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Vital forces and organization: Philosophy of nature and biology in Karl Friedrich Kielmeyer

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ABSTRACT

The historical literature on German life science at the end of the 18th century has tried to rehabilitate eighteenth century vitalism by stressing its difference from *Naturphilosophie*. Focusing on the work of Karl Friedrich Kielmeyer this paper argues that these positions are based on a historiographical bias and that the clear-cut boundary between German vitalism and *Naturphilosophie* is historically unattested. On the contrary, they both belong to the process of conceptual genealogy that contributed to the project of a general biology. The latter emerged as the science concerned with the laws that regulate the organization of living nature as a whole. The focus on organization was, at least partially, the result of the debate surrounding the notion of "vital force", which originated in the mid-eighteenth century and caused a shift from a regulative to a constitutive understanding of teleology.

In the course of the last thirty years a considerable body of scholarship has examined the life sciences that arose in Germany at the end of the eighteenth century. This literature has shown that previous dismissals of this tradition, assumed to be infected with a pathological imagination, were unwarranted. Yet the interpretations of the period have not always been consistent with each other, and have often been characterized by vagueness. Generally speaking, the scholarly debate has focused on the historical and conceptual relationship between three elements: (1) Kant's philosophy of biology, (2) the biological vitalism developed at the Göttingen medical school by Blumenbach and his students Kielmeyer, Link, Treviranus, and Reil, and (3) the *Naturphilosophie* of Schelling, Oken and Carus.

In his pioneering studies Timothy Lenoir (1978, 1980, 1981, 1982) argues that, although the life sciences developed in Germany in the late eighteenth century have been dismissed as an era dominated by empty speculation, they were in fact the result of a coherent research program. This program was developed in Göttingen by a well-connected group of biologists after receiving its first formulation in Kant's *Critique of the Power of Judgment* in 1790. In the second part of this work, Kant sees teleology as a necessary tool to understand fundamental features of living beings such as functions and development. He also considers it as a mere heuristic principle, not as a constitutive character of organized bodies. Lenoir claims that Blumenbach was the first naturalist who accepted the Kantian understanding of teleological principles and organized it as a structured research program. This program was first developed by his most distinguished students Karl Friedrich Kielmeyer, Alexander von Humboldt and Gottfried Reinhold Treviranus. This group of naturalists is thereby addressed as "Göttingen School." The distinctive approach practiced at Göttingen derived from ideas fashioned principally by Blumenbach during the 1780s and 1790s. He synthesized some of the best elements of Enlightenment thought on biology, particularly Buffon, Linnaeus and Haller, in terms of a view of biological organization found in the writings of Kant (Lenoir, 1981, 115). The disregard of this "Kantian" tradition in life sciences has, for Lenoir, both theoretical and historical grounds. The main issue is the assumption that only reductionist models are capable of generating a quantitative account of natural phenomena.

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Nevertheless, the idea that biological organization is not reducible to the laws of physics and chemistry is fully compatible with the fidelity to quantitative rigor as a touchstone of scientific explanation. According to Lenoir, the "vital-materialism" of the Göttingen School accepted this challenge and developed a "teleo-mechanical" research program based on the Kantian distinction between constitutive and regulative understandings of teleology. On the other hand, ascribing constitutive character to teleology, i.e. considering it as a real feature of living bodies, the *Naturphilosophen* exceeded the boundaries of science in the direction of empty speculation. From the historical point of view, the main reason for disregarding the Göttingen tradition is the assumption that it was just another example of speculative philosophy of nature. Lenoir believes this assumption is proven wrong by textual evidence, since both Kielmeyer and Treviranus openly criticize *Naturphilosophie*. Thirty years later, Hans Peter Reill (2005) unifies the vital-materialism of the Göttingen School with the Montpellier tradition of Bordeu, Barthez and Ménuret under the general label of "Enlightenment vitalism." Once again, the pivotal point of the argument is the distinction of this tradition from Romantic *Naturphilosophie*. Both accounts share a common argumentative pattern. Their fundamental aim is to rehabilitate eighteenth century vitalism by showing that its research program can be considered in "naturalized" terms. Their most important concern is then to mark the difference of this program from *Naturphilosophie*, which is considered the metaphysical and anti-naturalist program *par excellence*. In what follows, I argue that these positions are based on a historiographical bias, using the work of Karl Friedrich Kielmeyer as a basis for my argument.

Scholars have already argued that the alleged agreement between Kant and Blumenbach was based on a substantial misunderstanding of the respective conception of teleology: Blumenbach ignores the Kantian distinction between constitutive and regulative principles and conceives of the *Bildungstrieb* as a goal-directed drive proper to all organized beings (Richards, 2000). For this reason the Lenoir thesis can no longer serve as point of departure for the reconstruction of the German life sciences of this period (Zammito, 2012). Resting upon these studies I will develop my argument by showing that the clear-cut boundary between the vital-materialism advocated by Lenoir and *Naturphilosophie* is historically unattested. I will thereby position myself in accordance with Richards (2002), but use a different argumentative strategy. I will argue that *Naturphilosophie* is part of the same process of conceptual genealogy that contributed to the emergence of a general biology as a unified science. The latter became possible only after the determination of its proper object had reached completion. The object in question is "organization" as a specific property of living nature. Biology emerged as the science that deals with the laws regulating organization, both of single natural bodies and of living nature as a whole. I will try to show that the focus on the concept of organization was at least partially the result of the debate on the notion of "vital force" originated in mid-eighteenth century Germany. This debate led to a functional interpretation of the *scala naturae* according to which higher levels of organization display a greater number of vital functions than lower ones. I will develop my argument as follows. I will first provide a sketch of the different theories of vital forces formulated in Germany before Kielmeyer, with a particular attention to Haller, Wolff and Blumenbach. I will then take into detailed account the lecture on organic forces held by Kielmeyer in 1793 to verify the meaning of the claim of it being the first systematic program of a general biology. Finally, I will show how the framework put forward by Kielmeyer was coherently developed by Schelling and Treviranus.

1. Theories of vital forces before Kielmeyer: from Haller and Wolff to the Göttingen School

It is a striking fact that the great majority of scholarly works dedicated to the vital-materialism of the Göttingen School dealt with the issue using the vocabulary of Lakatos. The idea of a Kant–Blumenach "teleo-mechanical" program for biology, formulated for the first time by Lenoir, is still endorsed in recent studies (Bach, 2001; Dupont, 2007; Schmitt, 2006). This notion, however, is inadequate for understanding the transformations that led to the birth of biology at the beginning of the nineteenth century. The idea that the *Critique of the Power of Judgment* provides a research program for biology can in fact be criticized not only by emphasizing the divergence of Kant and Blumenbach, but also by showing that Kant's attention to biological issues was not the result (at least not primarily) of scientific concerns, but of strictly transcendental questions (Huneman, 2012; Zuckert, 2007). On the other hand, however, it is equally true that Kant dealt with biological matters in at least three different respects: (1) the relationship connecting the notion of *Naturzweck* to modern epigenesis, since the process of embryogenesis seems to presuppose its result (the adult organism) and be directed towards its realization (Huneman, 2007; Zammito, 2007); (2) the problem of functions, which cannot be explained without referring to final causes (the structure of a bird, for example, is apparently grounded in the purpose of allowing flight: Illetterati, 2008); and (3) the difference between *Naturbeschreibung* and *Naturgeschichte*, i.e. the discussion of the epistemological status of natural history as descriptive cataloguing or causal explanation of varieties (Fischer, 2007; Sloan, 1979, 2006).

This discussion is not the result of a research program but of a conceptual shift taking place in the last decades of the eighteenth century. It has been pointed out (Cheung, 2006) that during the eighteenth century the word "organism" generally refers to a specific form of order that could apply to different kinds of entities such as plants and animals, but also artifacts. At the end of the eighteenth century, the term became a generic name for individual living entities, by around 1830 it became a recurrent technical term in the emerging biological disciplines. Theories and models of living beings developed until the late eighteenth century must therefore be defined as pre-biological. With regard to this framework, even Kant makes no exception: although the critique of teleological judgment has in different ways been regarded as an endeavor towards the scientific foundation of biology (Löw, 1980; Marcucci, 1972; Philonenko, 1982; Zumbach, 1984), Kant's position on this issue is actually much more cautious (Ginsborg, 2001, 2006; Goy & Watkins, 2014; Guyer, 2005; Illetterati, 2010; McLaughlin, 1989, 1990; Zammito, 1992). According to Kant, biology may indeed never be regarded as a proper science, as the consideration of living beings implies reference to teleological principles, and the use of these principles has only regulative character. On the other hand, from the late eighteenth century, the term "biology" began to appear in the works of several naturalists, the most important of which is the monumental *Biologie, oder Philosophie der lebenden Natur für Naturforscher und Ärzte* (1802–1822) by Gottfried Reinhold Treviranus. What happened between 1790, the year of publication of the third *Critique*, and 1802, when Treviranus used the term "biology" as the title of a scientific work concerned with living nature as a whole? I wish to argue that the answer lies in the shift involving the modern semantics of organization. The birth of biology as a field is better understood in genealogical terms, considering the way through which "organization" became a specific object of natural science. In what follows I will argue that this process is intertwined with the conceptual history of the notion of "vital force."