

INTRODUCTION

According to scholars, "vitalism" (or the theory of the vital force) was virtually erased from the map of science to survive only in a few isolated niches.¹ As explained by Ernst Mayr:

"[...] by the 1920s or 1930s biologists had almost universally rejected vitalism, primarily for two reasons. First, because it virtually leaves the realm of science by falling back on an unknown and presumably unknowable factor, and second, because it became eventually possible to explain in physico-chemical terms all the phenomena which according to the vitalists 'demanded' a vitalistic explanation. It is fair to say that for biologists vitalism has been a dead issue for more than fifty years."²

Brigitte Lohff argues that this phenomenon had, in fact, happened almost one century earlier and in a more radical manner, as "after the works of du Bois-Reymond and his papers on the vital force, both term and hypothesis on the vital force lost all scientific significance. The term survived in everyday vocabulary – which characterizes the difference between scientific and non scientific approaches to life."³

¹ G. Stollberg argues that vitalism can be found in our days in homeopathy and in the notion of self-organization (autopoiesis) underlying theory of systems. See "Vitalism and Vital Forces in the Life Sciences", 3-4. <http://www.uni-bielefeld.de/soz/pdf/Vitalism.pdf>

² E. Mayr, *The Growth of Biological Thought*, 52.

³ B. Lohff, "Zur Geschichte der Lehre der Lebenskraft", 112.

The term became even pejorative,⁴ and was associated to such “ideological friends” – Fascism, Communism and New Age rhetoric – that “it does not need any enemies”⁵.

Our initial survey showed that, indeed, vitalism – defined as the resource to *sui generis* entities to explain the singularity of life – had remarkable visibility in the life sciences from the last quarter of the 18th century until the 1840s, when definite questioning of this approach became patent. In the German-speaking area, the epicenter of criticism seemed to locate in what scholars later called “the 1847 Group”⁶, i.e. a group of young physiologists centered around Johannes Müller (1801-1858), the celebrated professor of physiology of the university of Berlin. This group first met in Müller’s laboratory and, aiming at explaining all the phenomena in living beings through the notions and methods of the sciences of matter, sought to expel any *sui generis* entity from physiology to build it anew on the exclusive grounds of physics. This group was composed by Emil du Bois-Reymond (1818-1896), Ernst Brücke (1819-1892) and Hermann von Helmholtz (1821-1894), who soon after were joined by Carl Ludwig (1816-1895).⁷

One chord striking odd in this account is that Müller was a thorough vitalist. It can be argued that this, in fact, is a common situation: disciples initially learn theories and methods from a master to later come to disagree with them as the outcome of their own scientific practice. However, this is not the case here: the antivitalistic views of the disciples became manifest as they were carrying out research projects assigned to them and supervised by Müller. In this way, a first “dilemma” emerged: how did this group

⁴ So much that someone as Georges Canguilhem felt compelled to justify his vitalistic views, see e.g. *La Connaissance de la Vie*, in particular the essays “Aspects du Vitalisme”, 88-100, and “Machine et Organisme”, 101-127.

⁵ S. F. Gilbert & S. Sarkar, “Embracing Complexity: Organicism for the 21st Century”, 4-5.

⁶ On this appellative, see Chapter 4, section “The 1847 Group”.

⁷ E. du Bois-Reymond, [*Ueber Neovitalismus*], 628.

well as the application of the latter approach to the studies on the development of embryos (chapter 5). The circumstances surrounding the enigmatic mention of Driesch by du Bois-Reymond, as well as the former's reaction to it are discussed in chapter 6, before arguing in the final chapter the reasons underlying the brief exchange between both scientists.

Analysis still requires a clear understanding of the meaning of the term "vitalism", therefore a short account of its historical and historiographical treatment is given in chapter 1. Finally, as sciences are neither timeless nor develop in a vacuum but within particular historical contexts, chapter 2 approaches the specific socio-cultural features of the period under study.

This itinerary is methodologically approached through three intertwined layers of analysis. The first one concerns historiographical aspects as arising from the elaboration by previous and contemporary scholars. Then follows the consideration of the social and institutional context of the 19th century, circumscribing the specific boundaries within which a debate on vitalism was then possible. Finally, the third layer consists in an epistemic analysis of the documents and sources that allow for a theoretical understanding of this debate.¹⁰

¹⁰ This methodological approach follows the historiographical views developed by researchers at Centre Simão Mathias for Studies in History of Science, Pontifical Catholic University of São Paulo (CESIMA, PUC-SP); see Ana M. Alfonso-Goldfarb, "Simão Mathias Centennial: Documents, Methods and Identity of the History of Science".

come to develop ideas not merely diverging, but aiming at refute its master's?

According to traditional readings, this antivitalistic or mechanistic project was widely successful. Nevertheless, it did not put an end to the controversy between mechanism and vitalism. Indeed, in 1894, du Bois-Reymond - now a permanent Secretary of the Academy of Sciences of Berlin - gave a lecture at the Academy's yearly public session commemorating the anniversary of Leibniz, precisely on the annihilation and resurrection of vitalism. In particular, he warned against a new version of the old "enemy", namely neovitalism. Among the partisans of the latter, he mentioned an unknown 26-year-old zoologist by the name of Hans Driesch (1867-1941).⁸

This mention gives rise to a new "dilemma": although much later Driesch became a very famous - controversial, polemic, influent - character, precisely as representative of neovitalism,⁹ the mention by du Bois-Reymond, at that time an icon of the German scientific establishment, in such a solemn occasion, strikes as the type of odd chord to which the ears of the historians of science are sensitive to.

This book seeks to give an answer to both "dilemmas". In order to do so, it discusses the history of the rise and heyday of the theory of the vital force(s) in the 18th and 19th centuries (chapter 3); the criticism to it and the proposal to replace it by an approach that prescribed the use of the notions and methods of the sciences of lifeless matter in physiology (chapter 4); as

⁸ Between his graduation at Jena in 1889 and his arrival in Heidelberg University in 1900 as *Privatdozent*, Driesch had no university affiliations.

⁹ Besides Driesch's influence on biological ideas and his collaboration with reputed scientists, such as T. H. Morgan, a few further examples are his influence on Christian philosopher Jacques Maritain and on painter Wassily Kandinsky's theory of form. When China opened up to Western culture, Driesch was one among the thinkers invited to lecture at the universities; see J. Maritain, "Preface" to *La Philosophie de l'Organisme*; W. Kandinsky, ["Notes for Lectures at Bauhaus"]; T. Airaksinen, "The British Influence on the Radical Nationalism in China at the Beginning of the 20th Century"; and S. Waisse-Priven, "Fe y Razón en el Siglo XX: La Influencia de las Ideas de Hans Driesch en el Pensamiento Biológico de Jacques Maritain".