Inconsistency and theory choice in the reconstruction of scientific episodes: The case of Heterogenesis and Biogenesis

Reconstructions of episodes in the history of science possess (or lack) certain virtues such that, when we face two different reconstructions of the same episode, we should choose the most virtuous one. However, we will argue that when before of dissimilar reconstructions of the same episode, it is not always necessary telling the 'good ones' from the 'wrong ones', and that, as a matter of fact, each reconstruction could provide different but perhaps equally relevant data about the episode in particular and science in general.

In order to do so we will proceed in three steps. First, we will argue that a reconstruction of scientific episode has the main purpose of increasing our knowledge, although not only about the reconstruction's object of study, but perhaps also about a particular case study, a specific scientific context, or even about science itself. Next, we will stress that reconstructions are not mere theories, and thus might be evaluated according not only to its possession or lack of some epistemic values (as simplicity, scope, fruitfulness, consistency, among others), but of some methodological virtues (as historical relevance, historical accuracy, normative accuracy, among others) as well. Last, we present a particular case study which illustrates the above: During the 18th century, the theory of Spontaneous Generation (Heterogenesis) and the theory of Biogenesis contended to explain the origin of life. Nevertheless, the latter failed the tests to prove that parasitic worms were generated by biogenesis, yet it was possible to predict and explain their appearance through the theory of Heterogenesis.

This episode has been reconstructed in two different ways. On the one hand, it has been seen as a case of inconsistency toleration in science. It has been said that for over a century, scientists had to use both theories in explaining the origin of living entities in order to solve relevant problems in biology and parasitology (Farley 1972, 1979, 1989). On the other hand, it has been argued that this is rather a clear example of scientific growth were the theory that ended up being the established one was that that since the beginning achieved, despite its incompleteness, a set of specific epistemic values. In this sense, it has been said that scientists were always confident about Biogenesis, appealing to its simplicity and fruitfulness, and that they were only waiting for the development of the necessary experimental instruments in order to show how the theory could explain the origin of parasitic worms.

This case study shows how two very different reconstructions of a particular scientific episode can help us to increase our knowledge about science. The first one give us a picture perhaps less historically accurate but which expands the possibilities for theories' dynamics, while the second one give us a picture of scientific growth leaded by specific epistemic values in which historical accuracy plays a major role. Nonetheless, although each scores better in different sets of values, and perhaps because of that, both reconstructions increase our knowledge about science in general.