Anna Drogosz
Katedra Filologii Angielskiej
Uniwersytet Warmińsko-Mazurski w Olsztynie

Conceptual foundations of progress in Darwin's theory of evolution

Key words: progress, conceptual metaphors, Darwin

1. Introduction

The idea of progress remains one of the most debated and controversial issues of the theory of evolution. It may seem odd because beginning with Darwin's book *On the Origin of Species* evolutionary change had been described as undirected, devoid of design, purpose or intelligent creator. And yet, both the public and scholarly understanding of evolution (and Darwin himself in the text) often explicitly point to progress or improvement. This situation in which evolutionary biology can live neither with nor without the idea of progress was called by Greene (1991) a "biological dilemma".

The presence of progress in evolutionism was frequently explained by cultural factors (cf. Ruse 1996, Rosslenbroich 2006). It is often claimed that the concept of progress is a cultural one and that it found its way to the theory of evolution because of anthropocentric treatment given to the organic world. However, acknowledging the importance of this view, we believe that a cognitive linguistics analysis of Darwin's book reveals conceptual and linguistic motivation of the idea of progress as well. In this paper we are going to demonstrate that some of conceptual metaphors and analogies used by Darwin to describe the changes in nature inevitably imply progress.

The structure of the paper is as follows: First, we give a cursory overview of cultural sources of progress. Then we turn to an analysis of the analogy between artificial and natural

selection, and next to conceptual metaphors contributing to the sense of progress (the metaphor of journey, tree and struggle).

2. Cultural sources of progress in evolutionary thought and Darwin's theory

According to Rosslenbroich (2006:42), the idea of progress has three historical roots: the concept of *scala naturae*, the notion of social and cultural progress of the era of Enlightenment, and the theory of recapitulation. The concept of *scala naturae* (also known as the Great Chain of Being) is the hierarchical arrangement of beings and entities in the world. Levels such as god(s), people, animals, plants, and inanimate objects are vertically arranged into a kind of ladder. The hierarchy, known in its static sense in the Antiquity, gained a temporal interpretation in the 18th and early 19th centuries (cf. Lovejoy 1974, Rosslenbroich 2006), which meant that organisms could be seen in an ascending line from the simplest at the lowest level, to humans at the top (Ruse, 1996). The second historical source of progress was, according to Rosslenbroich (2006), the notion of social and cultural progress developed during the Enlightenment manifest in beliefs that humanity is capable to improve. "During the 19th century the general progress of society, science, technology and industry was taken for granted" (Rosslenbroich 2006:42). The third source is the theory of recapitulation which proposed that a developing embryo recapitulates on the way the simpler and earlier levels of development.

Darwin's main objective was a scientific explanation of biological diversity and emergence of new species of organisms. His line of argument could be summarized as follows: Through constant struggle for existence those organisms that are better adapted to their environment are more likely to survive and leave offspring than those that are not. That process of survival of the fittest was referred to by Darwin as natural selection and compared to the process of artificial selection, in which a human breeder selects for breeding those individuals that meet his expectations. All that leads to new varieties and, ultimately, new species. Such theory assumes no purpose and no predetermined goal. What is more, in a letter to his friend J.D. Hooker written in 1844, Darwin makes it explicit that the theory assumes no progress either: "Heaven forfend me from Lamarck's nonsense of a 'tendency to progression'" (quoted after Young 1985:86). However, a close analysis of the text of the *Origin* reveals that the concept of progress sneaked into the theory.

Gillian Beer (1983) observed that when Darwin was trying to present his theory to the public, he faced the problem of precipitating his thoughts and ideas in language and had to

resort to metaphors. And indeed, Darwin's text is rife in conceptual metaphors, such as A LIVING ORGANISM IS A PERSON, CHANGE IN TIME IS MOVEMENT IN SPACE, RELATIONSHIP AMONG ORGANISMS IS STRUGGLE, and many others (cf. Al-Zahrani 2008; Drogosz 2008, 2009, 2010). In this article we focus only on those metaphors and analogies that contribute to the interpretation of evolutionary change as progressive.

3. An analogy between artificial and natural selection

We believe that the first source of the notion of progress in Darwin's theory comes from his analogy between modifications that human breeder causes in domestic animals and plants (i.e. artificial selection), and the process of modification in the state of nature referred to Darwin as natural selection. Artificial selection, by definition, is aimed at production of varieties that are somehow improved from breeders' point of view. By analogy, natural selection, which becomes personified to a significant degree in Darwin's work, is claimed to produce forms or varieties that are somehow better adapted to the environment or improved in comparison with their ancestors. Consider:

1. In such case, every slight modification, which in the course of ages chanced to arise, and which in any way favoured the individuals of any of the species, by <u>better adapting them</u> to their altered conditions, would tend to be preserved; and natural selection would thus have free scope for the work of <u>improvement</u>.

2. It may be said that natural selection is daily and hourly scrutinising, throughout the world, every variation, even the slightest; rejecting that which is bad, <u>preserving and adding up all that is good</u>; silently and insensibly working, whenever and wherever opportunity offers, at the <u>improvement</u> of each organic being in relation to its organic and inorganic conditions of life.

3. It is, however, far more necessary to bear in mind that there are many unknown laws of correlation of growth, which, when one part of the organisation is modified through variation, and the modifications are accumulated by natural selection <u>for the good</u> of the being, will cause other modifications, often of the most unexpected nature.

In the discussion on natural selection, the fundamental notion of his theory, Darwin emphasizes that its actions always lead to the improvement of organisms, indeed selection of features that would be in any way injurious to organisms makes no sense. Darwin is explicit about it when he writes:

4. What natural selection cannot do, is to modify the structure of one species, without giving it any advantage, for the good of another species; and though statements to this effect may be found in works of natural history, I cannot find one case which will bear investigation.

Inevitably, the idea of improvement and accumulation of desired features becomes connected with the idea of progress. For an organism to be better adapted or fitted to its environment means that it is statistically more likely to survive and have offspring. It does not have to mean that it is better in some absolute sense (e.g. more complex, more intelligent, bigger, etc.). And yet not only Darwin's readers but he himself towards the end of the *Origin* seems to write progress into evolution:

5. And as natural selection works solely by and for the good of each being, all corporeal and mental endowments will tend to progress towards perfection.

6. Although we have no good evidence of the existence in organic beings of an innate tendency towards progressive development, yet this necessarily follows, as I have attempted to show in the fourth chapter, through the continued action of natural selection.[1]

Although the analogy between artificial and natural selection is a strong source of progressive interpretation of evolutionary change, it is significantly strengthened by the metaphor of the JOURNEY to which we now turn.

4. EVOLUTION IS A JOURNEY

The JOURNEY metaphor, which is an elaboration of the Event-Structure metaphor (cf. Lakoff and Johnson 1999, Kövecses 2002), is used to conceptualize changes in time that organisms undergo in the process of evolution. The conventional knowledge about the domain of journey is systematically mapped onto aspects of evolution: an organism (or its part) is conceptualized as a moving entity (7), small modifications correspond to steps (8) and the stages in its modification correspond to stages in a journey (9). Because in our experience journeys involve movement forward, in some direction, this knowledge is also projected onto evolutionary process (10). Consequently, showing ancestral features becomes described in terms of reversion (11) and showing undesirable features in terms of deviation from the right direction (12).

7. …that any organ or instinct, or any whole being, could not have arrived at its present state by many graduated steps.

8. …the steps in the process of modification to be more numerous or greater in amount, to convert these three forms into well-defined species

9. By comparing the accounts given in old pigeon books treatises of carriers and tumblers with these breeds as now existing in Britain, India, and Persia, we can, I think, clearly

[1] Interestingly, this fragment was added by Darwin to the text of the *Origin* in the 5th edition. What is more, there is a difference between the 1st and 5th edition in how often the word 'progress' is used and the sense in which it is used. While in the 1st edition most of the uses (14 of them) are synonyms of 'process', in the 5th edition the word appears 35 times and the new additions have the sense of improvement.

trace the stages through which they have insensibly passed, and came to differ so greatly from the rock pigeon.

10. I attribute the passage of a variety from a state in which it differs very slightly from a parent to one in which it differs more, to the action of natural selection in accumulating differences of structure in certain definite direction.

11. …these same species may occasionally revert to some of the characters of their ancient progenitors.

12. As natural selection acts by life and death—by the preservation of individuals with any favourable variation, and by the destruction of those with any unfavourable deviation of structure.

Darwin used this kind of language because he had to somehow describe evolutionary change and because it is actually a conventional way to describe any change not only in English. We suspect that describing modifications in organisms in time without resorting to the JOURNEY metaphor would be difficult in not impossible.[2] However, the extensive use of the JOURNEY metaphor reinforces the progressive interpretation of evolutionary change evoked by the analogy discussed above. This is because the concept of progress itself is based on the SOURCE-PATH-GOAL schema underlying the concept of journey. While the concept of journey provides a convenient language to write about change, at the same time it entails the sense of direction and goal. This entailment becomes manifest in sentences in which Darwin writes about evolutionary change 'leading' somewhere:

13. And I look at varieties which are in any degree more distinct and permanent, as steps toward more strongly marked and permanent varieties; and at the latter, as leading to sub-species, and then to species.

14. And here the importance of the principle of benefit derived from divergence of character comes in; for this will generally lead to the most different or divergent variations represented by the outer dotted lines) being preserved and accumulated by natural selection.

15. Natural selection, as has just been remarked, leads to divergence of character and to much extinction of the less improved and intermediate forms of life.

[2] The inevitability of the journey metaphor in describing evolutionary change can be confirmed by the metaphorical language of Richard Dawkins. For example, in *The Blind Watchmaker* he describes changes in biomorphs in the following way:

> What is the point of thinking in terms of space? Where does it get us? The answer is that it provides us with a way to understand evolution as a gradual, cumulative process. In any one generation, according to the rules of the computer model, it is possible to move only a single step through genetic space. In 29 generations, it isn't possible to move farther than 29 steps, in genetic space, away from the starting ancestor. Every evolutionary history consists of a particular pathway, or trajectory, through genetic space. (…) It is this that I mean when I talk metaphorically about 'wandering' through Biomorph Land. (Dawkins, 2006:95).

The metaphor of the journey strongly suggesting the existence of a goal of evolutionary changes and the analogy with artificial selection implying improvement would be enough to grant Darwin's theory the progressive reading. However, there two more powerful sources of progress in Darwin's conceptualization: the metaphor of struggle and the metaphor of tree.

5. The struggle metaphor and the UP-DOWN schema as a source of progress

The concept of struggle for life has become the hallmark of Darwin's theory and evolutionism as such. The metaphor RELATIONSHIPS AMONG ORGANISMS ARE STRUGGLE (often elaborated as RELATIONSHIPS AMONG ORGANISMS ARE WAR or RELATIONSHIPS AMONG ORGANISMS ARE COMPETITION) was used by Darwin to depict the relationships among organisms occupying the same area and needing the same resources.

The metaphor RELATIONSHIPS AMONG ORGANISMS ARE STRUGGLE is very well-represented in the text and constitutes the backbone of Darwin's argument: because more organisms are born than can possibly survive they all compete with each other, which means that an organism possessing a feature giving it an advantage over other competitors is more likely to survive and pass this feature on to the next generation:

16. Owing to this struggle for life, any variation, however slight and from whatever cause proceeding, if it be <u>in any degree profitable</u> to an individual of any species, in its infinitely complex relations to other organic beings and to external nature, will tend to the preservation of that individual, and will generally be inherited by its offspring.

17. But success will often depend on having special weapons or means of defence, or on the charms of the males; and the <u>slightest advantage will lead to victory</u>.

Apart from being strongly anthropocentric, the conceptualization of the relationships among organisms in terms of struggle reinforces the idea of progress and improvement, which becomes explicit in Darwin's language:

18. The competition will generally be most severe, as formerly explained and illustrated by examples, between the forms which are most like each other in all respects. Hence the <u>improved</u> and modified descendants of a species will generally cause the extermination of the parent-species…

19. I do not doubt that this process of <u>improvement</u> has affected in a marked and sensible manner the organisation of the more recent and victorious forms of life, in comparison with the ancient and beaten forms; but I can see no way of testing this sort of progress.

20. Widely-ranging species, abounding in individuals, which have already triumphed over many competitors in their own widely-extended homes will have the best chance of seizing on new places, when they spread into new countries. In their new homes they will be exposed to new conditions, and will frequently undergo further modification

and improvement; and thus they will become still further victorious, and will produce groups of modified descendants.

Following this line of thinking, Darwin infers that more contemporary organisms would be more successful than earlier forms:

21. If under a nearly similar climate, the eocene inhabitants of one quarter of the world were put into competition with the existing inhabitants of the same or some other quarter, the eocene fauna or flora would certainly be beaten and exterminated; (200)

In some passages, as in (22), the metaphor of struggle becomes intertwined with the UP-DOWN schema deriving from the metaphor of tree. Thus, one more source of progress in evolutionary change becomes activated.

22. But in one particular sense the more recent forms must, on my theory, be higher than the more ancient; for each new species is formed by having had some advantage in the struggle for life over other and preceding forms

While the metaphor of struggle helped to conceptualize the relationships among organisms occupying an area at a given moment of time, the tree metaphor (graphically represented as a diagram) was used to describe their genealogical affinities, the idea that over time species split into varieties which, in turn, due to accumulated differences, become new species. The diagram, introduced just as an illustration, meshed with the Great Chain of Being in its temporal sense and presented the vertical arrangement of organisms from the oldest (at the bottom) to the most contemporary (at the top). However, the UP-DOWN schema has a very strong axiological charge: UP being conventionally positively charged and DOWN negatively (cf. Krzeszowski 1997) and when it all became combined with the struggle metaphor it lead to the following conclusion: the more recent forms of organisms are those that were victorious in the struggle for survival with earlier forms; they are higher both the in the diagram and in valuation, as they must be somehow "better" than the forms they replaced. This reasoning is clear from the passage below:

23. Recent forms are generally looked at as being, in some vague sense, higher than ancient and extinct forms; and they are in so far higher as the later and more improved forms have conquered the older and less improved organic beings in the struggle for life.

This argument was applied not only to organisms but to their organs as well, as in (24), again implying the existence of progress.

24. In the Articulata we can commence a series with an optic nerve merely coated with pigment, and without any other mechanism; and from this low stage, numerous gradations of structure, branching off in two fundamentally different lines, can be shown to exist, until we reach a moderately high stage of perfection.

Conclusions

The objective of this paper was to investigate analogies and conceptual metaphors inherent in Darwin's theory that introduce the notion of progress into evolution. First we have discussed the analogy between artificial and natural selection, and then investigated the metaphors of journey, struggle and tree focusing on those aspects of metaphorical mappings which entail improvement and progress in evolutionary change. Although we in no way deny the relevance of cultural and historical roots of progress in evolutionary thought, we believe that metaphors employed by Darwin to express his ideas in a coherent and convincing way constitute equally powerful source of progress. What is more, in the light of this study any attempt to eradicate progress from evolution would mean rewriting the theory anew, using completely different metaphors.

Bibliography

Al-Zahrani, A. (2008) "Darwin's metaphors revisited: Conceptual metaphors, conceptual blends, and Idealized Cognitive Models in the theory of evolution" *Metaphor and Symbol*, Vol. 23, pp. 50-82. Psychology Press.

Beer, G. (1983) *Darwin's Plots* Cambridge: Cambridge University Press.

Darwin, C. (1998) *The Origin of Species*. Oxford: Oxford University Press.

Dawkins, R. (2006) *The Blind Watchmaker*. *Why the Evidence of Evolution Reveals a Universe without Design*. New York and London: W.W. Norton and Company.

Drogosz, A. (2008) "Ontological metaphors in Darwin's *The Origin of Species*" in S. Puppel and M. Bogusławska-Tafelska *New Pathways in Linguistics*. Olsztyn: Instytut Neofilologii. Uniwersytet Warmińsko-Mazurski.

Drogosz, A. (2009) "Metaphors of family, tree and struggle in Darwin's *The Origin of Species*" in S. Puppel and M. Bogusławska-Tafelska *New Pathways in Linguistics*. Olsztyn: Instytut Neofilologii. Uniwersytet Warmińsko-Mazurski.

Drogosz (2010) “Metaphors of time and Darwin’s scenario of evolution”. *Prace Językoznawcze* XII: 77-88, Olsztyn: Wydawnictwo Uniwersytetu Warmińsko-Mazurskiego.

Greene (1991) “Progress, science, and value: a biological dilemma”. *Biology and Philosophy* 6: 99-106.

Kövecses, Z. (2002) *Metaphor. A Practical Introduction.* New York and Oxford: Oxford University Press.

Krzeszowski, T. 1997. *Angels and Devils in Hell*. Warszawa Wydawnictwo Energeia.

Lakoff, G. and M. Johnson (1999) *Philosophy in the Flesh. The Embodied Mind and its Challenge to Western Thought*. New York: Basic Books.

Lovejoy, A. (1974) *The Great Chain of Being: a Study of the History of an Idea*. Cambridge: Harvard University Press.

Ruse (1996) *Monad to Man* Cambridge: Harvard University Press.

Rosslenbroich, B. (2006) “The notion of progress in evolutionary biology—the unresolved problem and an empirical suggestion”. *Biology and Philosophy* 21:41-70.

Young, R.M. (1985) *Darwin’s Metaphor: Nature’s Place in Victorian Culture.* Cambridge: Cambridge University Press.

Summary

Conceptual foundations of progress in Darwin’s theory of evolution

The objective of this article is an analysis of those conceptual metaphors and analogies used by Darwin in his book *On the Origin of Species* which introduce the notion of progress to the concept of evolutionary change. The analysis covers the analogy between artificial and natural selection, conceptual metaphors of journey, struggle and tree with the UP-DOWN schema. We demonstrate that some aspects of these metaphors make progress an inherent part of the concept of evolution.