criteria to recognize adaptation is survival), so since they have survived, we will find in that some justification of their adaptation. And that will be a handicap, which will prevent us from knowing, lost in rhetoric, the true causes of their survival.
Darwin himself falls into this trap when using Natural Selection to explain two contradictory phenomena (Darwin, 1872, p.208):
“*In certain whole groups of plants the ovules stand erect, and in others they are suspended; and within the same ovarium of some few plants, one ovule holds the former and a second ovule the latter position. These positions seem at first purely morphological, or of no physiological signification; but Dr. Hooker informs me that within the same ovarium, the upper ovules alone in some cases, and in other cases the lower ones alone are fertilised; and he suggests that this probably depends on the direction in which the pollen-tubes enter the ovarium. If so, the position of the ovules, even when one is erect and the other suspended within the same ovarium, would follow from the selection of any slight deviations in position which favoured their fertilisation, and the production of seed.*”.

In order to explain why one species exhibits one trait rather than another, we need to know what the advantage is (otherwise our explanation would fit both the case and its opposite equally well). The traits generally depend on the epoch or the environment, and we do not see much collapse in the explanation given by Natural Selection, since the advantage can always be vaguely attributable to “the change of circumstances”. The problem arises when, like in the above case, we face the explanation of one trait and its opposite – ovules erect and ovules suspended – which share the same individual (a kind of plant), the same time, and the same circumstances. If supposedly the trait is the advantageous one, then its opposite is not. If the opposite trait is the advantageous one, the same reasoning stands for the former. In default of an explanation of why both appear in the same conditions, Darwin needs to admit that his selective explanation surprisingly fits in *any possible case*.
Such a loose explanation seems to blur the regular aim of Science, no longer like

hitting the target with a well-aimed shot, but rather like moving the target to catch the bullet in flight, wherever it goes. Thus, nobody knows with certainty why the dinosaurs came into being, or why they were dominant, or why they died out, despite the fact that, by Natural Selection, we can be sure that they were perfectly adapted for a time, and perfectly unadapted, some time later.
The answer is always the same: "Evolution goes on thanks to the fittest species", but actually it does not mean anything by it, since there is no identification of any real reference or cause that made those species more efficient.

The strange thing about Natural Selection is not that it does not fail, but it *cannot* fail. Any scientific theory can be falsified, (with mental experiments, for instance). Natural Selection cannot: it is *only* and *always* correct, by definition. Any experiment we can imagine, will always be attributable to Natural Selection. If we asked: why did they survive? The answer is: "because they were fitter". But how do we know they were fitter? And the answer is "because they survived".
From this vague and circular argument, the only thing we can conclude is that the fittest do survive *at each moment*, without specifying why, nor the strange directionality of evolution, that does not go back to retake species once they have died out, even if the environmental conditions are the same ones that propitiated their appearance.

Another strange feature of Natural Selection is that it cannot predict. A scientific theory, in order to be recognized as such, requires *falsification* and *prediction*, both based on the model's ability to predict phenomena, in order to be validated (if the prediction is correct) or refuted (if it is incorrect). Natural Selection is not able to predict, *a priori*, which individuals or species will survive others; the only thing it does is to note their survival *a posteriori*, and look for the justification of their adaptation in it. That is why, actually, it is not a scientific theory: its hypothesis is the pure observation of facts. Its pseudo-prediction on "the survival of the fittest", is equivalent, in our football example, to predicting that "the team that scores the most goals will win", or in the medicine example, that "the one who stops breathing will die" (see Endnote iv).

Darwin himself concedes this lack of ability for prediction:
"*Who can explain why one species ranges widely (...), and why another allied species has a narrow range and is rare?*" (Darwin, 1968, p.68)
And elsewhere:
"(...) Probably in no one case could we precisely say why one species has been

victorious over another in the great battle of life". (Darwin, 1968, p.127)
Note that the past tense of his last phrase *"has been victorious"*, is indicative of the impossibility of explaining survival, not even *a posteriori*, when we already have the result in front of us.

Since both features, *falsification* and *prediction*, are required for any scientific theory in order to be considered as such, we are forced to wonder: *"Should we then acknowledge the enviable status of the Natural Selection hypothesis, and abandon the requirement of refutability as a symptom of good Science, and the theoretically controlled prediction as its main objective?"* (Marone, 2002).**[v]**

6. Beyond the Tautology
The first sentence of a letter to the Editor, signed by Ledyard Stebbins, in response to a paper by R.H. Peters, reads as follows (Stebbins, 1977, p.386):
"The article by R.H. Peters (1976) which leads off 110 volume of the American Naturalist could be dismissed by evolutionists as so far removed from evolutionary theory and experimentation as not to be worthy of attention were it not the lead article in a journal which in the past has been an outstanding organ of communication between biologists interested in major theories (…)"

As we can see, Darwinists' reactions against those, like Peters (Peters, 1976), who maintain the tautological character of Natural Selection, are anything but moderate –Stebbins, for instance, does not even cite Peters's paper in the section "Literature cited". It seems that, for them, critics of this kind are just "wealthy amateurs" (*Objections*, n.d.), (an implicit accusation of intrusiveness), and accuse them of simplification, misunderstanding, misquoting or quoting out of context, or even misunderstanding the notion of "circularity" (an implicit accusation of not understanding anything at all) (Caplan, 1977). So much sensitivity is understandable, since it would be terrible for top scientists – supposedly reasonable – to recognize that they have fallen into the syndrome of "the emperor's new clothes", fooled by false bafflements, moved by the fear of not being considered smart enough, if they don't agree with the orthodoxy.
In the introduction I pointed out the difference between *fact* and *explanation*; now I would like to point out the difference between *explanation* and *understanding*. Many times in Science we have thought we understood, when we just had an explanation. If the explanation is good enough, knowledge increases on a solid basis, but in some cases the explanation is poor or out of date, and still, in the lack of something better, reaches a position of "orthodoxy", growing artificially

upon more or less redundant justifications. This produces an *inflation of knowledge,* a knowledge bubble, which bursts when a new discovery shows its incorrectness, or its obsolescence.
This has happened in the past (the paradigmatic example is the hypothesis of the "ether"), and in my view, it is what is happening with Natural Selection now. For its time, when it was believed as an unquestionable matter that species were created by God such as they were, the explanation that species change over time through natural processes was undoubtedly revolutionary. For one hundred and fifty years afterwards, though, this explanation is taken for granted, not anymore a challenge for our minds.

I think those of us that dare to think Natural Selection is a tautology, do not have any intention to fool Science with artificial matters or empty rhetoric. Deep down within this controversy, there is a fundamental question: whether competition, the survival instinct, can be the explanation for the lives and progress of species, given that, at heart, this is an inherent instinct to life, and cannot be removed in any experiment for comparison purposes.
Even if that causal link "survival-evolution" were real, is it testable? Stebbins's paper, for instance, talks about "*experiments*" that "*have, of course, enabled evolutionists to falsify definitely and for all time the Lamarckian hypothesis (…)*", as if the falsification of the Lamarckian hypothesis was the confirmation of Natural Selection (Stebbins, 1977, p. 388).

Apparently, in these experiments, the "population pressure" (competition) is what forces the change of species, with the individual being more or less irrelevant. "*The individual",* he says,*" is never identified as such any more than is the individual molecule in experiments dealing with the dynamics of gases (…)*" (Stebbins, 1977, p.388).
However, we also know that, according to Natural Selection, the essential change from one species to another comes precisely from the individual, more concretely, from a microscopic change within a gene of the individual. And that is why this hypothesis of competition causing the species' change is so strange: it is as if a tank of Oxygen could turn into Hydrogen just because a single molecule reacted to a change of pressure, taking his gas example.**[vi]**

This question has been taken very seriously by Marone *et al.*, who have tried to clarify once and for all the supposed causal connection competition-adaptation in their own field, (Ecology), not in purely epistemological terms, but in practice, by

measuring its impact on a practical work in the field on desert communities (Marone, 2002). "*We want to avoid the temptation of criticizing Natural Selection from a purely epistemological point of view*". They, however, "*beyond any reasonable doubt*", could not find any connection between the identified selection pressures and the expected adaptation results. This negative output prompts the authors to ask: ""*if we are right, it seems fair to wonder why we demand certain scientific canons in Ecology, which we suspend – without criticism?- when we are dealing with Natural Selection*".**[vii]**
It seems as if Natural Selection was, rather than a scientific theory, a frame of work, into which the observable needs to fit (Popper, 1974). That is why it is so surprising that, when dealing with Natural Selection, our work is restricted to finding "the explanation of why it explains", limiting our research to justifying why the observed fits within it.

In my view, its lack of predictive power resides in that it involves the typical uncertainty of randomness (environmental historical accidents, random mutations), on which it still tries to build the causal evolutionary connection.
As a scientist, of course I am ready to accept that random events show a statistical distribution, which becomes apparent, not in the single event, but in the long-term series of events: For instance, if we roll a pair of dice, we will observe that the combination "7" is much more frequent than the combination "2" in the long term, since it is much more probable.

Thus, according to some authors, evolution is not a problem of "survivability", but a problem of "probability of survival", which weighs the long term result on the side of "the fittest". For them, "*(…) fitness is more accurately defined as the state of possessing traits that make survival more likely; this definition, unlike simple "survivability", avoids* (Natural Selection) *being trivially true*" (*Objections*, n.d.).
Or, in a more developed explanation by H. Pagels (Pagels, 1990, p.118):**[viii]**
"*The probability distribution is like invisible hands. A good example is the slow and invisible process of biological evolution. This process is only real when we go beyond the apparent random events, and we examine a distribution of probabilities which gives an objective meaning to the environmental pressure on those species over others, better prepared for surviving in that environment*"

Yet, if it was so, it will be reasonable to expect that those who are fitter – i.e. those who have a higher probability of survival, in fact will survive more easily, i.e. they will occur more frequently, in the same way that our combination of "7",

because it is the most probable, is also the most frequent in a pair of dice. Therefore, according to that, the more evolved the species is, the more frequent it will be, or in other words: elephants would be much more common than flies. However, we do not observe that in nature: the pyramid of evolution is as shown in Fig. 3.a, not inverted, only changing its tendency with the appearance of human beings, when it starts to collapse at the apex (see Fig. 3.b).

Probably this little paradox – brought about by the redefinition of "the fittest" – is which has obliged some to relax the definition of "evolution" as well: "*Biologists do not consider any one species, such as humans, to be more highly evolved or advanced than another*". "*Evolution does not require that organisms become more complex. (…) there is a question if this appearance of increased complexity is real, (…) Complexity is not a consequence of evolution. (…) Depending on the situation, organisms' complexity can either increase, decrease or stay the same, and all these trends have been observed in evolution*" (We find this in *Wikipedia,* under the entry "Objections to evolution").

Immersed in that relativism, we need to stop in our attempt to understand a process that we cannot even define.

7. Shortfalls of Natural Selection

Besides this, the argument of Natural Selection based on "struggle" suggests the question: struggle, against what? The answer could be against other individuals, other species, or against adverse environmental circumstances, in general. In any case, it implies that evolution is driven by "something", however imprecise it may be, which is *external* to the species.

This idea avoids the possibility that the life of species is something inherent, essentially evolutionary (*per se*), in the same way as many other natural processes. For instance, the life of an individual follows a defined evolutionary pattern of birth-growth-&-death imprinted in its genes, no matter whether there is another individual developing next. The life of a species could just be the temporal extrapolation of the life of individuals, and therefore, with the same birth-growth-&-death pattern.

There are many other processes of this kind (essentially evolutionary), which follow a cyclic pattern of birth-growth-&-death imprinted in the system, with no connotations of any kind of competition or struggle against external factors: The life of a star, the life of a galaxy, the life of the Universe, (space-time), or even the life of scientific ideas, ruled by a rather different dynamic from fight or struggle,

according to Planck (see quote in section 2).
Finally, in the evolution of species we can clearly identify two changes of paradigm that so far cannot be explained by Natural Selection: one is the origin of life itself, the other one is the origin of consciousness (intelligence). These are represented schematically by the two leaps in fig. 4. The first one represents the origin of life, emerging from an inert substrate, the second represents the origin of consciousness, emerging from unconscious life.

The first of these phenomena (the appearance of life from an inert substrate) cannot be explained by Natural Selection, since a statement based on surviving obviously only makes sense for organisms that are already alive. Therefore, the lower limit of validity of Natural Selection is clear: just beyond the border between the alive and the inert, not managing to explain such a leap: how or why that first living cell arises. The second of these leaps, the appearance of consciousness, marks a turning point in evolution, and still remains an enigma for anthropologists (Flinn, 2005, p.10). Both changes of paradigm fully enter in what we call the evolution phenomenon, and should not be ignored by any theory that aspires to explain it.
It is far from my intention to propose an alternative, pseudo-scientific model for evolution. Still, let me say that we might need to seek the explanation of life at the heart of the physical laws that explain the evolution of the Universe, not in an isolated way within Biology, as if the evolution of life were an independent phenomenon from everything else, and could evolve as if it were alien to it. In other words, life could be an evolutionary phenomenon, in the context of an evolutionary Universe. If that were right, the arrow of life's complexity would inexorably point towards the future, regardless of competition or eventualities, parallel to the arrow of time.
Of course, we are far from understanding the laws of nature, as to reach an understanding of its connection with the enigma of life and consciousness. But for the XXI century, this line of research, in my view, is much more challenging.

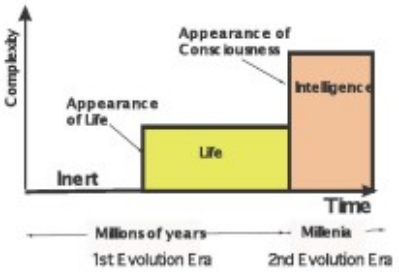

Fig. 4. Evolution, in perspective. This schematic drawing shows the different stages of evolution. The first era corresponds to unconscious life, which starts with the appearance of the first living cell (origin of life), and ends with the appearance of consciousness. This latter leap represents a change of paradigm comparable to the origin of life, and marks the second era of evolution

8. Conclusion

In his last chapter, "Recapitulation and Conclusion", Darwin writes:

"*Although I am fully convinced of the truth of the views given under the form of an abstract, I by no means expect to convince experienced naturalists, whose minds are stocked with a multitude of facts all viewed, during a long course of years, from a point of view directly opposite to mine. It is so easy to hide our ignorance under such expressions as the "plan of creation", "unity of design", etc. and to think that we give an explanation when we only restate a fact*". (Darwin, 1968, p. 453)

I cannot think of a more accurate conclusion for my paper; let me borrow it, just changing the words "plan of creation" and "unity of design" for others like "natural selection", "survival of the fittest" or "struggle for life".

NOTES

[i] To be honest, this suspicion is sometimes justified. Some very conservative religious parties are still reluctant to accept evolution today, others do accept

evolution but promote strange (not scientific) initiatives with scientists in support of their thesis, see for instance the manifest "against Darwinism", signed by one hundred scientists (ASDD, 2001). Since when do so many scientists need to co-sign a statement against, or in support of a scientific theory? But even stranger is the over-reaction of Darwinians, by collecting seven thousand scientists' signatures in just four days (ASSD, n.d). The battle still continues, giving an idea of how contaminated the debate is on both sides, on not so purely scientific or argumentative grounds.

[ii] A "Big Bang" of Life, comparable to the Big Bang of the Universe.

[iii] Popper, in his article "Natural Selection and the Emergence of Mind", regrets in the past having described the theory as almost tautological (Popper, 1978, p. 345). To understand this change of mind, it is useful to know that this paper is actually the speech he delivered at Darwin College (Cambridge) on November 8th, 1977. He may have fallen under the spell of the high reputation of both Darwin and Cambridge, when he was invited to give the first Darwin lecture. Such a "*great honour*", as he says, not being "*a scientist nor (...) a historian*" (Popper, 1978, p.339), may have conditioned his change of mind.

[iv] Identifying *result* and *process* is the main mistake of Natural Selection. It is as if, in a football match, for instance, we tried to explain the reasons for the victory in terms of the score, we would not have the chance to understand the *tactics* that propitiated that victory. A characteristic of the result (the survival, the victory) cannot be identified with, and used to explain, the *process* that led to that result, or the causes that conditioned it. If we explained, for instance, the death of somebody by saying that "he stopped breathing", it is obviously true, everybody dies for that reason, but the "stop-breathing" argument would not explain much about *why* that death came about. In the same way, "the survival of the fittest" is a *result,* and not the only one, of the process of evolution. Natural Selection fails in using it to explain the deep reasons that drove that process (evolution) throughout time. Despite the redundancy of this model, its wide success is surprising. A similar argument such as the one above to explain someone's death would not have had any credit in Medicine.

[v] Original in Spanish. Translation by the author.

[vi] The irrelevance of the individual on one hand and his relevance on the other seems to be a contradiction of the theory, and the step from the outside macroscopic pressure to the inner microscopic mutation is not clear – especially now that the Lamarckian hypothesis, according to Stebbins, has been dismissed.

[vii] Original in Spanish. Translation by the author.
[viii] Source in Spanish. Translation by the author.

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