

ISSA Proceedings 2010 - Three Kinds Of Polemical Interaction



In this paper, I will follow Marcelo Dascal's typology for different kinds of debates. His typology covers the main features of the basic kinds of polemical interactions. Other approaches, like Eemeren's pragma-dialectical or Pera's rhetorical approaches make important contributions to the subject; Eemeren, to the structure of what Dascal calls "discussion", and Pera to the use of rhetorical resources in what Dascal calls "controversy". However, Dascal's approach (Dascal: 2009, 2005a, 2005b, 2006, among others) deals with "soft" rationality without reducing it to the parameters of the logic of demonstration, the issue which is at the heart of all polemics about debates. He refers to 'hard' rationality as a concept of rationality which has standard logic and its application as its fundamental model, according to which there must be uncompromising obedience to the principle of contradiction; precise definitions; conclusive, deductive argumentation; formalization and similar parameters. "Soft rationality" covers the vast area of the "reasonable" and is the logic of presumptions which justify without proving, of the heuristics of problem-solving and hypothesis generation, of pragmatic interpretation, of negotiation, of exercising 'judgment', and of countless other procedures (as Dascal says) for dealing with theoretical as well as practical situations where uncertainty and imprecision are the rule.

I intend to show how Dascal's typology applies to the following debates: Charles Darwin *versus* Joseph Hooker on the migration of organic beings to explain phenomena of geographical distribution, Charles Darwin *versus* Alfred Wallace on the meaning of 'natural selection', and Charles Darwin *versus* George Mivart on the origin of species. Dascal's types are ideal types which may smoothly pass from one to the other. But they are solid analytical referential. The analyses of these debates make explicit the role of some specific points, such as the role of presuppositions, or the presence or absence of audience (thus potentially putting at risk the reputation of the contenders), and even the kind of their personal relationship with each other. In order to bring these points to light, it is helpful to have in mind the more basic question which relates to the one more immediately

at issue. In most cases, at this level of analysis the presuppositions involved arise naturally and reveal the contenders' differences or convergences, which guide much of the more immediate debate. In all of the three cases to be analyzed, the bottom problem is the explanation of how species are originated in Nature. A debate between friends can make the contenders more prepared to change their minds or to find a reconcilable solution. The presence of an audience makes the contenders worry about preserving their reputation. The Darwin *versus* Mivart polemic took place in public, and the presuppositions and world view of each of them were irreconcilable. The debate between Darwin and Wallace was restricted to their personal correspondence. It did not detract from the acceptability of Darwin's theory, but brought out some important issues related to the differences between their approaches, which have often been overlooked by their commentators. Darwin and Hooker's divergences were a *quasi*-epistolary episode, and their most heated arguments took place in their private correspondence. However, as Hooker had been invited to give a lecture on Darwin's theory at the British Association for the Advancement of Science, Darwin was afraid that their divergences might have public resonance, which could have affected the acceptability of his theory.

In order to make my guidelines clear, I will initially present one of Dascal's summarizing charts of his theory of controversies, which were presented in more than one place, to which I have added an extra row related to the role of rationality which characterizes each kind of debate:

	DISCUSSION	CONTROVERSY	DISPUTE
AIM	Truth	Persuasion	Victory
EXTENSION	Localized	Generalized	Localized
PROCEDURE	Decision procedure	Debated method	No internal method
PREFERRED MOVE	Proof	Argument	Stratagem
ENDING	Solution	Resolution	Dissolution

POSSIBLE COGNITIVE GAINS	Elimination of mistaken beliefs	Clarification of divergence; conciliation of opposites; Emergence of innovative ideas	Discovery of irreconcilable positions / attitudes
RATIONALITY	<i>Hard</i> (logic of demonstration)	<i>Soft</i> (logic + dialectics + rhetoric)	??? (Irrationality? Mere eloquence?)

1. Charles Darwin versus Joseph Dalton Hooker

The sources (texts and co-texts) of the debate to be here analyzed are found in Charles Darwin's *On the Origin of Species* (Darwin 1859, 1861, 1866), in Joseph Dalton Hooker's *New Zealand Flora* (1853), *Flora Tasmaniae* (1859), *Insular Floras* (1867) [which was originally delivered as Hooker's lecture to the *British Association for the Advancement of Science* (Nottingham, 1866)], and in their *Correspondence* from 1866 (2004).

The problem to be debated is concerned with geographical distribution: how to explain the fact that organic forms which are similar to each other inhabit territories which are distant from one another and not connected to one another? The debate seems at first to be closer to a *discussion*, in the sense that the contenders agreed on many of the basic assumptions related to the issue, and on the central role to be played by "good evidence" in order to solve the question at issue.

The basic question is how species are originated in Nature. For Darwin, *species are only well marked varieties*, from which new species are originated by means of "natural selection" or the preservation of favorable variations and the destruction of the injurious ones. Darwin's argument in favor to his position consists in his entire theory exposed in the *Origin of Species* which he referred to as "one long argument". This consists of four main steps: I. Historical Sketch (added to the 3rd. British edition, 1861), where he expounds his theory as the culmination of an evolutionist thought; II. Introduction, where he states his objectives and requires from a theory not only to marvel in face of the beauty and complexity of all adaptations and co-adaptations found in Nature, but to show how they actually happen; III. The development of the logical-conceptual framework of

the theory (chapters I-V), where Darwin presents the concepts of Domestication, Nature, Struggle for Existence, Natural Selection, and the Laws of Variation; IV. The explanatory power of Natural Selection: IV.I The treatment of the difficulties the theory has to face (chapters VI-IX); IV.II The transformation of key unfavorable evidence into favorable evidence (Chapter X); IV.III. Cases clearly favorable to the explanatory superiority of the Darwinian theory (chapters XI - XIV); V. Conclusion, where he recapitulates his “one log argument” showing all of its articulations in one and the same breath.

Hooker had no theory about the origin of species, but focused more on varieties. Although his main insights on the subject were in disagreement with Darwin's in *New Zealand Flora* (1853), he came to agree with Darwin's answer in *Flora Tasmaniae* (1859). In 1853, on considering the arguments and evidence in favor of the permanent specific character in the case of flora, he did not find unchallengeable bases for asserting the contrary, i.e. the mutability of specific character. His argument at that time was based on the limited power of external forces to produce new species, and on the fact that entirely diverse species maintained their own character, as well as on the fact that individuals living within the boundaries of the area occupied by another species tended to disappear. The fact that bigger families have a greater or lesser distribution in proportion to their greater or lesser facility for their dispersion would be evidence in favor of the geographical fact of dispersion. In 1859, Hooker recognized the impact of the theories of Darwin and Wallace had had on him, and held the hypothesis that species are derived and mutable. This amounted to saying that he supported the theory of natural selection. He found evidence for the mutability of species in the fact that Nature starts from variation: it first multiplies, then destroys, and finally isolates, and that the power to change ceases only when the life of the individual ceases (this condition would explain the limits and laws of variation). At the same time, he admitted that species are (temporally or not) real. Generally speaking, Darwin and Hooker had no major divergences about the origin of species.

In the light of his theory, Darwin defended the hypothesis that the great fact of geographical distribution, namely, the similarity between organic forms living in territories far apart from each other and without any land connecting them, was explainable by the occurrence of the occasional means of transportation. Edward Forbes' theory of continental extension explained the contemporary geographical

distribution of organic forms by supposing an earlier connection between the continents. Although this hypothesis might favor Darwin's theory of natural selection, he did not think that Forbes' theory was well supported by evidence. Darwin's own solution to the problem led him to make a careful study of the occasional means of transportation of organic forms. Hooker thought that Darwin's theory about this transportation was not borne out by the available evidence, and initially (1853 and 1859) was in favor of Forbes theory. Later, Hooker changed his opinion.

The argumentation between Darwin and Hooker was based on a debate about "evidence", which took place only in their correspondence. Hooker alleged he (Hooker) was not in favor of the theory of continental extension just because he was against the theory of transoceanic migration. He said had yet not formed an opinion. All the difficulties Hooker raised against Darwin's theory were listed in *Insular Floras* and were previously reported to Darwin in July, 1866 (*Correspondence* 2004, p. 253, 260). Darwin analyzed the counter-evidence presented by Hooker in the cases of Madeira, the Azores and the Canary Islands; called attention to the cases of coral islands with vegetation, and to probable cases of chance means of transportation which were inexplicable by the opposing theory (*Correspondence* 2004, p.257, 271, 281). According to Darwin's own words, it was not a case of a "proof" of his theory, but of sufficient evidence in favor of it, without any valid objections, whereas he maintained there were valid and weighty objections against the opposing theory (*Correspondence* 2004, p. 272, 282). For his part, Hooker answered the difficulties Darwin raised by analyzing from his point of view the evidence of the Azores, Madeira, and the Canary Islands (*Correspondence* 2004, p. 276). He alleged that there was evidence against what D. had said in the *Origin* (3rd. edition) about the rocks in the Azores and birds in Madeira, and that there was no evidence against to what was demanded by Forbes' theory in relation to the flora of England and Ireland. The debate about evidence seems to characterize a "discussion", i.e. how to apply the criteria shared by both parties - what is a "good evidence" - to deciding the question.

However, as Darwin himself recognized, it was not a question of "proof" (as is the case with "discussion"). On the contrary, at the meta-level of their argumentation, when the two parties were evaluating the very principles which guided their argumentation, Darwin said that it was a matter of choosing the best explanatory alternative: "... we both give up creation & therefore have to account for the

inhabitants of islands either by continental extensions or by occasional transport; now all that I maintain is that of these two alternatives, one which must be admitted as notwithstanding very much difficulty, that occasional transport is by far the most *probable*" (*Correspondence* 2004, p. 287). Hooker, in turn, assumed that Darwin expected the occasional means of transportation to be more than *a well established hypothesis*. (*Correspondence* 2004, p. 288). Hooker said that he intended to expound all the difficulties impartially and let the jury decide. "In my inmost soul" - Hooker said - I conscientiously say I incline to your theory - but I cannot accept it as an established truth, or unexceptionable hypothesis" (*Correspondence* 2004, p. 285). They both made it clear that it was not a case of a victory by conclusive evidence, but rather a matter of persuasion by offering alternative theories. Hooker recognized he made progress through the debate: "To be sure I have a very much clearer notion of the pros and cons on both sides (...) I see the sides of the well further down and more distinctly, but the bottom is obscure as ever" (*Correspondence* 2004, p. 288). In this way, the debate comes nearer to a "controversy", although it focused mainly on a localized question.

When we look at their argumentative strategies, we also find moves which are closer to those of a "controversy". They both tried to show the capacity of each one's standpoints for answering difficulties and objections; they both appealed to the explanatory power of the theory they defended as a whole. They both made use of emotional language. The day when Joseph Hooker was supposed to give a lecture on his own work and on his appreciation of the Darwinian theory of natural selection, was rapidly approaching. Up to this point, the debate had been a private one. Darwin feared their disagreement on the theory of means of transportation could become public and have a negative effect on the acceptance of his theory: "In Nottingham, when you exorcize the occasional means of transportation, be honest and admit how little we know about this subject" (*Correspondence* 2004, p. 272). In another note: "If you do not come here (at Down) before Nottingham, if you do not come afterwards, I shall think myself diabolically ill-used" (*Correspondence* 2004, p. 287). Hooker answered that Darwin should not resent the fact that they each saw things in a rather different light (*Correspondence* 2004, p.285), and that "disputants seldom stop to measure the strength of their antagonistic opinions" (*Correspondence* 2004, p. 288). Hooker had said: "You need not fear my not doing justice to your objections to the Continental hypothesis!" (*Correspondence* 2004, p. 282). "Do not be afraid: I will do justice to your objections to the continental hypothesis". The day next to

Hooker's lecture, Hooker wrote to Darwin: "the whole thing went off last night in a very good style" (*Correspondence* 2004, p.303). Hooker pointed out that Darwin's theory of migration provided an independent support for the Darwinian theory of natural selection, and that while Forbes' continental extension theory accounted for too much and then explained nothing, Darwin's theory, though it left unexplained a multitude of facts, offered a rational solution for many of the puzzling phenomena which were facts of no scientific interest in the light of Forbes' theory.

2. Charles Darwin versus Alfred Russel Wallace

Charles Darwin and Alfred R. Wallace had a great deal of background in common. They both spent several years as naturalists in other countries - Darwin spent five years on the *Beagle*, and Wallace eight years in Malaya. Both reached the turning-point of their careers in the tropics. Wallace read Darwin's "Voyage on the *Beagle*", and both read Lamarck, Humboldt, Malthus and Lyell. Like Darwin, Wallace became fascinated with the Galapagos Islands.

In the summer of 1858, Wallace sent to Darwin from the Malayan archipelago his essay *On the Tendency of Varieties to depart indefinitely from the Original Type*. "And his essay contained exactly the same theory as mine", said Darwin (Darwin 1993: 121). In fact, Wallace's paper put forward important points which were similar to those of Darwin's theory. The problem was solved with the help of Charles Lyell and Hooker. Wallace and Darwin jointly delivered their papers to the Linnean Society in June 1858. Then, Darwin hurried to finish his book *On the Origin of Species*, which was published in 1859. In spite of their similar background and the friendship which grew between them after Wallace's return to England, they diverged on many points throughout their lives, as they did in their debate about the meaning of "natural selection".

This debate was restricted to an epistolary episode, with no public resonance. Wallace claimed: "natural selection is a confusing expression". He argued that it was inadequate for the "general public", required personification, and confounded "fact" and "agent". "Natural selection", he said, was a metaphorical expression and a more precise one was needed. "Natural selection" was rather the result of the process, and the expression "the survival of the fittest" would be truer to the facts. Wallace also pointed out that Darwin argued against himself when he said that it was not improbable that favorable variations sometimes occurred. Why did he not simply say that variations of all kinds always occur and

leave the onus of the proof to his opponent? (*Correspondence* 2004, 227-230). (This suggestion would deprive “favorable” variations of a privileged status!)

More than precise meaning was at issue. Debating “natural selection” amounted to debating the basic question: “how do species originate in Nature?” The sources here analyzed are Darwin’s *Origin of Species* (1872 and 1959), Wallace’s *On the law which has regulated the Introduction of New Species* (1855), Wallace’s *On the Tendency of Varieties to Depart Indefinitely From the Original Type* (1858), and their July 2 and July 5, 1866 correspondence (2004, pp. 227-230; 235-237).

We have already seen how Darwin answered the question concerning the origin of species. For Darwin “species” were “well-marked varieties” and “varieties” were “incipient species”. New species were produced from common descent with modification by natural selection. For Darwin, “natural selection” was the process by means of which new species were produced in Nature. “Natural selection” was a process-and-its-result which implies, among other things, thinking about the kind of causal relationship involved (but that will be left aside here), i.e. an “agent” and a fact, with the objective dimension of a mechanism, and the power to act of a subject:

“I have called this principle, by which each slight variation, if useful, is preserved, by the term Natural Selection, in order to mark its relation to man’s power of selection. *But the expression often used by Mr. Herbert Spencer of the Survival of the Fittest is more accurate, and is sometimes equally convenient.*” (Darwin 1872, 49) - we italicized the passage included since the 5th. edition, 1869.

In all the six editions he revised Darwin says:

“Natural selection acts only by the preservation and accumulation of small inherited modifications, each profitable to the preserved being.” (Darwin 1872, p. 75)

“This preservation of favorable individual differences and variations, and the destruction of those which are injurious, I have called Natural Selection, or the Survival of the Fittest.” (Darwin 1872, 63).

Wallace replaces “natural selection” with “the great law” or “the general principle of Nature”. In his 1855 paper, *On the law which has regulated the Introduction of New Species*, he refers to the great law which explains all biological phenomena and the tendency of domestic varieties to revert to their *original type*: “every species has come into existence coincident both in space and time with a pre-

existing closely allied species” (Wallace,1871, pp. 10; 25). In 1857, Wallace presented the general principle of Nature which explained all biological phenomena as follows:

“... a tendency in nature to the continued progression of certain classes of *varieties* further and further from the original type - a progression to which there appears no reason to assign any definite limits (...) by minute steps, in various directions, but always checked and balanced by the necessary conditions, subject to which existence can be preserved (...) so as to agree with all the phenomena presented by organized beings, their extinction and succession in past ages, and all the extraordinary modifications of form, instinct, and habits which they exhibit”(Wallace 1871, pp. 43-44)

Given a change in the external conditions, by means of a gradual process those individuals

“forming the least numerous and most feebly organized variety would suffer first, and (...) must become extinct. The same causes continuing in action, the parent species would next suffer (...) and (...) might also become extinct. The superior variety would then alone remain, rapidly increase in numbers, and replace the extinct species and variety.” (Wallace 1871, p. 44).

The process by which new organic forms are originated was viewed rather as progression by elimination or extinction of those which are deficient, rather than by the preservation and accumulation of variations beneficial to those which bear them.

The “struggle for existence” was a basic factor for both naturalists since it established the conditions for the release of the mechanism by means of which new species appear. For Darwin, however, “struggle for existence” is referred to as a network of organic and inorganic relations which provides a representation (a picture) of Nature as a complex system, and by this means allows for an inquiry into the ontological status of Nature. Right from the 1st edition of the *Origin*, Darwin conceives the “struggle for existence” as forming such a network (Darwin, 1872, Chapter III, p.50).

Wallace’s view of the “struggle for existence” is restricted to a state of affairs or a general fact to be found in Nature, and is related to the following factors (Wallace 1871, pp. 28-41): (1) The population of a species fluctuates, but a permanent increase is almost impossible, due to the search for food, prey-

predator relationships, natural increase control, environmental changes; (2) The role of the individual organization and favorable (adaptive) and unfavorable variations; (3) Species are like individuals: only the fittest survive; (4) Extinction of the unfitted forms as a result of the “struggle for existence” explains progression and continuous divergence. However, if variations occur in parts which are unimportant for the preservation of life, varieties may develop together with their parental species; (5) Animals are better fitted (their powers are better exercised) in Nature than under domestication. (6) The analogy between Domestication and Nature is false, and we cannot infer from Nature to domestication.

In the *Origin*, Darwin gives two definitions of Nature which were included in the 3rd edition, 1861, and we can see it is objective and determined by dimension, as well as its dimension as an autonomous “subject”:

“ .. it is difficult to avoid personifying the word Nature; but I mean by Nature only the aggregate action and product of many natural laws, and by laws the sequence of events as ascertained by us.” (Darwin, 1872, p. 63)

“Nature, if I may be allowed to personify the natural preservation or survival of the fittest, cares nothing for appearances, except in so far as they are useful to any being. She can act on every internal organ ...” (Darwin, 1872, p. 65)

This all-embracing view of Nature exhibits an order (as opposed to chance). Through the view of Nature as a complex system, domestication becomes a niche within Nature, and is subjected to Nature’s law in spite of the particular conditions which pertain under domestication. Man’s actions can interfere with Nature’s selection, but he cannot act unless Nature gives him the variations. There is an analogy between Nature and Domestication rendered by analogous circumstances and common laws, and we can infer from Domestication to Nature by making due allowance for the particular conditions of domestication (Darwin, 1872, chapters I, IV and V).

We can infer from Wallace’s observation that Nature works on so vast a scale that the “doctrine of chances” applied to it is strictly accurate (Wallace 1871, p.37), that the “order” of Nature lacks the ontological connotations it had for Darwin. In Wallace’s texts, “nature” figures mainly in the expression “state of nature”, as opposed to the “state under domestication”. For Darwin, Nature is more than a state: it is personified as an object to be determined by human beings, and as a subject which acts.

We can now understand why Darwin's meaning of "natural selection" became a serious problem for Wallace, and why Darwin could not accept the latter's insistent plea to replace "natural selection" with "the survival of the fittest". Darwin gave Wallace the following answer (*Correspondence* 2004, pp.235-237): that very few people would be sensitive to the confusion, and that his expression had certain advantages over Spencer's "the survival of the fittest". Darwin considered the impossibility of "the survival of the fittest" being "used as a substantive governing a verb" as a real objection to Spencer's expression (*Correspondence* 2004, p.235), and this amounts to criticizing the possibility of using it as an "agent". Implicit in Wallace's criticism was the fear that the general public might understand "natural selection" as being more than the result of the elimination of the unfitted. This would not be a problem for Darwin, for whom 'natural selection" was both a process and a result, an agent and a fact. He would not be concerned by the metaphorical character of "natural selection", as he explained in the 3rd edition (1872, Chapter IV). He agreed with Wallace that he had said too much about the preservation of *favorable* variations, but that Wallace had over-emphasized the elimination of the *unfavorable* ones.

Their debate seems to lie somewhere between a "controversy" and a "dispute". As is typical of a "controversy", it was generalized, and there were no pre-established decision procedures. Indeed, it showed Darwin and Wallace had opposing views about Nature, its principles, and the way they operated. This and the fact that the whole debate did not make them change their own positions are aspects typical of a "dispute". Nevertheless, the issue of the "audience" has a different function here. Wallace had the "general public" (to be persuaded) in mind, while Darwin was not worried about this. Darwin told Wallace that he would revise his use of the expression "natural selection" in his next edition (the 5th edition, 1869). Their argumentative strategies could be used in a "controversy" as well as in a "dispute". Darwin answered the objections by disqualifying them and the sources on which they were based. For instance, he referred to as "metaphysicians" those who did not understand ordinary people, and said that, in Spencer's work, it was almost impossible to distinguish between the direct effect of external influences and "the survival of the fittest". Wallace's criticism was based on a defense of his own views. Both Darwin and Wallace made use of a strategy typical of those who criticize their opponent's views by affirming their own, i.e. leaving the onus of proof to the other party.

3. Charles Darwin versus George Mivart

I will briefly report on this polemic, which was presented at the 6th ISSA Convention, and examined in detail elsewhere (Regner, 2008). Here, it serves as a typical case of a “dispute” when compared with the other cases analyzed above. My sources are Charles Darwin’s *The Origin of Species* (1872) and St. George Mivart’s *On the Genesis of Species* (1871). In order to better understand the polemic, I will begin with some co-textual and contextual information.

The debate began with Mivart attacking Darwin’s theory of natural selection as presented in *The Origin of Species*. In fact, these attacks had begun earlier. St. George Mivart was a former member of the Darwinian circle, and highly praised by Thomas Huxley, Darwin’s great friend. However, he seems to have become disenchanted with natural selection. In 1845 he converted to Catholicism, and saw evolution by natural selection as detrimental to the Catholic faith. *On the Genesis of Species* was, in fact, a collection of criticisms of Darwin’s theory published in the Catholic journal *The Month*, to which Mivart was a regular contributor. Mivart tried to reconcile his religious and scientific beliefs. Later, his relationship with Huxley deteriorated (due in part to Huxley’s views on Catholicism), and Mivart was excluded from the scientific inner circle and started to write more about Catholicism. Mivart’s *On the Genesis of Species* had a strong impact on the public, and Darwin could not ignore it. Darwin delayed the publication of the 6th edition of the *Origin* in order to include a new chapter (1872, Chapter VII) which was mainly dedicated to answering Mivart’s objections.

The focus of the debate was the following basic question: “how are new species produced in Nature?” In spite of apparently dealing with the same problem (the *origin* and *genesis* of species), what was at stake was more than a specific question. “Origin” and “genesis” were based on very different arguments which generate different sets of questions. Darwin’s objective was to answer the specific question as a purely “natural” phenomenon. Mivart’s goal was to reconcile scientific, philosophical and religious views, and in this way to reconcile Evolution and Theology, by removing misconceptions and adding another stone to the “temple of concord”. It was necessary to attack the Darwinian evolutionary view, which *opposed*, according to Mivart, religious beliefs. In fact, Darwin wanted to keep them *apart from each other*, as belonging to different realms, and often declared in his correspondence that he did not think that evolution and religion, as different realms, were incompatible.

As the problem was different in each case, so were the answers to it. Darwin's answer depended on "natural selection" and left out the question of "creation", which Mivart stresses from the very beginning of his work. Mivart's proposal of a conciliatory path: a *tertium quid*, was a comprehensive view founded on a rational theism, according to which there would be two kinds of "creation": a supernatural or absolute creation, and a natural or derivative creation ("natural laws"). Mankind had a dual nature, biological and spiritual. In a general sense, the phenomena of specific forms could be explained by an internal force and a concurrence of laws. Mivart did not give a more detailed answer about the creative process. He concentrated his efforts on raising difficulties to Darwin's theory of "natural selection" rather than on proposing a theory of his own. Attacking Darwin's theory would pave the way to achieve his *tertium quid*.

When we look at their general arguments and argumentative strategies we can see that the entire argumentation consisted of Mivart attacking Darwin's theory and Darwin defending it on the basis of the structured "one long argument". In an attempt to construct a parallel between the two theories, Mivart describes the following structural steps: I. Introduction - where Mivart proposes to look for a *tertium quid*, reconstructs the Darwinian argument on his own terms, and examines the reasons for the wide acceptance of the Darwinian theory, which he maintains are basically founded on the ignorance of lay people; II. The scientific reasons for not accepting the Darwinian theory, and the plausibility of an alternative evolutionary view (I.Introduction, chapters II-XI); III. The main points of his proposal concerning "Evolution and Theology"(chapters IX, XI, XII). Mivart integrated the defense of this own position with his attack on Darwin's position. He could not argue in favor of his own theory without attacking Darwin's.

Darwin had constructed a solid theory by making use of a consistent set of argumentative strategies in the *Origin*: I. The particular whole-part movement in assembling his argument; II The explanatory power as a whole; III The comparison of his view with those of his opponents; IV The treatment of difficulties/ objections / exceptions; V. The weight of reasons for both sides of any issue; VI. The interplay of the actual and the possible; VII. Appeals to the extent of our ignorance, to scientific authority, values and ideals, to the psychological conditions of scientific investigation, and to the revolutionary character of his theory. Mivart's strategies took place on two main fronts. I. Defending his theory: I. I. Alleging that "natural selection" does not exclude other kinds of explanation; I.II Separating the domains of physical science, philosophy, and theology as relating to different kinds of "proof"; I.III Establishing careful semantic

distinctions, as in the case of “creation”; I.IV Appealing to well-known authorities. II. Attacking natural selection as an evolutionary approach: II.I Attacking Darwin on the bases of the concept of species and on the non-scientific credentials of his theory (Mivart mixed candor and irony in his comments); II.II Reconstructing Darwin’s general argument (as modified by his own interpretation); II.III. Analyzing a list of the general and specific difficulties of Darwin’s theory.

Darwin and Mivart also diverged on the presuppositions which determined their different positions. For Darwin, gradualism and naturalism were epistemological and ontological tenets, and evolutionism was the way of finding the answers to the origin of species, whereas for Mivart the general theory of evolution was “perfectly consistent with the strictest and most orthodox Christian theology”, but could not be considered as “fully demonstrated”. Darwin held a non-essentialist view of species, while Mivart held an essentialist view. Darwin had an interdisciplinary view of the support that evidence from different fields of scientific investigation could give to his theory, and advocated the separation of Science and Religion. Mivart’s attempt to explain how new species are produced in Nature view rested on a harmony between religious beliefs and scientific background which would bring the two together.

Darwin and Mivart’s debate is better classified as a “dispute”, given the fact that their opposing presuppositions precluded their opinions from reconciliation. Their presuppositions show that what was at stake was not a specific question but a variety of questions. Unlike from what happens in a “controversy”, they were not trying to persuade each other, but the scientific community. The way in which one depended on the other in this task is very different. Darwin had to answer Mivart’s objections moved by the impact they might have on their audience, but his answers would not be essential to the strength of his theory. Mivart, on the other hand, needed to make his attack on Darwin in order to have his theory properly structured. The conflict between their irreconcilable positions and attitudes did, however bring about a cognitive gain, even though they did not change their presuppositions or beliefs, and they both gave very detailed descriptions of a series of phenomena. In addition, each of them had to offer a consistent set of reasons for their position in order to gain the audience’s approval. The overall framework, in order to be rational, had to belong to “soft rationality”, which lies somewhere between “irrationality” and “hard rationality”.

4. Conclusion

First of all, Dascal's typology is a very helpful tool for understanding scientific argumentation, which is not reducible to "discussion" or to the obedience of pre-established procedures and the deductive logic criteria for appraisal of theories. Although preserved in their structurally analytical function, the ideal types are not rigidly applicable and show that the boundaries between them can be crossed. Instead of a weakness in the typology, this flexibility is one of its strengths. It permits its own enrichment by not only informing, but learning from its application to concrete cases, and leading to a greater attention to the context. In the debates referred to above, we can see the importance of presuppositions in a debate, as well as the attitude, cordial or hostile, to the acceptance of the opponent's ideas.

Secondly, "soft rationality" allows us to understand the argumentation used in the debates, which were not "irrational" enterprises. Darwin and Hooker were not indifferent to what might count as "good evidence" and "good criticism". Their debate could not be resolved in terms of a demonstration, so the choice of the best alternative by weighing up the various factors involved was a "rational" alternative. Darwin and Wallace's debate exemplifies the role of presumptions as well as the role of being accepted by the scientific community. Darwin and Mivart, although not interested in persuading each other, were seeking the "public" approval without forgetting that the community was sensible to "rational appeals".

Finally, all these debates pose meta-level questions. For example, Darwin and Hooker's debate raises the question about "evidence" not being free of interpretation and depending on a network of factors. Another question, in Darwin and Wallace's case, is that what is at stake in the debate may have a different impact on each contender. And, in all of the above cases, both "logos" and "pathos" have a role to play in the argumentation.

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