1999

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The Metaphors of *The Origin of Species*:
A Case Study of the Relationship between Metaphor, Thought, and Bodily Experience

By

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Presented in Partial fulfillment of the Requirements for
The Degree of Masters of Arts – Anthropology (Linguistics)

The University of Montana
1999

Approved by
Chairer, Board Examiners

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5-5-99 Date
Darwin’s book The Origin of Species by Means of Natural Selection abounds with metaphors. In fact, the very theory of natural selection is couched in metaphors that exhibit striking consistency and coherence. In this paper I attempt to approach these metaphors with some of the theoretical concepts developed within cognitive linguistics.

I argue that the phenomenon for which Darwin tries to detect the basic mechanisms, i.e., evolution, involves vast, indeterminate, and ambiguous observations that are difficult to subject to the empirical methods. This fact motivates Darwin’s extensive use of metaphors to organize his observations, structure the vague correlative concepts, and ultimately render his observations meaningful and intelligible.

I demonstrate that Darwin’s metaphors, as far as they are elements of Idealized Cognitive Model, prove valuable in achieving this goal. I first identify the conceptual metaphors underlying the main metaphorical expressions and show how these conceptual metaphors give rise to entailments and inferences central to Darwin’s theory. The conceptual metaphors I identify are NATURE IS A MOTHER, NATURE IS A READER, LIFE IS WAR, LIFE IS A RACE, and EVOLUTION IS PROGRESS. I then turn to characterizing the idealized cognitive models (ICMs) that function as the preconceptual ground in virtue of which the metaphors of The Origin are meaningful, coherent, and helpful to scientific thinking. These ICMs are the ICM of struggle, and the image-schema of SOURCE-PATH-GOAL.

In doing so I demonstrate that metaphor plays significant and constitutive roles in thinking everyday life as well as in scientific thinking.
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Acknowledgement

I should like to acknowledge my indebtedness and express my gratitude to a number of people without whose help and encouragement this study would have not been possible. Dr. John Douglas was considerate, patient and encouraging during the hardest time of my program. Professor Istvan Kecskes has overwhelmed me with incessant, generous, and warm support and encouragement, both professionally and personally. Language fails to convey my gratitude to him. Professor Katherine Weist has always been generous in her helps, advises, and comments and continued to be so as a member of the MA committee. Professor Matina has taught me in so many different ways, even greater than he may have recognized. He supplied me with a treasure of criticism and comments. Dr. Randall Skeleton has always been of great help. He tolerated a non-biologist's tampering with the greatest work ever written in evolutionary biology. At a crucial time of the progress of writing this study, when I had disturbing doubts about it's value, Dr. Irene Applebaum assured me and dispelled some of my doubts. Dr. Gregory Campbell was a radical educator who trusted me with a space of freedom, perhaps, more spacious than I deserved. My thanks and respects are due to these wonderful people.
Dedication

To the memory of my mother, Fatimah, who left our world suddenly and quietly while waiting for a long and anguished time.

To my brother, Ahmed, who is struggling with death after having struggled with life a long struggle
1.0 Introduction

1.1 The Subject and the Theoretical Approach

In this paper I attempt to approach the metaphorical expressions in Darwin's book *The Origin of Species* with some theoretical principles and concepts that have been developed within cognitive linguistics. The fundamental insight of cognitive linguistics, as regards metaphor, is that metaphors are conceptual in nature. This means that for the most part human reasoning as it is actually done is metaphorical (Johnson 1987:11). Humans do not experience the real world but, rather, a projected world (Lakoff 1987 & Jackendoff 1983, 1992), a world constructed by the biological nature of the human body and its interaction with the world. From the experiential interaction between the human organism and the physical world certain recurring patterns emerge and "percolate up" to the mind as cognitive models. It is through the mediation and extension of these idealized cognitive models (ICMs) that humans interpret experience and understand the more abstract and less delineated concepts.

Normative formal logic, according to the epistemological premises of cognitive linguistics, is only one cognitive model among others. Furthermore, many of the properties of formal systems are "simply formalizations of experiential patterns by means of which we organize our experience and understanding" (Johnson 1987 p.38). The categorical syllogism, for instance, "is...a consequence of the fact that we understand categories as metaphorical containers"(Lakoff 1987:353).
1.2 The Paper’s Thesis

The main thesis of this paper holds that the natural selection theory is a construction in which the concepts NATURE, LIFE, and EVOLUTION are metaphorically structured in terms of other concepts, that the basic metaphors of *The Origin of Species* (henceforth *The Origin*) are elements of idealized cognitive models, and these exhibit the typical characteristics predicted by the ICM theory. That is to say that the ICMs may or may not fit the world and that they are structured gestalts used to interpret and understand experience. That ICMs may or may not fit the world is only natural for any metaphorical mapping highlights some aspects of our experience and hides others.

Ultimately this paper is an appreciation of and inquiry into how certain bodily experiences wind up in the mind as structured gestalts metaphorically extended to shape Darwin’s theory of evolution and consequently our understanding of this phenomenon. That said, a precautionary remark is in order at the outset to avoid any misapprehension. This paper does not aim at refuting or invalidating (or for that matter interpreting) Darwin’s theory by saying “look natural selection theory is metaphorical, therefore it is false”, for the approach I adopt does not draw a sharp line between literal true reasoning and metaphorical false reasoning. On the contrary, it views metaphor as pervasive mode of language and metaphorical thinking as natural. Indeed, considering the philosophical premises of this approach, metaphorical reasoning is the norm, discernable both in everyday life discourse and scientific discourse.

*This paper, then, is a case study of how language and thought are manifestations of the preconceptual structures that emerge from bodily experiences and wind up in the*
mind as models for thinking and metaphorical mappings. Thus, whether the theory of natural selection is true or false is irrelevant to the purpose of this paper.

1.3 The Plan of the Paper

The paper comprises six sections including this introduction and a conclusion. In the second section I outline the theory of natural selection beginning with a brief historical account of its intellectual context. The third section is a theoretical exposition of the cognitive linguistics (see section 3.1) treatment of metaphor and the theoretical differences between autonomous linguistics and cognitive linguistics. This discussion is an important one for it situates the question of metaphor in a broad context as well as pointing to the motivation behind the distinctive treatment of metaphor in cognitive linguistics. A relatively detailed exposition of Lakoff and Johnson’s theory of the metaphorical concept and the ICM theory follows this discussion. The fourth section is an application of the theoretical innovations of cognitive linguistics to Darwin’s most important metaphorical expressions. In this section I identify the metaphorical concepts underlying those expressions and the entailment and inferences they generate. The fifth section is a demonstration of the interrelation between the metaphors of The Origin as elements of idealized cognitive models. Finally in the conclusion I summarize and recapitulated the findings of this study.
2.0 The Theory of Natural Selection: A Brief Exposition

2.1 The Intellectual Context of "The Origin"

Darwin’s book *The Origin of Species by Means of Natural Selection* is one of the most influential books ever written in the intellectual history of the West. In *The Origin* Darwin undertook a daring scientific enterprise, namely, to explain what had been generally accepted as a universal fact (i.e., evolution) with mechanistic simple natural law or principle, with no appeal to religious or metaphysical ideas. *The Origin* was the consequence of over twenty years of meticulous and systematic scientific research that started with the famous voyage on board of the *Beagle* in December 1831. Yet it was, as it is the case in every scientific work, conditioned and inspired by the intellectual horizon of its time. Thus, it was not exclusively Darwin’s book but also a book written, as it were, by a whole intellectual epoch. Consider, for example, this passage from Darwin’s *Autobiography*:

In October 1838...it happened to read for amusement Malthus on *Population*, and being well prepared to appreciate the struggle for existence which everywhere goes on from long-continued observation of the habits of animals and plants, it at once struck me that under these circumstances favourable variations would tend to be preserved, and unfavourable ones to be destroyed...Here, then, I had at last got a theory *by which to work* (emphasis added, In Schweber 1977:230)

At the turn of the nineteenth century the idea of evolution became a central idea that pervaded every discipline and functioned as an organizing principle that guided future research and structured the observations and data in every field of knowledge. It was not peculiar to biology, nor did it have its origin in it. In the following historical
sketch I will adopt Greene’s characterization of Darwinism as indicating a “general view of reality (natural and social) connected with scientific theories instead of being used to denote the theories themselves” (Greene 1981:132). In this sense the word Darwinism designates a worldview shared by many biologists, social theorists and philosophers in the eighteenth and nineteenth centuries, a particular intellectual climate, which favored the writings of The Origin and without which it would have not been possible. I use Greene’s concept of worldview as merely a descriptive concept. Greene depicts Darwinism as comprising three components, physical, organic and social plus an epistemological component that pervades, unifies, and confers on them a coherent view of how science should be done.

The Darwinian worldview developed and hardened over the ages since the seventeenth century when Galileo, Descartes, and Newton laid down its oldest and most general component, “the idea of nature as a law-bound system of matter in motion, the mechanical view of nature (with its corollary of primary and secondary qualities)” (Ibid., p. 130). In the following century and a half a temporal dimension was added and emphasized “to give rise to Kant-La Place nebular hypothesis, to Buffon’s theory of the origin of the solar system, to the geological uniformitarianism of Hutton and Lyell, ...and the full-blown evolutionism of Erasmus Darwin and Lamarck (Ibid., p.131). Erasmus Darwin and Lamarck adumbrated the second component of this worldview, “the idea of organic evolution from the simplest to the most complex living forms, including man through the operations of the system of nature”. The third component, the social dimension, came from Adam Smith’s book The Wealth of Nations (1776). He
championed the idea that “free competition in the marketplace was a divinely ordained system of natural liberty that, if allowed to operate by its own laws…would produce, as if guidance of a divine hand, the wealth of nations and the progress of mankind”(Ibid., pp.131-132). In the later stage of British political economy, Malthus and Ricardo discovered the dark side of Adam Smith’s optimistic ideas. Greene points out that “this competitive ethos was to exert a powerful influence on the thinking of Darwin, Wallace, and Spencer when combined with the idea of organic evolution and …[the] idea of a science of human progress based on laws analogous to those governing the physical world”. Herbert Spencer was the bold speculative architect who molded all these ideas into a grand evolutionary synthesis. He was an extremely popular philosopher in his time, perhaps, because he expressed the eidos of his time in the clearest and most appealing manner. “Spencer” writes Greene “was a “Darwinian” before Darwin, emphasizing the efficacy of population pressure, the struggle for existence, and survival of the fittest”(Ibid., p.134). His key idea in 1857 was progress, something out of human control, “a beneficent necessity”. In 1861 Spencer substituted “progress” with the term evolution. It was amid this intellectual milieu that Darwin formulated his idea of organic evolution and wrote his book.

2.2 A Fundamental Distinction

Any discussion of Darwin’s theory needs to make a fundamental distinction between evolution and the theory of selection. Evolution is the “observation” or the phenomenon that stands in need for explanation. Natural selection theory is the explanation. Thomas Kuhn writes that “the evidence pointing to evolution, including the
evolution of man, had been accumulated for decades, and the idea of evolution had been suggested and widely disseminated before [Darwin's theory](Kuhn 1996:171 & cf. Stebbins 1971:1-17). Natural selection, however, was new but far from revolutionary. This paper in its examination of Darwin's metaphors provides the evidence for the commonplace knowledge and cultural ground of natural selection theory.

2.3 Natural Selection

How does natural selection operate and produce the continuous appearance and disappearance of organic forms? The mechanism can be summarized as follows. Organic beings "continuously" reproduce new "unlimited" numbers of varied offspring that come to populate an environment, organic and inorganic, that possesses limited capacity for sustenance. Struggle for existence, the most primary condition under which all organisms live, ensues from this inherent contradiction between the geometric rate of reproduction and the limited environmental capacity. Finding themselves in this condition all organisms strive to get a portion from the environment, to reproduce the greatest number of offspring, and to live for the longest possible time. Since the individuals of a species exhibit clear variations in their physical organization and physiological functioning and no two individuals are identical, not all the individuals survive the condition of struggle. Only the fittest survive the struggle for existence. The fittest of these organisms continue to occupy the scene by reproducing offspring that possess, like their progenitors, advantageous characteristics. Darwin's theory of evolution can be found condensed in the following excerpt from *The Origin*, where I have
marked in boldface the terms that signify the turns of reasoning, logical structure, and the
conclusions.

If under changing conditions of life organic beings present individual
differences in almost every part of their structure, and this cannot be
disputed; if there be, owing to their geometrical rate of increase, a severe
struggle for life, at some age, season, or year, and this certainly cannot be
disputed; then, considering the infinite complexity of the relations of all
organic beings to each other and to their condition of life, causing an
infinite diversity in structure, constitution, and habits, to be advantageous
to them, it would be a most extraordinary fact if no variation had ever
occurred useful to each being's own welfare, in the same manner as so
many variations have occurred useful to man. But if variations useful to
any organic being ever do occur, assuredly individuals thus characterized
will have the best chance of being preserved in the struggle for life; and
from the strong principle of inheritance these will tend to produce
offspring similarly characterized. This principle of preservation, or the
survival of the fittest, I have called, Natural Selection. It leads to the
improvement of each creature in relation to its organic and inorganic
conditions of life; and consequently, in most cases, to what must be
regarded as an advance in organization (Darwin 1872:168).

The passage contains the following points:

1. The first "if" introduces the idea that organisms exhibit variations between and among
   species.

2. The second "if" introduces the idea that organisms reproduce in a rate that exceeds the
   sustenance capacity of the world they come to populate.

3. "Then" draws the conclusion that the individual variations are either adaptive or
   maladaptive.

4. From 1 and 2 the struggle for life follows. And since variations imply differential
   adaptive values only the fittest survive the condition of struggle. This is the
   conclusion introduced by the word "assuredly".
5. The survivors “replicate” themselves through reproducing offspring with similarly advantageous characteristics. Moreover, these characteristics are improvement and advancement.

This is what Darwin calls the theory of descent with modification by natural selection. It is a consequence “of one general law leading to the advancement of all organic beings – namely, multiply, vary, let the strongest live, and the weakest die” (Darwin 1872:360).
3.0 Metaphor in Cognitive Linguistics

3.1 Autonomous Linguistics Versus Cognitive Linguistics

A number of linguists, with a definite theoretical outlook, consider metaphor a topic of great theoretical importance. This is so because metaphor, if carefully studied, both points to the inadequacy of autonomous linguistics and suggests an alternative approach with more successful explanatory potentials. This approach is that of cognitive linguistics, which is “responsive to empirical results from cognitive and developmental psychology, cognitive anthropology, neurology etc” (Lakoff 1991:54). The cognitive approach can be better appreciated by contrasting it with the Chomskyan linguistics.

There are three fundamental questions about which there is much disagreement between Chomskyan linguists and cognitive linguists. These questions can be represented in the following antinomies:

- Rich innate endowment Vs Developing initial state
- Modularity of mind Vs Uniformity or homogeneity of mind
- Formal mental representation Vs Meaningful image schema representation

Chomskyan linguists espouse the theories in the left column while cognitive linguists assert the theories on the opposite side. The former holds that from the poverty of stimulus argument it follows that the initial state of the first language learner is already rich with innate biological endowment underlying the cognitive capacity for acquiring language. Despite the fragmented and incomplete experience and the lack of instruction, normal children “learning” the first language are able to produce and comprehend novel sentences that they have never experienced. What enables them to transcend the poverty
of stimulus is the language faculty- an innate faculty, which consists of the universal grammar (UG). The UG in its turn

consists of various subsystems of principles; it has the modular structure that we regularly discover in investigation of cognitive systems. Many of these principles are associated with parameters that must be fixed by experience (Chomsky 1986:146).

These parameters have different values, perhaps only two (plus or minus). What the first language learner has to do is only to fix the values of the parameters under the presence or sometimes absence (default value) of evidence. Since the UG has a modular structure “a single change of value may lead to collection of consequences that appear...to be unrelated”(Chomsky 1986:151). Again since “the mind is a highly differentiated structure with quite distinct subsystems”(Chomsky 1980:27), the UG is an autonomous cognitive faculty. The autonomy of the language faculty (syntax) as well as its meaningless formal nature can be demonstrated by perfectly meaningless grammatical sentences like “colorless green ideas sleep furiously”. Or conversely by ungrammatical sentences that are meaningful such as “this sentence has contains two verbs” (Pinker 1994:87). What makes this possible is that grammar is independent from our conceptual system (semantics) and that it is a discrete combinatorial system, that is, a “finite number of discrete elements...are sampled, combined, and permuted to create larger structure...with properties that are quite distinct from those of their elements”(Ibid. p. 84). Thus, syntactic generalizations can be stated by characterizing formal and meaningless rules with no appeal to semantic considerations(Lakoff 1991). In Rules and Representations Chomsky writes:
We might discover that there is no language faculty, but only some general modes of learning applied to language or anything else. If so, then universal grammar in my sense is vacuous, in that its questions will find no answers apart from general cognitive principles (Chomsky 1980:29).

This theory, which, presently accounts for language acquisition, competence and performance, has rival theories. In the same book Chomsky contrasts his general theory of language with two different approaches; the Behaviorism of Skinner and the cognitive psychology of Piaget. The former accounts for the acquisition of language and linguistic behavior in terms of definite mechanisms that govern learning processes in general. Language, according to Behaviorism, is just another behavioral habit acquired as conditioned responses to stimuli, enforced over time in accordance with the same general learning mechanisms. Behaviorism is averse to any reference to the mind and restricts psychological research to observable behavior without any appeal to introspection or positing an entity called the mind. In limiting itself to directly observable behavior, Behaviorism fails to account for the striking creativity characteristic of linguistic behavior and the acquisition of language under what is known as the poverty of stimulus. Besides, Behaviorism's complete disregard of the mind's cognitive capacities weakens its answers and assertions concerning the cognitive aspect of language. I do not need to sacrifice more space for discussing Behaviorism for it is irrelevant to the purpose of this paper. I need, however, to dwell for a little while longer on Piaget's psychology. Chomsky calls Piaget's approach constructivist and interactionist (Chomsky 1980).

Piaget's psychology is constructivist because it is "opposed to the view of knowledge as a copy, a passive copy of reality"(Piaget 1970:15 & cf. 1971:172-174). Piaget argues that "to know is to assimilate reality into systems of transformations. To
know is to transform reality in order to understand how a certain state is brought about" (Ibid. p15). He discovers a parallelism or isomorphism between basic biological functions and structures, on the one hand, and the cognitive functions and structures on the other. The organism for example must and will transform the substances it takes in in order to incorporate their food values into its system. An initial transformation occurs when the substance is ingested by chewing. Still more drastic changes occur as the substance is slowly digested, and eventually it will lose its original identity entirely by becoming part of the structure of the organism. The process of changing elements in the environment in such a way that they can become incorporated into the structure of the organism is called assimilation (Piaget 1971:172-174). In the process of assimilating foodstuffs into itself, the organism is also doing something else, namely, adjusting itself to them. The mouth, for example, must open, chew, and digest the foodstuff in certain way or the nutritive substances can not be assimilated and incorporated into the system of the organism. Just as objects must be adjusted to the peculiar structure of the organism so also must the organism adjust itself to the idiosyncratic demands of the object. This process is called in Piaget's terminology the accommodation process. That is, the organism must accommodate its functioning to the specific nature of the object it is trying to assimilate.

The invariant processes of assimilation and accommodation also characterize cognitive functioning. The similarity drawn here between biological and intellectual is not an analogy. Instead, it is a real extension of the biological functioning. Assimilation and accommodation are the functioning aspect of intelligence or cognition the other aspect is the structural one, which Piatet calls organization. In order to assimilate and
accommodate itself to the environment the organism must organize itself internally. Organization, assimilation, and accommodation are general cognitive structures and processes. They generalize to every intellectual activity including language. Chomsky calls this approach interactionist because the cognitive capacity of human beings follow a definite developmental route in interaction with the environment. Piaget's system is elaborate and complex at the same time but this synopsis, which is by no means self-contained, is sufficient for satisfying the purpose of this section. Jackendoff (Jackendoff 1992) correctly observes that there is a strong similarity between Piaget's view of cognition and the approach of Lakoff and other cognitive linguists.

Cognitive linguists, on the other hand, argue that from the empirical findings the premises of autonomous linguistics are misguided and theoretically dispensable. In fact adhering to the premises of autonomous linguistics imposes limitations on our understanding of language and prevents us from properly describing our linguistic practices (Lakoff 1991, Langacker 1991). There is no need to posit an autonomous language faculty whose sole function is to provide patterns of meaningless syntactic constructions. Chomskyan linguists feel this need only because they are guided by certain type of philosophical realism, which Putnam calls the "metaphysical realism". According to this doctrine the world is composed of objects, properties and relations obtaining between them. Further, natural categories (natural kinds) do really exist, as we perceive them. Humans have direct access to this world and language provides labels for the things of the world, their properties and relations. Consequently meaning is a matter of correspondence between words and things.
Cognitive linguists argue that meaning is always relative to the conceptual system we have about the world. The world is always mediated by such conceptual system. This does not mean that the world does not exist. On the contrary the world exerts limitations on our conceptual systems. Yet we know the world only as organisms with biologically determined cognitive capacity. Our cognition of the world and possession of certain conceptual systems develops through our interaction with the physical and cultural environment (cf. Chomsky 1980:234-38). Since language is an integral part of these cognitive processes and exhibits the same characteristics of cognition in general, it is acquired not as a consequence of having an innate language faculty but develops through our physical and cultural interaction. Empirical findings support this view.

Lakoff has shown that grammatical categories exhibit the same characteristics of human categorization in general. The members of the so-called natural kinds or categories do not acquire their membership by possessing necessary and sufficient properties but by exhibiting family resemblance. This empirically confirmed fact of human categorization accounts for what is known as "prototype effect". That is to say the membership of any category is not a matter of either/or but of graded membership. Some members are typical of the category in question and some others are less typical. The grammatical categories do not differ from this general fact of human categorization. The phoneme, for example, is not a bundle of features but, rather, a number of sounds that exhibit family resemblance (Lakoff 1987). Langacker has demonstrated that

Grammatical structures do not constitute an autonomous formal system: instead they are inherently symbolic, providing for the structuring and conventional symbolization of conceptual content. Lexicon, morphology, and syntax form a continuum of symbolic units divided only arbitrary into separate components of grammar (Langacker 1991:275).
"Cognitive linguistics" says Lakoff

is open to the possibility that aspects of general cognition, semantics, and communicative function might play a necessary role in the generalizations governing syntactic phenomena (Lakoff 1991:55).

In what follows I present and adopt this cognitive approach to studying the metaphors of *The Origin*.

### 3.2 The Theory of Conceptual Metaphors.

Metaphor embodies the major principles of cognitive linguistics. First, many metaphors "are not reducible to cognitively equivalent literal expressions" (Johnson 1979:19). Second, the underlying representation of metaphor is meaningful image schemata not meaningless formal representation. Third, metaphor is conceptual in nature, an integral part of cognition, that is, there can be no clear dividing line between language (metaphor) and thought.

Sketching the history of the philosophical treatment of metaphor, Johnson (Johnson 1979) avers that metaphor had been trivialized as mere linguistic ornament, a cosmetic crust encapsulating the literal meaning, to evoke and satisfy aesthetic reception. Or, alternatively, it had been devalued and condemned as a distortion of reality and concealment of truth. Johnson regarded I. A. Richard(1936) and Black’s (1955)views of metaphor as a departure form the traditional treatment. Richards rejects the traditional view that metaphor is a “mere embellishment or added beauty” or elliptic simile.

According to Richards metaphor

is a borrowing between and intercourse of *thoughts*, a transaction between contexts. *Thought* is metaphoric, and proceeds by comparison, and the metaphors of language derive therefrom. (emphasis in the original, Richards in Johnson 1979:51)
Since thought is metaphorical many important metaphors give rise to thoughts or meanings that are not attainable without the use of metaphors. Richards goes even further in his treatment of metaphor as constitutive of reality when he writes “Our world is a projected world, shot through with characters lent to it from our own life” (my italic, Ibid. p. 60).

Max Black develops Richards’ insights into a distinctive theory of metaphor, namely, the interaction view. Like Richards, Black views metaphor as essentially a matter of thought not merely a decorative language, which results in producing novel ideas that cannot be expressed in literal language. The interaction view argues that the primary subject, (the tenor in Richards’ terminology) and the secondary subject (the vehicle in Richards’ terminology) interact with and interanimate each other and from this interaction a new idea or image is produced. The interaction between the two ideas of the metaphorical expressions is not only an interaction between two lexical items. It is an interaction between two “associative complexes”. This is so because “every metaphor” writes Black “is the tip of a submerged model” (Black 1979:31).

Black, however, was less daring, though clearer, in his treatment of metaphor than Richard had been. It seems to me that Black’s interaction view does not demarcate a fundamental departure from the traditional Objectivist view. What Black seems to be saying is that there are some metaphors that cannot be adequately accounted for by applying to them the substitution view or its special case the comparison view. This class of metaphors provides us with an
opportunity to come up with better account that generalizes to all types of metaphors. This account is the interaction view. My reason for regarding Black’s view as still within the Objectivist doctrine is that he makes a distinction between a word’s literal meaning and its associative complex, a distinction that is reminiscent of and corresponds to the traditional distinction between denotations and connotations. The former corresponds to the literal meaning while the latter correspond to the associative complexes. Metaphor, according to the interaction view, suspends the denotations or literal meanings of its two ideas and allows and induces their connotations or associative complexes to interact creatively and produce new ideas. It is under this condition that metaphor can be said to screen, filter or create similarities.

In Metaphors We Live By Lackoff and Johnson present us with the real departure from the Objectivist doctrine by focusing on conventional metaphors and the experiential ground of metaphors. They stress that metaphor is not a decorative language. Our conceptual system is fundamentally metaphorical, hence the terms ‘metaphorical concept’ or ‘conceptual metaphor’. We comprehend reality, think, interpret our experience and guide our actions by metaphors. “The essence of metaphor” they write “is understanding and experiencing one kind of thing in terms of another” (emphasis in the original, Lakoff and Johnson 1980:5). This is to say that in the metaphorical expression one concept is metaphorically structured in terms of another. Metaphorical structuring is a mapping from some source domain to some target domain. Target
domains are best thought of as abstract conceptual domains, often of the internal
mental or emotional world, sometimes of the social world, in other times unseen
and unknown domains of the physical world, as for example the world of
cognitive mental processes. Source domains are familiar ones, most often of the
physical world, which are easy to think with. The source domain is immediately
known and intimately understood. The target domain is vague and known only
through metaphorical mapping. For the most part the source domain consists of
experiential gestalt or embodied schemata that emerge from our bodily experience
or cultural practices. Johnson views embodied schemas from a functional point of
view.

In order for us to have meaningful connected experience that we can
comprehend and reason about there must be a pattern and order to our actions,
perception, and conceptions. A schema is a recurring pattern, shape, and
regularity in, or of, these ongoing ordering activities. These patterns emerge as
meaningful structures for us chiefly at the level of our bodily movements
through space, our manipulation of objects, and our perceptual interactions
(Johnson 1987:29).

Lakoff argues that:

We have general capacities for dealing with...real world objects via Gestalt
perception, motor movement, and the formation of rich mental images. These
impose a preconceptual structure on our experience. Our basic concepts
correspond to that preconceptual structure and are understood directly in terms
of it. (Lakoff 1987:270-71)

It is from these preconceptual structures that we derive our metaphors for those
embodied schemas are, as it were, immediately understood by our bodies.

There are two broad categories of metaphors: conventional metaphors and
creative metaphors. The former consists of three subcategories; structural,
orientational, and ontological metaphors. Structural metaphors are “cases where one concept is metaphorically structured in terms of another”. Consider the following metaphorical expressions:

- Your claims are indefensible.³
- He attacked every weak point in my argument.
- I demolished his argument.

These metaphorical expressions are possible because there is a conceptual metaphor underpinning them. The conceptual metaphor is ARGUMENT IS WAR. The following are other examples:

- You are wasting my time.
- How do you spend your time these days?
- That flat tire costs me an hour.
- I have invested a lot of time in here.

The conceptual metaphor underlying these expressions is TIME IS MONEY. In these cases the concept of argument and time are metaphorically structured in terms of the concepts of war and time respectively.

Ontological metaphors are cases where an abstract concept is understood in terms of physical objects “especially our own bodies” (Lakoff and Johnson 1980:25). For examples, the conceptual metaphor THE MIND IS A MACHINE underlies the following metaphorical expressions:

- My mind just isn’t operating.
- I’m a little rusty today.
- We’re still trying to grind out the solution to this problem.

Orientational metaphors are cases where “a whole system of concepts is organized with respect to another” (Ibid. p.14). Lakoff and Johnson call these metaphors orientational because “most of them have to do with spatial orientations: up-down, in-out,
front-back, on-off, deep-shallow, central-peripheral” (Ibid. p. 14). For example, HAPPY IS UP, and SAD IS DOWN. Hence, we have the metaphorical expressions, I’m feeling up, that boosted my spirits, my spirits rose, and you’re in high spirits. Also we have these expressions; I’m feeling down, I’m depressed, and my spirits sank. The distinctive character of this theory consists in conceiving metaphor as irreducible to propositional representation, underpinned by meaningful image schemas or cultural script, and as a manifestation that language is inseparable part of cognition and pragmatic functions.

3.3 The Idealized Cognitive Model Theory

In Women. Fire, and Dangerous Things George Lakoff articulates the theory of conceptual metaphor with the ICM theory. Metaphor, in cognitive linguistics, allows us to experience and understand one experience in terms of another. This is made possible through the metaphorical structuring of one concept in terms of another. Concepts, however, exist as elements of models and correspond to categories.

“In general, concepts are elements of cognitive models...[and]...many concepts...are characterized in terms of scenario ICMs...[and] for every concept there can be a corresponding category” (Lakoff 1987:286).

Cognitive linguists, such as Lakoff as well as linguists who are greatly influenced by Chomskyan linguists, such as Jackendoff (Jackendoff 1983, 1992), argue that humans know their world as a result of bodily sensory-motor interaction between them, as physical objects, and the world. Our world, then, is a human world. We cannot transcend our biological nature and look at the world from an external God’s Eye point of view. We know the world and understand our experience by looking at the world from an internal point of view. From this perspective meaning is not possible through immediate
correspondence between language and the world. Instead, meaning can be characterized "in terms of the nature and experience of the organisms doing the thinking". Not just the nature and experience of individuals, but the nature and experience of the species and of communities" (emphasis in the origin, Lakoff 1987:266). From our biological capacities and our physical and social experiences as bodies functioning in an environment, experiential structures emerge, mediate, and facilitate our cognition and communication. That is to say these experiential gestalts underpin our conceptual system, language, meaning and communication.

The experiential gestalts are of two kinds; bodily experience such as basic-level structures and kinesthetic image-schemas and social experience such as frames. Basic-level structures characterize the human capacity for categorizing diverse natural and cultural objects. This capacity is determined by our biological constitution. Kinesthetic image schemas emerge from our motor movement in the physical environment. The CONTAINMENT schema for example emerges from experiencing our bodies as containers moving into and out of what we experience as containers such as rooms, houses, cars etc. the structural elements of this schema are: INTERIOR, BOUNDARY, and EXTERIOR. This image schema, like most image schemas, has a “basic logic” that is due to its configuration as gestalt. Lakoff illustrates this “logic” thus. “Every thing is either inside a container or out of it...if container A is in container B and X is in A, then X is in B”. Categorical syllogism is a formalization of this schema. “If all A’s are B’s and X is an A, then X is a B”. The bodily experience that gives rise to this schema is manifested in language as metaphorical extension of this schema. “The visual field is understood as a container, e.g., things come into and go out of sight. Personal relationships are also

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understood in terms of containers: one can be \textit{trapped in a marriage} and \textit{get out of it} (Lakoff 1987:272).

Social experience also provides us with experiential gestalts that vary from culture to culture. These are usually scripts or frames such as the scripts underlying one's social knowledge of how to get oneself fed in a fast food or traditional restaurant or how the passage of time is organized into a structured calendar. These experiential gestalts become idealized cognitive models, by which we organize our experience, build up our cognition and conceptual systems and in so many occasions are metaphorically extended to structure our experience of the vague domains of experience. They are idealized because we abstract them from our immediate rich experience. They are models because they are unified wholes with internal structure. And finally they are cognitive because we use them to understand our world and interpret our experience. We are not born with these models but develop them in the course of our bodily and cultural experience. This is made possible via unstructured mental spaces, the opposite analog of autonomous linguistics' modularity of mind and language organ. We have these unstructured mental spaces as being certain species. During our bodily and cultural experience we develop experiential gestalts that structure those mental spaces, the unstructured medium. The experiential gestalts we develop can be extended by metaphoric and metonymic mapping.

To summarize briefly: we are born with potential cognitive capacity as being certain species. This potential capacity is conceptualized in cognitive linguistics as an unstructured medium called "mental spaces". Through our bodily and cultural experience we develop preconceptual experiential gestalts that structure the mental spaces. These
preconceptual gestalts underpin our conceptual system and through them meaning, cognition, understanding, and communication are made possible. This accounts for the fact that a great part of our conceptual system is composed of metaphorical concepts that emerge from and rest on our preconceptual gestalts. Our conventional metaphors belong to and derive from the metaphorical concepts. The imaginative metaphors often invoke and obtain their power from the conventional metaphors but new metaphors can be absolutely novel. Black indicates that "every metaphor is the tip of a submerged model". In the metaphorical concept LIFE IS A STRUGGLE, for example, the metaphorical focus, struggle, is part of a model and corresponds to a category. And by virtue of being so, it has a number of properties mapped onto the concept LIFE. This metaphorical structuring gives rise to entailments and inferences. In the remaining part of this paper I will apply the theoretical approach I have so far discussed to the metaphors of The Origin.
4.0 The Conceptual Metaphors in “The Origin”

4.1 The Dispute over the Natural Selection Metaphor

Building on the foregoing theoretical exposition I shall examine the major metaphorical expressions in *The Origin* and identify the underlying conceptual metaphors in virtue of which these expressions impart an indispensable cognitive content, give rise to specific entailments and inferences, and confer coherence on the theory of natural selection. Before I begin this examination I should like first to have a quick look at some aspects of the dispute between Darwin and his critics over the ‘natural selection’ metaphor. My hope is that this quick look will serve as an illuminating introduction to this section.

We have seen in the previous section that some rhetoricians, philosophers, and linguists argue that the deviant view or the comparison view of metaphor fails to account for many metaphors especially those that are irreducible to a literal equivalent. In no case is this more evident than in the natural selection metaphor. Darwin refused with admirable scientific “fanaticism” to yield to sympathetic criticisms as well as unsympathetic criticisms. Alfred Russell Wallace wrote a friendly letter to Darwin saying “I am led to conclude that the term [natural selection] itself, and your mode of illustrating it, however clear and beautiful to many of us, are yet not the best adopted to impress it on the general naturalist public” (Young 1971:472). Wallace published his opinion about the term in “Creation by Law” under the title “Mr. Darwin’s Metaphors liable to Misconception”. Some naturalists accused Darwin of something like blindness for being unable to see “that Natural Selection requires the constant watching of an intelligent
"chooser", like man’s selection". Another naturalist complained, in a letter to Darwin, about the same difficulty that arises “almost entirely from your choice of the term ‘Natural Selection’ and so constantly comparing it in its effects to Man’s Selection, and also your so frequently personifying nature as “selecting”, as “perfecting” as “seeking the good of the species”(Young 1971:472). But Darwin believed that there was “a great advantage to bringing into connection natural and artificial selection”. His reply to his critics was this: “The term Natural Selection has been so largely used abroad and at home that I doubt whether it could be given up, and with all its faults I should be sorry to see the attempt made”. And in a remark that subtly betrayed the deep cultural inspiration of his theory, Darwin added, “whether it will be rejected must now depend ‘on the survival of the fittest’. In the third edition of The Origin Darwin added this argument:

In the literal sense of the word, no doubt, natural selection is a false term; but who ever objected to chemists speaking of the elective affinities of the various elements? – and yet an acid cannot strictly be said to elect the base with which it in preference combines. It has been said that I speak of natural selection as an active power or Deity; but who objects to an author speaking of the attraction of gravity as ruling the governments of the planets? Every one knows what is meant and is implied by such metaphorical expressions; and they are almost necessary for brevity. So again it is difficult to avoid personifying the word Nature (Darwin 1993:109, emphasis added)

Moreover, Darwin added another argument that revealed the programmatic nature of his theory and forcefully called into mind Richards Boyed’s idea of theory-constitutive metaphor. In a letter to Herschel, who criticized natural selection as “the higgledy-piggledy” he wrote:

I feel quite easy about the ultimate success of my view...because I find so many young & middle-aged truly good workers in different branches, either partially or wholly accepting my views, because they find that they can thus group & understand many scattered facts (Young 1971:478).
In view of Darwin’s acknowledgement of the metaphorical nature of his theory and, at the same time, his adherence to his metaphors one cannot help asking the following questions: why was Darwin so unwilling to give up on his term? Why was he so persistent in his refusal to reconsider his term despite the fact that he recognized that it was ‘a false term’? Was his refusal to reconsider his metaphorical terms justifiable?

It seems to me that there are only two possible relevant reasons. The first is that he intended his theory as a research program that would guide the future research, for Darwin’s term was an example of what Boyed (Boyed 1979) called theory-constitutive metaphor. The function of this type of metaphor is to ostensively fix the reference, suggest strategies for future research, and invite the reader to the similarities and analogies between features of the primary and secondary subjects, including features not yet discovered or not yet fully understood. The second is that substituting the natural selection metaphor with another term would have deprived Darwin’s theory of its untranslatable cognitive content and undermined the metaphorical system in virtue of which the theory has assumed a coercive explanatory force. The natural selection metaphor is a typical instance of what Black calls emphatic metaphor. Black defines emphatic metaphors as follows:

A metaphorical utterance is emphatic...to the degree that its producer will allow no variation upon or substitute for the words used - especially the ‘focus’, the salient word or expression, whose occurrence in the literal frame invests the utterance with metaphorical force (Black 1979:26).

Furthermore, emphatic metaphors, according to Black, are not decorative or ornamental, but “intended to be dwelt upon for the sake of their unstated implications”
(Black 1979). It is the second reason that is more important for Darwin's refusal and relevant to the purpose of this paper. To be sure, the natural selection metaphor could have been replaced by another, probably more accurate term, such as natural elimination or automatic extermination (of the weakest). However, this substitution would have undermined the whole structure of Darwin's theory and compelled him to write his book anew and reformulate his theory in such a way that the final outcome would have been a radically different theory. This is so because metaphors embody cognitive contents, irreducible to literal meaning, and generate entailments and confer coherence on discourse.

Moreover, the natural selection metaphor is not the only metaphor that plays a constitutive role in Darwin's theory. In fact the natural selection principle is only one metaphorical element of the idealized cognitive model of struggle, which I will explain more fully below. Darwin explicitly indicated that he had borrowed the term from Malthus treaties on the principles of population (Darwin 1872:21 & 91. Cf. Schweber 1977 & Bowler 1989:173-175).

He also indicated that the 'struggle for existence' term was used "in a large and metaphorical sense"(Darwin 1993:90). Without the 'struggle for existence' metaphor, which is the basic metaphorical gestalt, the other metaphors such as natural selection and the survival of the fittest would have not been possible.

I will treat the ICM of struggle as one structured whole after the following section. For now I will turn to discussing how Darwin's metaphors structure the vast, ambiguous, and illusive concepts NATURE, LIFE, and EVOLUTION in terms of familiar concepts.
4.2 Nature is a Person

In *The Origin* Darwin proposes a theory that aims at explaining organic evolution, the continuous emergence of new forms of life and equally continuous extinction of other forms, and identifying the mechanisms underlying these evolutionary processes, without appealing to unscientific notions, whether theological or metaphysical.

The book contains fifteen chapters. Darwin presents and discusses the main ideas of his theory of evolution in the first five chapters and dedicates the remaining chapters to defending his theory against the critics' objections and sustaining it with empirical observations that cannot be explained, according to Darwin, with any theory save that of natural selection.

The whole book is built upon an analogy and ICM composed of metaphors. In the first chapter entitled "Variation under Domestication", Darwin presents us with the crucial analogy, artificial selection in terms of which organic evolution is understood and explained. The importance of this analogy cannot be exaggerated, for it plays a decisive formative role in both the development and articulation of Darwin’s theory. Secord tells us that:

Darwin always viewed the study of domestic animals and plants as an essential introduction to his theory of evolution. His manuscript essays of 1842 and 1844 opened with the subject, as did the unfinished long manuscript *Natural Selection* and the *Origin* itself. Darwin felt he was "following the example of Lyell in Geology," extrapolating from observable events to the unseen...The selection hand invisible in nature, was manifested for Darwin in Man’s selection as a breeder. Darwin always maintained that the analogy with domestication had played an essential role in his discovery of the natural selection (Secord 1981:164-165).
According to this analogy, at first glance one may say that the concept of nature is metaphorically structured in terms of the concept of PERSON or BREEDER. Although this is true, it is nonetheless insufficient, for it does not adequately and exhaustively describe this metaphorical structuring. Darwin’s metaphor is too intricate to be described and explained by invoking this conceptual metaphor. One glimpses through the natural selection metaphor layers of conceptual metaphors superimposed on each other. Hence I will call this metaphor stratified metaphor. In order to better understand and illuminate the concept of stratified metaphor I shall contrast it with Lakoff and Johnson’s concept of complex metaphor.

According to Lakoff and Johnson a concept may be metaphorically structured by employing different and in a sense unrelated metaphors, each highlights one or more aspects of the concept. These metaphors function together to structure and confer coherence on the concept as well as to facilitate consistent entailments. For example the concept ARGUMENT is metaphorically structured by these conceptual metaphors: ARGUMENT IS WAR, ARGUMENT IS JOURNEY, ARGUMENT IS BUILDING and ARGUMENT IS CONTAINER. The metaphorical entailments and similarities aside, the lexical items ‘journey’, ‘war’, ‘building’ and ‘container’ possess no obvious relatedness. They are neither synonymous nor polysemous words. When they are applied to the concept of argument, however, they clearly delineate the concept and facilitate coherent entailment and ultimately “satisfy the purposes of our day-to-day functioning” (Lakoff and Johnson 1982:87-105 & 118, cf. Lakoff 1987:416).

In addition to this mode of metaphorical structuring one may identify another, which produces stratified metaphors. ‘Natural selection’ and ‘struggle for existence’,

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the most fundamental and constitutive metaphors in The Origin belong to this specific mode of metaphorical structuring. Stratified metaphors are made possible through polysemy and synonymy. ‘Natural selection’ metaphor depends on polysemy while ‘struggle for existence’ metaphor is built on synonymy.

I explain the case of the first metaphor as follow. Artificial selection is a technical term used by Darwin to denote breeding, that is, producing and nurturing new varieties of a species. However, the lexical items ‘breeding’, ‘breed’, and ‘breeder’ are themselves institutionalized (in Lyons’ terminology) or dormant (in Black’s terminology) that had created a polysemic word. Considered from an etymological point of view the word ‘breed’ is a verb that originally indicated female animals’ natural capacity to produce young or hatch. Through a metaphorical extension the word came to mean to keep animals for the purpose of producing young, especially by selecting the best parents for mating, and hence the derivative noun ‘breeder’. The word also came to mean to bring up and educate (Oxford Dictionary of English Etymology 1966 & The Barnhart Dictionary of Etymology 1988). The breeder metaphor, then, structures the concept of human agent in terms of the concept of female animal, that is a mother. Accordingly, the conceptual metaphor underlying the dead metaphor breeder is THE BREEDER IS A MOTHER.

Since the breeder metaphor was an institutionalized metaphor that claimed different yet related meanings to its origin, it provided a more or less clearly delineated experiential gestalt ready for use to structure other less clearly delineated concepts. This was exactly what Darwin did by coining the metaphorical term ‘Natural Section’. The conceptual metaphor underlying the Natural Selection metaphor is this: NATURE IS A
BREEDER. Darwin’s creative metaphor natural selection, therefore, directly invokes this metaphor and indirectly another conventional metaphor, frequently used and deeply rooted in the subconscious of the English speakers, namely, the ‘mother nature’ metaphor. (The philosopher Daniel Dennet uses this metaphor quite extensively in his book *Darwin’s Dangerous Idea* 1995). Thus Darwin reaches the lowest metaphorical stratum indirectly, for the bedrock on which these metaphors were built was the conceptual metaphor NATURE IS A MOTHER. I construct the stratified natural selection metaphor as follows. The first conceptual metaphor is NATURE IS A BREEDER. The second metaphorical layer is THE BREEDER IS A MOTHER. And by inference we reach the third conceptual metaphor NATURE IS A MOTHER. This metaphorical inference can be represented as follows:

\[
\begin{align*}
\text{The breeder} &= X \\
\text{Mother} &= Y \\
\text{Nature} &= Z \\
Z &\text{ is } X \\
X &\text{ is } Y \\
\text{Therefore} \\
Z &\text{ is } Y
\end{align*}
\]

This inference does not add a new piece of information, for NATURE IS A MOTHER is the basis for all the metaphorical concepts I have identified. The conceptual metaphor NATURE IS A MOTHER, which structures the concept nature in terms of the concept of mother is transparent in many metaphorical expressions in *The Origin*. For instance Darwin wrote:
Though nature *grants* long periods of time for the work of natural selection *she* does not grant an indefinite period (Darwin 1872:133).

Nature may be said to have taken pains to reveal *her* scheme of modification...but we are too blind to understand *her meaning* (Ibid. p. 636).

*She* can act on every internal organ...on the whole machinery of life. Man selects for his own good: Nature only for that of the being which *she tends* (emphasis added, Ibid. p.111).

The concept of mother belongs to what Lakoff calls cluster models. It “is based on a complex model in which a number of individual cognitive models combine, forming a cluster model”(Lakoff 1987:74-76). It is an element in the PART-WHOLE schema of the family- an ICM that comprises, beside the concept of mother, the concepts of father and son or children. It is also an element of the birth model, genetic model, nurturance model, and genealogical model. It is in virtue of being an element of these ICMs that the concept of mother derives its range of meanings. In characterizing the mother concept I will draw on the nurturance and birth models, specifying only the following dimensions:

1- A mother gives birth to children.
2- A mother is a purposeful person.
3- A mother is nurturing and caring person.
4- A mother follows certain strategies for improving and nurturing her children that involve reward and punishment
5- A mother nurtures her children for their own good and benefit.

This conceptual metaphor creates similarities between its two domains, generates entailments, inferences, and provides coherent metaphorical gestalt. Consider the following entailments and inferences:

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• NATURE IS A MOTHER
  A mother gives birth to children.
  Therefore nature gives birth to new species

• NATURE IS A MOTHER
  A mother works to improve her own children and for their good and benefit
  Therefore nature works in such a way that “each creature tends to become more and more improved” (Darwin 1872:160)

• NATURE IS A MOTHER
  A mother cannot intentionally harm her children
  Therefore nature “will never produce in a being any structure more injurious than beneficial to that being” (Ibid. pp. 256).

• NATURE IS A MOTHER
  A mother may unintentionally harm her children.
  Therefore nature may produce overspecialization and “regression in the scale of organization” (Ibid. pp.161-63) but the overwhelming general characteristics is toward more developed organization.

Darwin was greatly influenced in his early life by the attractive idea of adaptation and overall harmony in nature, which was developed by Paley in his book *Natural Theology*. This influence was clear in his 1844 essay in which he “implied that species normally exist in a state of perfect adaptation ...where the struggle for existence is unnecessary” (Bowler 1989:179). “Paley’s argument from design was essentially utilitarian: it stresses the usefulness of each character as it contributed to the adaptation of the species to its environment” (Bowler 1977:31).

Even when Darwin turned Paley’s idealist philosophy upside down the idea of adaptation and the utilitarian principle in nature lingered on in the mother metaphor, which structure certain aspect of nature in terms of the concept of mother. This is why one finds in *The Origin* such statement as: “Thus from the war of nature, from famine and death the most exalted object which we are capable of conceiving, namely the production
of the higher animals, directly follows” (Quoted in Ospovat 1980:172, see also footnote No 14).

Moreover, and certainly more important as far as evolution is concerned, nature, as I mentioned above, is a breeder in the sense conveyed by the term artificial selection. The natural evolutionary dynamics underlying and governing the organic world- dynamics that are not directly accessible and empirically tangible, are structured in terms of the concept BREEDER or SELECTOR, especially that of artificial selection, which is itself a subcategory of the more general concept SELECTION. That is to say that the structured experience, the gestalt, of the concept BREEDER is imposed on the organic world to make it graspable and intelligible. The concept of breeder may be characterized along five dimensions:

1- An agent.
2- Has a purpose or goal.
3- The agent selects from varied entities.
4- The agent has criteria for selection.
5- The agent produces new varieties or subspecies

Each metaphor serves the purpose of providing an understanding of different aspect of the phenomena of nature and life. Let us consider some of the entailments and inferences generated by this conceptual metaphor.

- NATURE IS A BREEDER
  Breeders produce new varieties among species
  Therefore nature produce new species.
• **NATURE IS A BREEDER**  
Breeders are purposeful and selective  
Therefore nature is purposeful and selective in favoring some individuals and disfavoring others. (see Wallace’s letter to Darwin above)

• **NATURE IS A BREEDER**  
Breeders “picks out those individuals...which possess something of the characteristics he seeks and breeds his next generation solely from these. Thus he isolates the desired characteristics and by selecting further variations in the same direction can improve it in later generation”(Bowler 1983:166)  
Therefore “In living bodies, variation will cause the slight alterations, generation will multiply them, and *natural selection will pick out with unerring skill each improvement*” (Darwin 1993: 232).

• **NATURE IS A BREEDER**  
Breeders isolate the unfavorable individuals and deem them to extinction.  
Therefore nature exterminate those individuals with maladaptive characteristics hence prevents them from producing new offspring with the same maladaptive characteristics.

The breeder metaphor highlights or rather creates, through the metaphorical structuring of one concept in terms of another, selectivity and planning in nature. Both metaphorical concepts NATURE IS A MOTHER and NATURE IS A BREEDER are subcategories of ontological metaphors. These metaphors not only structure the concept NATURE in terms of physical object but also personify nature. This allows us to comprehend NATURE in terms of human motivations, characteristics, and activities.

### 4.3 Life is Struggle

In addition to these metaphors there is the ‘struggle for existence’ metaphor, by far the most significant metaphor in *The Origin*, which functions, as an ICM, to shape the natural selection theory, confer coherence on the use of the other metaphors, and uphold and cement them together. The constitutive role of this metaphor as an ICM will be
discussed in the following section. For now I will examine its underlying conceptual metaphors.

At first sight one may justifiably say that the concept of life is metaphorically structured in terms of the concept WAR. Yet this does not exhaust all the unstated implications, for ‘struggle for existence’ is a stratified metaphor, though one that depends on categorical synonymy rather than polysemy. Darwin used different metaphorical expressions, such as competitors, race, and struggle, that cannot be adequately explained by or traced back to only the conceptual metaphor LIFE IS WAR. To adequately explain the different metaphorical expressions used by Darwin we are compelled to find another conceptual metaphor merging into the conceptual metaphor LIFE IS WAR. Among the synonyms of struggle are ‘exertion’, ‘strain’, ‘toil’, ‘competition’, ‘combat’, ‘battle’, ‘contest’, ‘match’ etc. It is clear that the lexical item ‘battle’ is not identical with ‘strain’ or ‘match’, yet they belong to one general radial category of senses. The reason why I call them synonyms is that they all belong to the same radial category of senses and exhibit family resemblance. These synonymous lexical items facilitate a second metaphorical structuring of the rather vague concept of life in terms of the concept of a race. Thus, the conceptual metaphors underlying the somewhat loose metaphorical expression ‘struggle for existence’ are these: LIFE IS A RACE and LIFE IS WAR. The concept of race may be characterized at least along six dimensions as follow:

1. There are two or more participants in race
2. There is a goal in that each participant strives to achieve first and/or best.
3. A race is an event conventionally regulated by rules that set, among other things, the goal of the race.
4. A race is supervised and run by a referee (or referees) who rationally decide the
   winner and the loser.

5. A race ends up with recognition of the first and the best and disregarding and
   eliminating the other participants.

This conceptual metaphor gives rise to entailments similar to the mother and breeder
metaphors. Please consider the following entailments and inferences:

- **LIFE IS A RACE.**
  In a race each participant strives to achieve the goal of the race first and/or best.
  Therefore in life "every single organic being may be said to be striving to the utmost
  to increase in numbers" (Darwin 1993:94)

- **LIFE IS A RACE.**
  In a race only the best survive the competition.
  Therefore in life only the fittest survives.

- **LIFE IS A RACE.**
  A race requires referees who decide which team or participant is the winner.
  Therefore, in life, natural selection decides which organic beings should survive and
  which shouldn’t.

*The Origin* is rich and colorful in war metaphors such as victor, victory, battle,
arm, and weapon. Consider for example this passage:

How low in the scale of nature the law of battle descends, I know not...The war
is, perhaps, severest between the males of polygamous animals, and these seem
oftenest provided with special weapons. The males of carnivorous animals are
already well armed; though to them and to others, special means of defence may
be given through means of sexual selection, as the mane of the lion, and the
hooked jaw to the male salmon; for the shield may be as important for victory, as
the sword or spear (my italics, Darwin 1872:118).
The concept of war possesses, more or less, the same structural properties as the concept of race but also includes additional properties. The following dimensions are sufficient to satisfy the need of this investigation:

1. War ends with the victory of one force and the destruction of the other.
2. The outcome of war depends on the weapons, equipment, strategies, tactic...etc.

The following are some of the entailments and inferences generated by this conceptual metaphor:

- **LIFE IS A WAR.**
  The outcome of war depends on weapons, strategies, tactics...etc
  Therefore in life “success will often depend on ...having special weapons or means of defence ... and a slight advantage will lead to victory” (Darwin 1872:623)

- **LIFE IS A WAR.**
  War ends with the destruction of one of the combating forces.
  Therefore in life a “each species is constantly suffering enormous destruction at some period of its life, from enemies or from competitors” (Ibid. p.96).

The term ‘the survival of the fittest’ is also a metaphor or, more accurately, an inference or by-product of the ICM of struggle. The word ‘fittest’ is as general a category as the word ‘struggle’ and corresponds to it. The degree of generality of the categories of ‘struggle’ and ‘the fittest’ is striking. They facilitate somehow free imaginative use of the members of these categories as metaphors. This is why the word ‘fittest’ fits perfectly well in the ICM of struggle. In the same manner that ‘struggle’ is a general category of senses that encompasses members like war, race, and competition so is and does the category of ‘the fittest’. It comprises several kinds of fitness such as strength, fleetness and swiftness. This becomes clear when we find out that the typical examples of fitness,
provided by Darwin, are fleetest, swiftest, and strongest (Darwin 1872:120-121). The word ‘fittest’ corresponds to ‘struggle’, ‘strongest’ to ‘war’, and ‘swiftest’ to ‘race’. Besides this, the ICM of struggle, which consists as a category of the ICMs of race and war, is metaphorically extended to a domain in which there are no races and wars in the literal sense. That is to say that the properties of the ICM of struggle are mapped onto certain features of the world, namely, the natural world of organic beings. This point will be discussed in the following section. Let me now turn to examining another metaphor.

4.4 Evolution is Progress

The concept of EVOLUTION is another metaphorically structured concept. There are many recurring metaphorical expressions made possible through the conceptual metaphor EVOLUTION IS PROGRESS. Progress is a general facet of the SOURCE-PATH-GOAL schema, which consists of four structural elements; starting point, tragictor, trajectory, and target point. The imaginary beginning of life on earth corresponds to the starting point, the organic beings to the tragictor, the time that has passed since the beginning of life to the present corresponds to the trajectory, and the present to the target point. Progress is the word that captures the movement of the trajector along the path and toward the goal. This conceptual metaphor accounts for the following metaphorical expressions:

[I]t may not be a logical deduction, but to my imagination, it is far more satisfactory to look at [different species of organic beings] as...consequences of one general law leading to the advancement of all beings, - namely, multiply, vary, let the strongest live and the weakest die (Darwin 1872:360).
And this [the amount of differentiation and specialization of the several organs] will include the advancement of the brain for intellectual purposes (Ibid. pp. 161).

It [natural selection] leads to the improvement of each creature in relation to its organic and inorganic condition of life; and consequently, in most cases, to what must be regarded as an advance in organization (Ibid. pp. 168).

The ultimate result is that each creature tends to become more and more improved in relation to its conditions. This improvement inevitably leads to the gradual advancement of the greater number of living beings throughout the world (emphasis added, Ibid. pp. 160).

In all the cases I have examined we can find confirmation of the idea that “each metaphor has a source domain, a target domain, and a source-to-target mapping... [and] is motivated by the structure of our experience” (Lakoff 1987:276, Cf. Black 1979). However, the source domains of the metaphors I have so far examined do not always belong to the “embodied experience and preconceptual structures of our sensibility” (Johnson 1987:14).

The conceptual metaphors of war and race are not outgrowths of primary bodily experience that involves sensory-motor interaction with the world. Instead they are cultural modes of existence due to our material and cultural conditions of life. At any rate these metaphors function to render the indirect and illusive nature of the target domain intelligible and graspable. For instance, the source domain of the mother metaphor is the intimately familiar and clearly delineated concept of MOTHER. The target domain is the vast, unclear, and illusive concept of nature. And finally there is a mapping of some of the properties of the former onto the latter. This mapping is motivated by the structure of our experience; that the concept of mother emerges naturally from our bodily experience and cultural conceptualization of this fundamental experiential gestalt while the concept of
nature is by far less basic and vague. The metaphorical mapping dispels this vagueness and facilitates reasoning. In what follows I will show how the metaphors of *The Origin* are exploited to reach a higher level of metaphorical thinking by virtue of being integral elements of the ICM of struggle.
5.0 The Idealized Cognitive Model of Struggle

5.1 The Bodily Basis of the ICM of Struggle

The metaphors of 'struggle for existence', 'natural selection', and 'the survival of the fittest' are elements of idealized cognitive models articulated with each other. The ICM of struggle is integrated with the ICM of source-path-goal. Similarly, the ICM of war is articulated with the ICM of race as a result of being members of the same general category of senses, i.e., the category of struggle. In this section I demonstrate the bodily basis of the ICM of struggle, and point to its internal consistency (5.1), identify war and race as among the best exemplars of the category of struggle (5.2) and finally show how the elements of this model interrelate to one another in a structured gestalt (5.3). I demonstrate the interrelation of the model's elements by introducing slight changes into the model and seeing how the model disintegrates due to the fact that its elements require one another.

Let me now dwell for a little while on the metaphors of the theory of the natural selection and see in an elementary way how they relate to each other and then probe into its preconceptual ground, the bodily experience of struggle. Consider the metaphors of the theory of natural selection.

Struggle for existence

The Natural Selection

The Survival of the Fittest

These are not disconnected and haphazard terms but an integral, self-sufficient and self-sustaining whole, composed of interdependent components that operate together to
generate a coherent and consistent image that emerges from the **structured gestalt of struggle**. The gestalt of struggle is a bodily experiential structure. It emerges from the awareness of the human body, its needs, and movements in the physical world in which it experiences forces that push and pull it away from achieving its purposes. Think, for example, of the baby in its early repeated exertions to walk and balance itself on the ground (Cf. Johnson 1987:74), its attempts to reach things and grasp them, its attempt to overcome and gratify its many needs, of ascending and descending a hill or stairs, moving against winds while walking on deep fine sands, swimming in rough water, carrying or moving a heavy thing, and physically wrestling with somebody. In such experiences we physically come to touch and meet the most rudimentary and intimate experiential gestalts of struggle. We feel forces that prevent us from accomplishing our intentions and we exert ourselves to overcome these forces and ultimately achieve our goals.

Based on these and many other bodily experiences a specific preconceptual gestalt, the STRUGGLE image-schema (ICM), takes shape and offers itself as a ground on which our conceptual system builds up to underpin meaning and facilitate communication and understanding. One recognizes in these experiences the structural invariants of the STRUGGLE image-schema. That is to say

- Two or more conflicting forces are involved in struggle each strives to achieve certain goals that are at loggerheads with each other.
- One force achieves its goals at the expense of other forces.
- The outcome of this conflict is not arbitrary but governed by some sort of rules or natural laws.

Furthermore, I suspect that the STRUGGLE schema is often, if not always, coupled with the SOURCE-PATH-GOAL schema so that the achievement of any participating force of
its goal results in the advancement and progress of that force along the path and toward its ultimate goal. Therefore, I will add the following structural element.

- The force that achieves its goal advances along a path that leads to an ultimate goal.

These structural elements can be made transparent by using certain linguistic elements or grammatical structures. The English verb ‘to struggle’ may be followed by the prepositions ‘for’, ‘with’, ‘against’, ‘up’, ‘along/on’, or the ‘to infinitive’ construction to profile certain aspects of the STRUGGLE image-schema and its accompanying SOURCE-PATH-GOAL image-schema. Consider the following examples:

(a) She struggled (her way) up to the top of the mountain.
(b) I struggled (hard) to achieve success in my business.
(c) He struggled his way through the crowd.
(d) He has been struggling against cancer since 1994.
(e) We must struggle against his prejudices for a more tolerant attitude to our beliefs.
(f) She struggled for compensation with the administration of her previous company.
(g) The two leaders are struggling for power.
(h) The shopkeeper struggled with the thief.
(i) She struggled along on a tiny income.

The prepositions ‘with’, ‘against’ highlight the opposing force or forces in the event of struggle. The preposition ‘for’ and the grammatical construction ‘to infinitive’ highlight the goal profile. The prepositions ‘along/on’ and ‘through’ profile the path of the SOURCE-PATH-GOAL schema, which is usually combined with the STRUGGLE schema. Further, more than one preposition can be used to profile more than one aspect of the STRUGGLE schema and SOURCE-PATH-GOAL schema as in (f) and (g).
Human cultures elaborate and kindle the struggle gestalt by inventing struggle events, such as games and races, and fueling the sentiments of competition. In some other times human groups engage in wars, which are exemplary events of struggle. In such human occasions the experiential gestalt of struggle, the STRUGGLE image-schema, attains its clearest mode, for races and wars, among other activities, exhibit high degree of prototypicality of struggle and manifest all the structural elements of STRUGGLE schema in its fullest mode when it appears a *unified and structured gestalt*.

### 5.2 Race and War: Prototypes of the STRUGGLE Image-Schema.

'Struggle' is a concept of an action and a category of events at the same time. As a concept struggle has a specific structure and as a category it has a number of individuals or members. The structure of the concept STRUGGLE derives form the corresponding category of struggle especially from the prototypes of that category, which give the category its peculiar character. There are numerous events that deserve to be called struggle. Verbal duels, football matches, chess games, computer games, wrestling, boxing, swimming, races, working hard, challenging one's self to achieve some goal, election campaign, and wars are instances of struggle. This list can be greatly extended by adding events that are metaphorically structured in terms of the concept of struggle. All these events exhibit family resemblance. However, they are not all equal in being representatives of the their category. Some of them are better exemplars than others are.

Cognitive linguists and some cognitive psychologists argue that humans do not categorize things, natural and cultural, by applying to them a checklist of “necessary and sufficient properties” (Fillmore 1975, Lakoff 1987, Taylor 1989). Instead entities (and let
the word ‘entities’ be understood in the widest sense) differ in terms of the nature of
cognitive processes of categorizing them. Categorization consists of cognitive processes
that aim at reaching beyond the individual concrete (or abstract) entities to grasp their
essence by grouping individual entities under one category. There are entities whose
categorization follows from our genetically determined perceptual apparatus such as
colors. There are “colors” that cannot be perceived such as infrared and ultraviolet
because their wavelengths are beyond the visible spectrum and consequently cannot be
categorized. Further there are colors that are more basic than others are, and therefore
used as basic categories under which other less basic colors are subsumed. There are also
things whose categorization is determined by their immediacy relative to our bodily
functions and gestalt perception such as chairs, dogs, trees...etc. If the context does not
require specification or certain degree of generality we call any chair ‘a chair’ not
‘furniture’ or ‘desk chair’. This is so because our gestalt perception and bodily function
determine what seems at the first glance arbitrary categorization.

For some other entities the “sufficient and necessary properties” or feature bundle
categorization is the cognitive process underlying their categorization such as rational
numbers, natural numbers, even numbers...etc. Still there are actions whose
categorization is image-schematic one such as struggle events. Our bodies undergo
recurring existential experiences that we come to call struggle experience and “absorb”
them as preconceptual gestalt with definite characteristics though not always readily
accessible to our awareness. Lakoff (1987) and Taylor (1989) seem to understand image-
schematic and prototype categorizations as mutually exclusive.
Investing in Wittgenstein’s concept of family resemblance, I will argue that the struggle events are categorized by *first* image-schematic and *second* prototype categorizations. Once the recurring image-schema has been established or built into our bodily awareness with its definite structural elements, it turns into a prototype to group or subsume all events that exhibit family resemblance to the prototype (that is the image-schema) under one category. Struggle, I believe, is such event. Race and war are among the best instantiations of the image-schema of struggle and hence best represent, as prototypes, the concept of struggle, a concept built on and derived from the unified and structured gestalt of struggle.

Let me now resume my discussion of Darwin’s terms to clarify and elucidate the idea of the *unified and structured gestalt*. Each term in Darwin’s metaphorical complex above characterizes one aspect or structural element of the experiential gestalt of struggle. As Johnson has indicated “experiential gestalts have internal structure that connects up aspects of our experience and leads to inferences in our conceptual system” (Johnson 1987:44). Here are the structural elements of the ICM of struggle put next to the skeleton of the Darwinian theory of evolution to show their affinity in being isomorphic with one another.

<table>
<thead>
<tr>
<th>THE ICM OF STRUGGLE</th>
<th>THE DARWINIAN STRUGGLE</th>
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<tr>
<td>• A conflict between two or more forces for some goal.</td>
<td>Struggle for existence.</td>
</tr>
<tr>
<td>• The conflict is governed by conventional laws or natural laws or both.</td>
<td>Natural Selection.</td>
</tr>
<tr>
<td>• The conflict ends with one force achieving the goal of the conflict and the other loosing it.</td>
<td>The Survival of the Fittest</td>
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I will elucidate this rather abstract ICM with its prototypical instantiations; race and war. Think, for example, of a soccer match as a kind of STRUGGLE. The soccer match is regulated and governed by a number of rules and conventions that spell out, for example, the number of each team’s players, the space of the playing field, the width of the goal, the substitution of players, the permissible and impermissible movements, and above all what each team should strive to achieve. I would like you to think of this conventionally regulated condition as "The Struggle for Existence". The soccer match is supervised and run by referees who guarantee that the match is performed in conformance with the soccer regulations, and most importantly decide which team is the winner. This part of the soccer match event is the "Natural Selection". The final result of the soccer match, namely, the winner team, is "The Survival of the Fittest".

War, which is also a kind of struggle, may elucidate this metaphorical complex as well. For Darwin employed several metaphorical expressions that are related to one another by virtue of being items of the ICM of war. The concept of war involves two (or more) armies each one aiming at the destruction of the other, for some reason that each army takes as a matter of survival. This is the equivalent of Darwin's struggle for existence. War "always" ends with victorious and defeated armies. This outcome is the survival of the fittest. It is not a matter of chance who wins the war and who loses it but the business of "natural laws" that comprise, among other things, considerations of conventional war strategies, tactics, knowledge, power, arms, and the performance of each army during the battle. These are what decide the outcome of any war. The aggregate of these experiences and knowledges is the analog of Darwin's natural selection. It is clear that the theory of natural selection is isomorphic with the ICM of
struggle, which is extended metaphorically to structure the phenomenon of evolution including all the concepts it involves (Cf. Black 1979).

5.3 The Integratedness of the Model of Struggle:

It is important to note that this ICM is an idealized one, that is to say, it may or may not fit every event that is a kind of struggle (Lakoff 1987:70). The phenomenon whose basic nature Darwin tried to discover, that is the organic evolution, involves among others the concepts NATURE, EVOLUTION, and LIFE. These concepts are first metaphorically structured; second they are held together by being elements in one experiential gestalt, the ICM of struggle; and finally this ICM is metaphorically projected onto the natural world of organic beings. As is the case in every ICM, the elements of this ICM “do not exist independent of the whole” (Lakoff 1987:284) and any attempt to break it down or analyze it “will destroy the meaningful unity that makes it the particular gestalt that it is” (Johnson 1987:44). Since I argue that the metaphors of *The Origin* are elements of the ICM of struggle the latter must exhibit these characteristics, namely, that its meaningfulness is derived from being a unified gestalt with internal structure; that it may or may not fit the world; and finally it is used to understand the temporal dimension of the natural world of organic beings.

In order to reveal these characteristics I will perform a simple experiment of successive stages. In the course of this experiment the Darwinian metaphorical complex undergoes a “metamorphosis” of two simultaneous processes. The first process is a gradual dismantling of its “building blocks”, while the second process, which immediately imposes itself on us as the only legitimate alternative, is a gradual
substitution of new and similarly metaphorical components of another complex or system. By the last stage of this experiment we will have a new and different metaphorical complex which I will call the “shadow terms”. These new metaphorical terms generate different entailments and reflect different images about nature, life, and evolution. Let’s, then, consider again the Darwinian metaphorical model and see if we can introduce legitimate and systematic modifications into it and what that modifications may entail. This is the metaphorical complex.

Struggle for Existence.

Natural Selection.

The Survival of the fittest.

To begin with, Darwin himself indicated that “in the literal sense of the word, no doubt, natural selection is a false term”(emphasis added). He complained bitterly about his critics’ “inability” to understand his metaphor. Some of his critics “have imagined that natural selection induces variability, whereas it implies only the preservation of such variations as arise and are beneficial to the being under its conditions of life”(Darwin 1872:109). Throughout The Origin Darwin emphasized his understanding of natural selection as gradual, mechanistic, non-innovative, and indirect preservation of the favorable characteristics via the extermination of the detrimental characteristics (see pages 88,108,109,112,121,127,141,168,260,626). “Natural selection acts only by the preservation and accumulation of small inherited modifications, each profitable to the preserved being”(emphasis added)(Ibid., p.127)\textsuperscript{13}. It is again the “preservation of favorable individual differences and variations, and the destruction of those which are
injurious" (Ibid., 108). The preservation of the favorable individual is a by-product of the destruction of those individuals with injurious variations (Cf., Riddiford and Penny 1984: xv-xxi). Darwin's discussion of natural selection as \textit{the cause} of extinction but \textit{not the cause} of variations is explicit in this regard (Darwin 1872: 141-143). This is also clear from Darwin's many scattered observations in his book that variations are due to inheritance whose mysterious laws were unknown to him or to his contemporaries (Ibid. pp. 29-34). Individual variations continuously crop up just when natural selection appears on the scene turning a blind eye to those individuals possessing favorable characteristics and killing off those with detrimental ones. According to this understanding it is very reasonable to think that the positive and active function of Natural Selection is to exterminate the unfit. What does natural selection do to the fit? Nothing, it just ignores it. Bowler tells us that Darwin had "a long-standing emotional suspicion that death indeed played a creative role in the world" (Bowler 1989: 173). It eliminates the least fit. Of course there is the other side of this elimination, namely, the accumulation of the favorable characteristics, but the fact is that natural selection is the agent of extinction more than the direct agent of evolution. Natural selection metaphor, however, highlights one side and hides the other exactly as Lakoff and Johnson demonstrate. I believe that it is legitimate to try to substitute the term natural elimination (admittedly an equally metaphorical term though less anthropomorphic) for the term natural selection and see what the resultant metaphorical complex looks like. We will have the following metaphorical complex.
Struggle for Existence

Natural elimination

The survival of the fittest

Natural elimination looks awkward between the other two terms. It does not dovetail with them and instead of cementing them it undermines them. For natural elimination cannot be the elimination of the fit or the fitter. The following example from Darwin makes this clear:

If, for instance, a bird of some kind could procure its food more easily by having its beak curved, and if one were born with its beak strongly curved, and which consequently flourished, nevertheless there would be a very poor chance of this one individual perpetuating its kind to the exclusion of the common form; but there can hardly be a doubt, judging by what we see taking place under domestication, that this result would follow from the preservation during many generations of a large number of individuals with more or less strongly curved beaks, and from the destruction of a still larger number with the straightest beaks. (Darwin 1872:121-122).

The elimination must be the elimination of the least fit (in the above example with the straightest beaks). Moreover, the ever emerging and never eroded variations between the individuals of each species, the precondition for natural selection and the very raw material on which it acts, are concealed by Darwin’s metaphorical term the survival of the fittest. This means that Darwin’s metaphor does not completely fit the world though it fits in the ICM of struggle. While the survival of the fittest dovetails perfectly well with ‘natural selection’ and ‘struggle for existence’, the insertion of the metaphor the natural elimination in the body of the Darwinian metaphorical complex compels us to make further modification. The elimination of the least fit entails the survival of the weak, the weaker, the strong, the stronger, and the strongest, that is to say the fittest, the fit, and
“the less fit”. The resultant metaphorical construction after this logical modification looks like this:

Struggle for Existence

The natural elimination of the least fit

The survival of the fittest, the fitter, the fit, and the less fit.

I was compelled to make this modification as a logical consequence to the entailment generated by the natural elimination metaphor in the same way the natural selection metaphor generates its entailment, the survival of the fittest. A moment’s reflection on this new metaphorical construction makes us recognize its frailty due to a lingering residue from the previous metaphorical complex, the ICM of struggle. For what is the meaning of a struggle for existence in which the weak, the weaker, the least strong, the strong and the strongest are allowed to exist. This is truly not a struggle and more emphatically not a struggle for existence. In the chapter entitled “Struggle for Existence” Darwin wrote:

I use this term [struggle for existence] in a large and metaphorical sense including dependence of one being on another, and including (which is more important) not only the life of the individual, but success in leaving progeny. Two canine animals, in a time of dearth, may be truly said to struggle with each other which shall get food and live. But a plant on the edge of a desert is said to struggle for life against the drought, though more properly is should be said to be dependent on the moisture.(emphasis added)(Darwin 1872:90).

Thus, Darwin intended to use the metaphor ‘struggle’ to mean, in addition to the literal struggle, its very opposite ‘symbiosis’ or structural interdependence. He explicitly acknowledged that “plants and animals remote in the scale of nature, are bound together by a web of complex relations”(Darwin 1993:101) so that the existence of one depends on the existence of another and the flourishing of one species is made possible through...
the thriving of another. He gave sufficient examples of these complex relations between
the organic beings. Here is one example:

the mistletoe is dependent on the apple and a few other trees, but can only in a
farfetched sense be said to struggle with these trees, for, if too many of these
parasites grow on the same tree, it languishes and dies...as the mistletoe is
disseminated by birds, its existence depends on them; and it may methodically be
said to struggle with other fruit-bearing plants, in tempting the birds to devour
and thus disseminate its seeds.(Darwin 1872:90 & cf. 405)(emphasis added).

From these passages it is clear that the objective world does not fit the metaphorical ICM
of struggle in which the theory of natural selection is couched. Yet the force of this ICM is
so strong that when Darwin extrapolated from such observations or stated some
generalizations he systematically returned to the ICMs to which he committed himself and
tied his theory and wrote statements like:

Not that under nature the relations will ever be as simple as this. Battle after
battle must be continually recurring with varying success; and yet in the long run
the forces are so nicely balanced, that the face of nature remains for long period
of time uniform, though assuredly the merest trifle would give the victory to one
organic being over another (emphasis added)(Darwin 1872:100).

The complex, ambiguous and illusive relationship between different species of ants is
structured metaphorically in terms of slave-master metaphors, which are components of
the ICM of war, if the latter is sufficiently elaborated. This model is articulated with the
ICM of race by a single word i.e., 'struggle'. Certain species are called master-species or
slave-making species while some other species are called slave-species. This ICM
involves an array of words such as combat, capturing, enslaving, serve, tyrant, slave-
making expeditions, victorious and so on. The target domain, the indeterminate
relationship between the different species, is metaphorically structured by the mapping of
the clearly and experientially delineated properties of the source domain, the slave-master metaphor, onto the target domain. Nevertheless some passages of this section betray the inadequacy or incoherence of metaphorical structuring. The following are excerpts from this section.

This ant [Formica rufescens] is absolutely dependent on its slaves; without their aid, the species would certainly become extinct in a single year. The males and fertile female do no work of any kind, and the workers or sterile females, though most energetic and courageous in capturing slaves, do no other work. They are incapable of making their own nests, or of feeding their own larva. When the old nest is found inconvenient, and they have to migrate, it is the slaves which determine the migration, and actually carry their masters in their jaws. So utterly helpless are the masters, that when Huber shut up thirty of them without a slave, but with plenty of the food which they like best, and with their own larva and pupa to stimulate them to work, they did nothing; they could not even feed themselves, and many perished of hunger. Huber then introduced a single slave (F. fusca), and she instantly set to work, fed the survivors, made some cells and tended the larva and put all to right.(Ibid. pp334).

In a passage about the intriguing relationship between a slave-making species (F. sanguinea) and a slave-species (F. fusca) Darwin wrote.

When the nest is slightly disturbed, the slaves occasionally come out, and like their masters are much agitated and defend the nest: when the nest is much disturbed, and the larva and pupa are exposed, the slaves work energetically together with their masters in carrying them away to a place of safety. Hence it is clear, that the slaves feel quite at home.(Ibid. pp335).

In another passage describing the relation between the F. sanguinea and F. fusca he wrote:

One day I fortunately witnessed a migration of F. sanguinea form one nest to another, and it was a most interesting spectacle to behold the masters carefully carrying their slaves in their jaws instead of being carried by them, as in the case of F.rufescens. (Ibid. pp336)

Here again the slave-master metaphors, which are by-products of the ICM of struggle, does not fit the world, for the observations Darwin described in this section do not resemble the relation between the slaves and the masters in human society. There are no masters who carry their slaves and no slaves, aware of being enslaved, defend their
masters' land with such vehemence. Moreover, there are no human masters who would go extinct within "a single year" without slaves. These observations, which resist being forced into some metaphors are the only visible and tangible characteristics of the relation between these species of ants. It is quite plausible that there exist other features beyond the reach of our senses that are incompatible with the slave-masters metaphors. There is no doubt that there is some sort of a relation here, but the slave-master metaphor does not adequately fit the phenomenon. The words slaves, masters, capturing and other lexical items evoke the whole ICM of war and this drags with it a pattern of typical concepts that involves war, revolution, mutiny, oppression, dispossession, freedom, inequality and many other concepts characteristic of the global pattern of power relations in human society. The slave-master metaphors confirm the fact that the meaning of the 'struggle for existence' involves encyclopedic cognitive structures, embedded in patterns of knowledge and belief about the world. If there is a species that is so utterly helpless to even feed itself it is fairly reasonable to think that the other side of the equation may be a species that can not survive without helping the first species. The reason for mentioning this is not to question the validity of the natural selection theory, but merely to point out that the relation between these species could have been perceived from some perspective as symbiotic. However, Darwin could not see this and eschewed applying different language to it for the concepts involved in the slave-master frame fit perfectly well in the higher and dominant metaphor of struggle for existence. Let us then substitute the metaphorical expression struggle for existence with another more or less consistent with the observations conveyed by many examples in The Origin. The term I believe fitting
these examples is "symbiotic existence". The resultant metaphorical complex will look like this:

Symbiotic Existence

The elimination of the weakest

The Survival of the weaker, the weak, the strong, the stronger, and the strongest.

For the sake of easing the subsequent discussion I will call these terms the shadow terms (of Darwin's ICM) avoiding calling it the shadow ICM for the reasons that will be clear as I discuss those terms. Reflecting on the shadow terms one may be tempted to conclude that they describe Darwin's observations as well as his own ICM does. Whenever one looks upon nature one finds striking gradiance of adaptability, be it within species or between species. One does not see "the fittest" but instead a scale of fine differences in adaptability. Further one does not see natural selection "picking out" the fittest but often sees the weakest of organisms die away or killed before reaching the reproductive age due to its inherent weakness. Besides, the interdependence between organisms is as striking as struggle, if not more. Nonetheless, Darwin's metaphors are much more superior to the shadow terms. The reason is that Darwin's metaphors constitute a coherent and consistent whole in which each metaphor presupposes and entails the others. Struggle for existence presupposes individual variations and limited resources and entails selection. Natural selection presupposes struggle for existence and entails the survival of the fittest. The survival of the fittest presupposes selection and entails progress. The coherence and consistency of Darwin's terms are consequences of very well selected metaphors intuitively understood and directly meaningful. These are
made possible by virtue of grounding the metaphors of *The Origin* in an experiential gestalt, the ICM of struggle.

By contrast the shadow terms do not form an ICM. The ICMs are either propositional in nature such as the ICM of the seven-day-cycle of the week (Lakoff 1987:68-69), or bodily experiential gestalt such as FRONT-BACK and UP-DOWN schemata (Ibid Chapter 17) and BALANCE schema (Johnson 1987 Chapter 4). Monday, for example, is meaningful only relative to its frame or ICM of the seven-day week cycle, for there is no objective Monday existing “out there” in the world. “The fog is in front of the mountain” is meaningful thanks to presupposed FRONT-BACK schema that is extended metaphorically to structure the scene that sentence describes. Bearing this in mind let us examine the consistency of the shadow terms. There is a blatant inconsistency inherent in the shadow terms. How is it possible that in a symbiotic existence the weakest is eliminated or destroyed? Understood metaphorically in such mode of existence it is the weakest that is taken care of and not eliminated. In what is supposed to be a symbiotic mode of existence such as that of family life or socialist organization of communities the more able provides for the unable. If, on the other hand, one understands “symbiotic” as mere structural interdependence such as the one apparent between the body’s organs or a machine’s parts then the elimination of the weakest becomes out of place and a complete misnomer. This inconsistency inherent in the shadow terms is due to the fact that they do not constitute an ICM. I should like underline the fact that in examining Darwin’s ICM I continuously appealed to the observations of the outside world not to any alleged inconsistency internal to the model, for there was none. By contrast I continuously avoided any reference to the
facts of the outside world and focused on the inconsistency inherent in the relation between the shadow terms, for they did not constitute an ICM.

We have seen how the Darwinian ICM underwent a radical change, which resulted in new metaphors and with them a new picture of nature even though an inconsistent one. The internal structure that holds Darwin’s metaphors together is characteristic of the idealized cognitive models. The unity and meaningfulness of the ICM of struggle emerge from recurring and significant patterns of bodily experience that are elaborated by cultural practices and generally named ‘struggle’. Nor is that all one can say about the unity and meaningfulness of this metaphorical mapping. For the unity and meaningfulness of the ICM of struggle are enhanced and sustained by integrating it with the SOURCE-PATH-GOAL schema that I have identified above. Struggle for existence is not merely a struggle, but a progressive struggle that leads, in successive waves of struggle, to more advanced and higher conditions in the scale of nature (Darwin 1872:160). The following is a schematic representation of the integrated schemas of struggle and source-path-goal

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STRUGGLE-----STRUGGLE-----STRUGGLE-----STRUGGLE-----STRUGGLE
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The doted line indicates the progress of the fittest, the outcome of struggle, to more advanced position along the path of evolution. The integrated schemas of struggle and source-path-goal account for the “misunderstanding” of the theory of natural selection. Darwin complained bitterly, as we saw in the above excerpt, about the inability of his

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critics to understand the theory. I would like to argue that in actuality there is no such "misunderstanding", for our cognitive models of struggle and source-path-goal are the unconscious ground for realizing meanings, communication, and understanding. The language of *The Origin* itself invokes these ICMs and inevitably leads to what it has been dubbed as misunderstanding. So far I have tried to identify the internal coherence of the theory of natural selection by dint of being built on metaphors that are elements of image-schemas or ICMs emerging from our bodily experience. There is also an external aspect of the meaningfulness and consistency of Darwin’s theory. I mean the nice fitness of his theory in the intellectual milieu of its time. This topic does not fall within the domain of this study. Besides, the exploration of the coherence of the theory of natural selection with political, sociological, economic, and philosophical discourses requires a separate study of its own.
6.0 Conclusion and Recapitulation

In the course of this study I have found that Darwin's theory of evolution is essentially metaphorical, a fact that not by any means belittles the theory of natural selection. Three key concepts, NATURE, LIFE, and EVOLUTION are metaphorically structured in terms of the more delineated concepts of MOTHER, BREEDER, RACE, WAR, and PROGRESS. Thus, we have the following conceptual metaphors: NATURE IS A MOTHER, NATURE IS A BREEDER, LIFE IS A RACE, LIFE IS WAR, and finally EVOLUTION IS PROGRESS. Further two types of struggle, war and race, were used as ICMs, to cement these metaphorical concepts together and facilitate coherent relations of entailment and inference. Besides, the ICM of struggle is metaphorically mapped onto the natural world of organic beings. The upshot of this metaphorical mapping is that the phenomenon of evolution, a vague phenomenon that comprises equally vague concepts such as life, nature and the complex relation between organic beings, appears isomorphic with the ICM of struggle. This isomorphism becomes more robust when we note that the ICM of struggle incorporates the SOURCE-PATH-GOAL image-schema to produce a coherent image of evolution as repeated events of struggle, each one results in advancing and progressing along the path of time toward a goal that is superior, in many considerations, to the starting point of evolution. In addition, The Origin is an unmistakably rhetorical polemic, highly colorful in metaphorical expressions such as slave-master metaphors that are by-products of the ICM of struggle. Darwin's extensive use of metaphors is natural and predicted by the conceptual metaphor and the ICM theories. The cognitive domain that Darwin tried to detect its basic dynamics was too broad and complex to be
constrained by and subjected to the empirical method. The immensely complex relations that hold among the organic beings, on the one hand, and between them and their environment, on the other, presented Darwin with an indeterminate, ambiguous, and elusive picture. This characteristic rendered this cognitive domain susceptible to metaphorical mapping, which reproduced and represented this domain in an intelligible and familiar way. For this reason the metaphors I have identified play a significant role in organizing, structuring and ultimately understanding the natural history of life.
Autonomous linguistics is sometimes called formal linguistics, Chomskyan linguistics, or generative-transformational linguistics. Each name highlights an essential aspect of this approach.

Quotations of "The Origin of Species" are all from the sixth edition republished by Random House, Inc. 1993.

All the examples regarding the types of metaphors are from Lakoff and Johnson 1980.

In The Polemical Mr. Darwin John Angus Campbell advances three reasons for Darwin's language. He writes: "The role of polemicist was forced upon Darwin first of all by the limitations of scientific language... Darwin had no such unambiguous language available to him and had to communicate his ideas through the medium of everyday language in order to communicate them at all... Second, the role of polemical advocate and interpreter was forced on him by the accident of time and circumstance... Faced with the choice of seeing his ideas announced to the world through the subsequent writings of another [Alfred Russell Wallace], or sitting froth his own version at a time and in a form not of his choosing, Darwin ceased research, began composition and within a year published On The Origin of Species as an abstract of a larger work to come... Third, Darwin was forced to accept the role of polemicist by the limitations of his evidence. Though he warns "analogy may be a deceitful guide", The Origin relies upon analogy in particular and imagery in general to develop an argument whose conclusions are not certain but, at best, only probable" (Cambpell (1975:367-377). The reasons advanced by Campbell as the circumstances that condition Darwin's language can be reduced into two broad categories. The first is external historical conditions, to which Campbell's first and second reasons belong. The second is a scientific condition internal to Darwin's theory, that is, the insufficiency of evidence. In the present study I limit myself to focusing on the universal cognitive properties of metaphor evinced in the special case of Darwin's metaphors. Although the external conditions, historical and cultural, are crucial for understanding The Origin they are not centeral to the purpose of this study. Hence this study does not contain an elaborate treatment of the historical and cultural conditions under which Darwin wrote The Origin.

According to Boyed "[T]here exists an important class of metaphors which play a role in the development and articulation of theories in relatively mature sciences. There function is a sort of catachresis – that is, they are used to introduce theoretical terminology where none previously existed...[they are used] to accomplish the task of accommodation of language to the causal structure of the world. By this I mean the task of introducing terminology, and modifying usage of existing terminology, so that linguistic categories are available which describe the causally and explanatorily significant features of the world."(Boyed 1975:357-358). As an example of this class of metaphors Boyed points to the metaphors used in cognitive psychology, which are derived from computer science. He writes: "if one looks at theory construction in the relatively young sciences like cognitive psychology, one finds theory-constitutive metaphors in abundance... The following examples are but a small subset of the actual cases [Boyed's list is longer than the list I quote here].

1. The claim that thought is a kind of "information processing," and that the brain is a sort of "computer"
2. The suggestion that certain motoric or cognitive processes are "programmed"
3. The view that learning is an adaptive response of a "self-organizing machine"
4. The view that consciousness is a "feedback" phenomenon.

In short theory constitutive-metaphor functions as a linguistic procedure that ostensively fixes the reference, suggests research program, and leads scientists to explore similarity between the primary and secondary subjects of the analogy established by the scientific metaphor. It is no
exaggeration therefore to regard theory-constitutive metaphor as “extra sense” in the service of scientific community.

Polysemy is a term used in semantic analysis to refer to a single lexical item, which has a range of different though related meanings. “plain” for example has several meanings such as “unadorned”, “obvious”, “simple”, “straightforward”...etc. Although these senses are different they are closed to each other. Etymology and closeness of the relationship between polysemic words have been among the criteria for distinguishing polysemy from homonemy (i.e., two lexical items which happen to have the same phonological form such as “bank” or the river and “bank” the financial institution). In cognitive linguistics polysemy is understood as a radial category of senses. “The senses of a word are related to one another more or less closely by various means, one of which is conceptual metaphor...a metaphor can be viewed as an experientially based mapping from an ICM in one domain to an ICM in another domain. This mapping defines a relationship between the idealized cognitive models of the two domains. It is very common for a word that designates an element of the source domains' ICM to designate the corresponding element in the ICM of the target domain” (Lakoff 1987:417, see also Crystal 1997:297, and Lyons 1995:54-60).

John Lyons finds it difficult to “draw a sharp distinction between the spontaneous [metaphorical] extension or transfer of meaning by individual speakers on particular occasions and their use of the existing, or institutionalized, and transferred meanings of a lexeme that are to be found in a dictionary” (Lyons 1995:59-60). However, it is not impossible to make this distinction in the metaphorical use of the word ‘breed’ and its different forms. The original literal meaning of this lexeme is ‘to produce or hatch young by female animals’. The metaphorical extension of this lexeme in its various forms was institutionalized and incorporated into the English dictionary to form polysemic word.

It remains to point out that Lyons’ distinction between ‘institutionalized’ and ‘spontaneous’ metaphors corresponds to the distinction made by Lakoff and Johnson between ‘conventional’ and ‘creative’ metaphors.

Black (Black 1979) rejects the distinction between ‘dead’ and ‘alive’ metaphors arguing that ‘dead’ metaphor is not a metaphor at all. He proposes a tripartite distinction between ‘extinct’, ‘dormant’, and ‘active’ metaphors. The latter has two aspects, the emphatic and the resonant aspects. However, except for the emphatic and resonant aspects of Black does not elaborate or justify his classification.

As far as I know “nature” has never been metaphorically personified as “a mother” in Arabic culture and language. It is life that is a mother, but the mother of hardship and recurring absurd calamities. In fact in Arabic all events that can be conceived of as a kind of calamity are grammatically marked for the feminine gender.

It is “a common observation” and “by now almost a truism” that absolute synonyms are extremely rare (Lyons 1995:60-61, Taylor 1989:55-56). Just as the polysemic word ‘breed’ is a category of senses that includes the senses I have discussed in the text the word ‘struggle’ is another category of senses that contains several other synonymous words. ‘Struggle’ as a category of senses, therefore, consists of overlapping synonymous words that facilitate a number of conceptual metaphors such as: LIFE IS TOIL, LIFE IS STRAIN, LIFE IS A MATCH, LIFE IS CONTEST, LIFE IS COMPETITION...etc...etc.

In this excerpt Darwin talked about different instincts as products of the same law, namely, natural selection law. I believe that replacing “different instincts” with “different species” is not a distortion of the text, for the whole book is about how natural selection carves all living forms including their instincts.

Darwin writes about natural selection and the survival of the fittest as if they are synonymous. According the view I advance in this paper the two metaphors describe two different aspects of
the model of Struggle where the survival of the fittest follows natural selection in the same way that the effect follows from the cause.

13 The full title of Darwin’s book is *The Origin of Species by Means of Natural Selection or the Preservation of Favored Races in the Struggle for Life.*

14 This passage and many others in The Origin are reminiscent of the following passage from *The Wealth of Nations:*

“A revolution of the greatest importance to the public happiness, was in this manner brought about by two different orders of people, who had not the least intention to serve the public. To gratify the most childish vanity was the sole motive of the great proprietors. The merchants and artificers…acted merely from a view to their own interest, and in pursuit of their own pedlar principle of turning a penny whenever a penny was to be got. Neither of them had either knowledge or foresight of that great revolution which the folly of the one, and the industry of the other, was gradually bringing about” (Adam Smith, *The Wealth of Nations.* In *The Essential Adam Smith* 1986:256-257). If one consider the word ‘gradually’ more important and less rhetorical than the word ‘revolution’ then one has a theory of social evolution not very different from the biological theory of natural selection.

15 There is no necessity here but strongly plausible possibility justified by the operations of natural selection in the Darwinian sense. Just as it is quiet imaginable to conceive of natural selection as an agent that produces functionally and structurally different complementary “casts” of ants within one species, it is also imaginable to hold that natural selection produces complementary species where one can not survive without “helping” the other. It is interesting as well as revealing to contrast the metaphors used to describe the functional and structural differentiation within one species (i.e., queen, workers... etc.) with the metaphors used to describe the differentiation between species (i.e., slaves, masters). Whereas the former highlights loyalty, collaboration, and unity the latter highlights adversary and tension. This particular domain shows how difficult it is to avoid using metaphors for describing them. We can not but experience empathy. As I. A. Richards says “our world is a projected world, shot through with characters lent to it from our own life”