

## Chapter 8

# Metaphors in Science: A Change of Perspective

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### ABSTRACT

*Usually it is held that metaphors are expressions in which something is said but it is evoked or suggest another thing. It is also said that they are - or should be - almost exclusive patrimony of literary or vulgar languages and are not relevant in scientific discourse. However, there are three arguments that lead one to suspect that there is something wrong in these points of view. First, the ubiquity of metaphor in past and present sciences. Second, in almost all such cases, metaphorical expressions are not substitutes or paraphrases of other literal expressions that scientists would use with their colleagues but instead are the common way they are expressed; there is just no other language, metaphors are part of the technical vocabulary. Third, the theoretical and practical consequences of metaphors are part of the corpus or theoretical system to which they belong, in the same manner that the consequences of theorems of an axiomatic system are part of the theoretical system. The three preceding arguments allow us to sketch the following hypothesis: metaphors used by scientists (at least a lot of them) say something in themselves, but are not mere subsidiaries of other literal expressions; therefore, they have legitimate and irreplaceable cognitive and epistemic functions. This change in approach challenges at least four different problem fields: 1) the concept of metaphor; 2) the standard epistemological tradition and its postmodern heresies such as the social studies of science; 3) the history of science; and finally, 4) the biological and cognitive sciences. These four problems will be addressed in this article.*

*It was a metaphor. The metaphor is always the best way to explain things. (J. Saramago, Todos los nombres)*

### INTRODUCTION

We talk all the time with metaphors but do not notice this because we use them naturally. We usually relate metaphors with literature and rhetoric. However, there is something suspicious and uncomfortable

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in metaphors if they are related to science; always they need an alibi, some extraordinary permission to enter land that is forever prohibited. It is clear why. According to the traditional view, science is related to the referentially rigorous, formalized and controlled language, while literature and rhetoric are linked to creativity, free association, and lack of logical and formal limits. Undoubtedly, this has to do with stereotypical visions and is more quasi-mythical than real, but this view has enjoyed both scope and diffusion which has led to a gentlemen's agreement and centuries of tranquility: literature (and rhetoric) with a hegemonic dominance over territory in which science is not interested. Science, for its part is in search for a neutral and refined language, despising figurative or diverted expressions.

However, the huge amount of metaphors in all science leads one to suspect strongly that their presence is the rule rather than the exception. What do these comparative words do, but act as a metaphor, such as those who argue that the universe is a kind of organism, or that it is a machine, or it is a book written in mathematical characters? There are sciences that argue that humanity or civilization develops or dies; that the laws of economics or sociology are equivalent to those of Newtonian physics; that among commercial companies, technological innovations, or even between peoples and cultures there is a Darwinian selection mechanism type; that the market regulates itself through the invisible hand; that the human mind is like a computer or a computer is like a mind; that human ontogeny reproduces phylogeny or, conversely, that phylogeny reproduces ontogeny; that information from one generation to another is transmitted through a genetic code.

However, it is not only a matter of detecting the almost ubiquitous presence of metaphors in past and present science. There are two other arguments that would support a change in the traditional view.

1. **Lexicality:** Many times, in defense of epistemic privilege of science, it is said that expressions like the above are only ways of speaking, figurative language, diverted to fulfill, in the best case, didactic or heuristic functions, but not to express the genuine explanation that science has, an explanation that is inaccessible except for specialists. However, in almost all such cases metaphorical expressions are not substitutes or paraphrases of other literal expressions that scientists would use with their colleagues but are instead the common way they are expressed. There is just no other language; metaphors are part of the technical vocabulary.
2. **Consistency:** Secondly, the theoretical and practical consequences of metaphors are part of the corpus or theoretical system to which they belong, in the same manner that the consequences of theorems of an axiomatic system are part of the theoretical system. For example, the organicist sociologies of the late nineteenth century conceived of society as an organism and the latter as a harmonious, orderly and stable structure. Following this simile, social conflict is what messes up the structure (in fact one of the great problems of Europe of that time), it is designated and evaluated as a "disease". However, just as happens in the individual organism, the attack (conflict) comes from outside, not as a result of injustices of the functioning of society. In this context, the attacking agent must be removed to preserve social harmony and health.

The three preceding arguments (ubiquity, lexicality and consistency) allow us to sketch the following hypothesis: metaphors used by scientists (at least a lot of them) say something in themselves, and do not function as mere subsidiaries of other literal expressions; therefore, they have legitimate and irreplaceable cognitive and epistemic functions. It is worth noting that this change in approach does not point to a devaluation of science because it uses metaphors (in the manner of Nietzsche, for example, or some more current postmodern irrationalism), nor does this approach equate science with literature

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