

# The Use and Problematics of Descriptive Imaginary<sup>1</sup>

Horia-Costin CHIRIAC, *Ph. D.*  
*Postdoctoral Grant Recipient POSDRU ID 56815*  
*Romanian Academy, Iași Branch*  
*horiachiriac@yahoo.com*

## Abstract

*The present work intends to justify the use of descriptive imaginary as conceptual tool in investigating the structure of scientific discourse. Our aim will be that of revealing the existence of a fictional component of such a discourse and of explaining the evolution of scientific concepts from the point of view of their ontological authority. Nonetheless, we will try to justify the use of the term “imaginary” instead of “imagination” as regards the dynamics of scientific representations in modern natural sciences.*

**Keywords:** *descriptive imaginary, scientific representation, scientific theory.*

The present work will try to investigate the dynamics of scientific discourse in natural sciences using the concept of descriptive imaginary. The goal is that of clarifying the way in which scientific theories evolve, taking into account the process of conceptual development within the same theory or from one theory to another one. What is also intriguing for us and will influence our investigation is the way in which the ingredients of scientific descriptions of reality evolve throughout the historical process of conceptual maturation of a scientific theory.

The investigative tool we are going to use is the concept of descriptive imaginary. It will help us to emphasize the fictional component of scientific discourse, which in our opinion represents a key point in the dynamics of scientific descriptive representations that influences the evolution of scientific theories.

We have to explain what the descriptive imaginary is and what distinguishes it from other types of imaginary, but before doing that, it is necessary to justify the use of the term “imaginary” in a work dedicated to philosophy of science.

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Imagination was regarded with reluctance by many philosophers, also as regards its use in the discussions about science. Especially modern science represented for a long time a field in which the use of the term “imagination” was a very prudent one. Giving the fact that scientists use their imagination in conceiving new experimental scenarios and proposing new solutions to different scientific problems, such a situation could seem pretty strange.

In fact, at a closer look, one could easily observe that the difficult relation between imagination and knowledge influences indirectly the relation between imagination and science in western cultural space. Starting with Plato and up to the modern period, imagination was rather associated with fantasy and illusion than with the knowledge of the real.<sup>2</sup> Therefore, any imaginative excess was regarded as dangerous for the effort of building knowledge about real world. This attitude became stronger in the moment of modern natural sciences emancipation. The mathematical component of modern scientific discourse in natural sciences developed by Galileo and Newton determined philosophers to sharpen the distinction between analytical thinking and imaginative thinking. The platonic orientation towards a kind of knowledge based on analytical thinking, capable to reveal the truth beyond sensorial illusions was inherited by later philosophical tradition. Scientific truth in modern science became more and more dependent on analytical thinking combined with measurement and experimental activity, whereas imaginative thinking was hardly considered as having a positive role in expanding scientific knowledge.

The general conviction of these authors was that our senses can trick us easily and taking them into account as primary source of knowledge exposes us to errors in identifying the real causes of phenomena, as happened with Aristotelian Physics. On the contrary, the mathematical method combined with experiment could lead us to the discovery of counter-intuitive truths about nature, like those revealed by Galileo or Newton. Moreover, an excessively imaginative manner of describing reality could favor the development of fanciful scenarios about real world and could even indicate the presence of a psychological disease. After all, the limitation of the use of imagination in natural science could help us to make the distinction between modern chemistry and alchemy, between modern astronomy and astrology, for example.

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<sup>2</sup> Hélène Védrine, *Les grandes conceptions de l'imaginaire, de Platon à Sartre et Lacan* (The Big Conceptions of the Imaginary), Librairie Générale Française, Paris, 1990, p. 27.

Of course, there are also other historical causes that favored the reserves towards the use of imagination in science. Among them, as Ioan Petru Culianu revealed, the religious ones should not be neglected.<sup>3</sup> Protestant Reform influenced the attitude towards images in general. Therefore, scientific descriptions of the natural phenomena became more and more abstract and the non-visual mathematical tools like algebraic calculus were used extensively instead of visual mathematical tools like geometry. This trend can be usually observed throughout the historical development of modern science.

However, as we will see immediately, there are also limitations of this process that must be taken into account. For instance, Newton maintained the geometrical character of demonstrations in his *Mechanics*. Every theorem and every principle in his book was corroborated with a geometrical schema that illustrates the magnitude and the direction of mechanical forces represented by vectors.<sup>4</sup> This way, Newtonian *Mechanics* maintains its geometrical character, being a good example of physical theory that combines the visual character with the analytical one. Of course, later development of Analytical *Mechanics* favored the enrichment of analytical component of the scientific discourse in this case.

Considering all of the above, we could concede, on one hand, that the reticence of those who hesitate in associating the use of imaginative faculty with the development of scientific knowledge is somehow understandable. However, on the other hand, it is quite easy to emphasize the importance of imaginative faculty within the historical process of scientific theories development, at least as regards natural sciences. For example, almost every new set of concepts that accompanies the introduction of a new theory is developed starting from a set of experimental data that are intriguing in the context of the old theory. This is normal, because the final goal for any theory in natural sciences is that of providing a viable description of natural phenomena, or an accurate description of the properties of nature. Such a description could help in making verifiable predictions testable and measurable, but also in developing new technologies able to exploit the properties of nature emphasized by the new theory.

Thus, imaginative faculty is an important tool for any scientist who aims to develop new descriptive strategies regarding the properties of nature. The real question is what are the limits and the specificity of using imagination in science

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<sup>3</sup> Ioan-Petru Culianu, *Eros și magie în Renaștere – 1484* (Eros and Magic in the Renaissance – 1484), Nemira Publishing House, Bucharest, 1994, p. 19.

<sup>4</sup> Tian Yu Cao, *Conceptual Developments of 20th Century Field Theories*, Cambridge University Press, New York, 1997, p. 51.

in order to help the scientific progress and not to mislead it by excessive use of fictional elements that could reduce the rigor of scientific descriptions. Moreover, isn't that a contradiction to claim that scientific discourse, which intends to describe the real world has a fictional component that depends on the use of imaginative faculty?

Starting from these questions, we are going to introduce the concept of descriptive imaginary. First, we have to mention that the term "imaginary" - which we consider here as a substantive, not an adjective – has been introduced by the French school of philosophy and history, starting from Gaston Bachelard and continuing with Gilbert Durand,<sup>5</sup> Jacques Le Goff<sup>6</sup> or, more recently, with Jean Jacques Wunenburger.<sup>7</sup> It was preferred instead of imagination for two reasons.

On one hand, it represented a good alternative to imagination, a term with negative resonance within the history of philosophy.

On the other hand, imaginary is a term that reflects an essential feature of human communities: that of putting in common social representations at the interpersonal level, which triggers a process of selecting, mixing and replacing some representations with others, resulting in the end a group of commonly shared representations which are in fact "common places" for large categories of people belonging to the same culture, to the same religion, or to the same geographical area. "Heaven" could be, in this respect, a good example of representation that belongs to the religious imaginary of some cultural areas, as Lucian Boia states,<sup>8</sup> a representation that maybe in time migrated towards social imaginary.

As to scientific communities, they are not different from other types of communities as regards the putting in common of representations, so in this respect we could talk about a scientific imaginary.

But "imaginary" as an adjective refers to the entities that do not have a correspondent in the real world, simply being products of imagination. Therefore one could have justified reserves in accepting to discuss about scientific imaginary, since this implies somehow the idea that scientific discourse could have

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<sup>5</sup> Gilbert Durand, *Structurile antropologice ale imaginarului* (The Anthropological Structures of the Imaginary), Univers Enciclopedic Publishing House, Bucharest, 2000, p. 21.

<sup>6</sup> Jacques Le Goff, *L'Imaginaire médiéval* (The Medieval Imagination), Gallimard, Paris, 1985, I-II.

<sup>7</sup> Jean-Jacques Wunenburger, *L'imaginaire* (The Imaginary), Presses Universitaires de France, Paris, 2003, p. 12.

<sup>8</sup> Lucian Boia, *Pentru o istorie a imaginarului* (For a History of the Imaginary), Humanitas Publishing House, Bucharest, 2000, p. 14.

an important fictional component. There is no problem in accepting the fictional character of literature, of mythology or of other fields, whereas such a claim regarding natural sciences could contradict with their claim of discovering the properties of the real world.

In our opinion there are clear examples of fictional entities in scientific discourse, namely all those old scientific concepts that proved in time unnecessary for the scientific explanation of various phenomena. All such concepts, as “ether” for example, proved useless in time or, as we put it, revealed their nature of fictions.

Of course, in this point one could ask himself if such concepts *had* a hidden nature of fictions that was revealed in time, or if they *became* fictions in the moment they became useless, unnecessary or negligible for scientists. And our answer to this question is that such concepts, like any other scientific concepts, have been *always* fictions in the sense that they were products of human mind.

Not their *fictional nature* varied in time, because that was “genetic” and they were “born” with that. What varied in time was their *usefulness*. At a certain moment in time, scientists claimed to represent the features of the real world using those concepts. Consequently, their epistemological status became a positive one. They were invested with ontological authority as part of “trendy” scientific descriptions at that moment. In time, their place in the conceptual hierarchy changed and together with the rise of other conceptual and explanatory alternatives, especially in the case of a renowned explanatory conceptual system, namely a new scientific theory, their epistemological status eroded. In the end, they regained their initial status: that of simple fictions suitable of being used, eventually, in the scientific description of the world. That is why we prefer to call them descriptive fictions.

Scientists use descriptive fictions continuously and, of course, are inclined to treat them as fictions only in the beginning of the process of their introduction in scientific descriptions or in the end of it. In the beginning, the hypothetical character of the descriptions proposed helps scientists to detach themselves epistemologically from their own creations. At the end, their detachment is guaranteed by disappointment, because their conceptual tools, namely the old concepts, proved to be less useful in comparison with new concepts that finally replaced them. However, in the middle of the process the claim that a popular scientific concept has a fictional nature seems outrageous for many scientists. They are so found of the explanatory power of the concept, that they become impressed by its ontological authority. Therefore, as long as a new concept or a

new theory doesn't replace the old one, they are pretty skeptical in admitting the fictional nature of the scientific concept.

For example, it is much easier for contemporary scientists to discuss about the fictional nature of "ether" or of the "caloric" than to discuss about the fictional nature of "electrons", "neutrons" or "quarks". Of course, in the future things could change drastically.

Coming back to our primary concern, we can say that the evolution of scientific theories is highly influenced by the dynamics of descriptive imaginary, scientific communities sharing sets of descriptive representations in a continuous exchange process. They tend to choose quite rigorously the descriptive representations which are going to be invested with ontological authority in the scientific discourse. This makes descriptive imaginary to be quite different from social, artistic or religious imaginary. Not only the selection criteria are more rigorous in its case, but also the way in which old and new descriptive representations are combined to form a scientific theory determines scientists to use their imaginative faculty somehow within the limits of rationality when proposing new representations.

Therefore, in conclusion we can say that descriptive imaginary represents a useful conceptual tool for investigating the dynamics of scientific representations, with specific patterns of evolution, whose use is justified by the obvious, although uncomfortable existence of the fictional component of scientific discourse.

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