Hegel's Philosophy of Nature
Its Origins, Development, and Contemporary Relevance

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Over the past three decades, there has been a growing surge of interest in Hegel among Anglophone scholars. Initially, this interest was predominantly directed toward the study of his major published works, including the *Science of Logic*, the *Phenomenology of Spirit*, and the *Philosophy of Right*. In recent years, the *Encyclopaedia of the Philosophical Sciences*, which was previously undervalued and viewed primarily as a secondary text for teaching purposes alongside Hegel's lectures, has started to receive the recognition it deserves. However, despite acknowledging the immense significance of the *Encyclopaedia* as the only form in which Hegel ever published his entire mature philosophical system, certain parts, such as the Logic and the Philosophy of Spirit, have garnered a disproportionately greater attention from scholars. The Philosophy of Nature, which holds a central position within Hegel's tripartite comprehensive philosophical system as its second part, has remained marginalized in terms of its systematic importance and contemporary relevance, if not largely overlooked altogether.

0.1 On the Reception of Hegel's Philosophy of Nature

To be sure, over almost two centuries since the release of the third edition of the *Encyclopaedia* in which Hegel introduced the final revisions to the text of his Philosophy of Nature, there have been several reputable instances of positive receptions of Hegel's natural philosophy worth mentioning. The first is associated with the "Hegel Renaissance" at the turn of the twentieth century and during its first decades. It is true that despite an intensifying enthusiasm about Hegel and a new rise of Hegelianism, many commentators maintained a generally skeptical and dismissive stance toward his philosophy of nature, which is particularly evident within the German scholarly community.[1] However, at the same time, in England,

[1] For publications reflecting the early (1802–41) reactions to Hegel's philosophy of nature, see Neuser 1987b (cited in Ferrini 2014, 3n8).

such scholars as Charles Sanders Peirce, Alfred North Whitehead, and John M. E. McTaggart were in the process of developing ideas that show substantial influence from Hegel, including his philosophy of nature. Perhaps the most prominent example was Peirce, who openly claimed to have revitalized Hegel's metaphysics and philosophy of nature in his own interpretation of matter as "effete mind" and his speculative notions concerning the spiritual attributes of cytoplasm, elaborated in his work *Man's Glassy Essence* (1892). Significant parallels can be also drawn between Hegel's views of nature and Whitehead's process philosophy that develops similar ideas. One such example is Hegel's conception of organism that undoubtedly inform Whitehead's metaphysics of *Process and Reality* (1929), a work often described by the author and commentators as "the philosophy of organism" (see Tabaczek 2013). One of the key representatives of the second wave of British idealism, John McTaggart, dedicated decades to grappling with Hegel's ideas, culminating not only in numerous interpretations and critical commentaries on Hegel's works but also in his original metaphysical system expounded in the two-volume masterpiece *The Nature of Existence* (1921; 1927). This work advances concepts closely aligned with Hegel's ontology, underscoring McTaggart's profound engagement with Hegelian thought but also providing an opportunity to see how this thought inspired new ideas (Kreines 2008b).

When, after a long period of outright rejection, in the 1980s and 1990s, Hegel's star rose again in the Anglo-Saxon world, so did efforts to revive Hegel's Philosophy of Nature emerge.[2] Initiated by the 1970 publication of Michael Petry's English translation of the 1830 *Encyclopaedia* Philosophy of Nature (*Enc.* 2P), accompanied by an elaborate commentary that illuminated the importance of this part of Hegel's system in comprehending his overall philosophy, those efforts materialized in intensified attempts to engage the topic (Hortstman et al. 1986; Petry 1987; 1993; Burbidge 1996; Houlgate 1998).

Nevertheless, many scholars who recognized the importance of Hegel's philosophy of nature within the comprehensive framework, and lauded its essential role in interpreting the transition from Idea to Spirit, still harbored contempt for the outcomes presented by Hegel in this realm. They cast doubt on the scientific validity of his conception of nature and the relevance of the content of his natural philosophy to then-contemporary results from the empirical sciences (Pippin 1989, 66; 2002; Bungay 1994,

[2] For a more detailed discussion of the reception of Hegel's Philosophy of Nature in this period, see Ferrini 2014.

32–33). It is only during the last decade that scholars began showing a renewed interest in Hegel's philosophy of nature, setting in motion its close examination (Stone 2005; Rand 2010; Khurana and Menke 2011; Stone 2013; Giladi 2014; Corti and Schülein 2023a). What is characteristic of the present engagement with this topic is an increasing renunciation of the dismissive attitude toward Hegel's philosophy of nature and a growing appreciation for its contents worthy of recognition in its own right. This has expanded the topics of inquiry from traditional, merely systematic questions, such as the place and actual functionality of this area within Hegel's mature philosophical system, the relation of Nature to the Idea and Spirit, to more specific ones, including the development of Hegel's concept of embodied life, his notion of organism, and such issues as human nature, human autonomy, and the emergence of consciousness (Corti and Schülein 2023a; 2023b). Prompted by a growing appeal of a "metaphysical" reinterpretation of Hegelian thought (Pippin 2002; 2017; Kreines 2015) and the lately introduced "naturalist" reading of Hegel (Pinkard 2012; Stone 2013; Giladi 2014), contemporary scholarship has been marked by attention to aspects crucial to understanding Hegel's project of the philosophy of nature and the strategy he employs there. This requires an investigation of a variety of topics treated by Hegel in each of the three main sections of his Philosophy of Nature – the "Mechanics," "Physics," and "Organics" – along with their subsections. Aspects of Hegel's thought introduced in the "Organics" are generally better represented in the recent secondary literature than their counterparts from the "Mechanics" and "Physics" (Rand 2017, 395). While such a disparity is not surprising, especially given the present appeal of the concept of life and intensified attempts to understand the emergence of organic nature largely fueled by contemporary research in the biological sciences, insufficient coverage of topics from the "Mechanics" and "Physics" leads to an incomplete picture of Hegel's Philosophy of Nature, which makes the development of an explicit evaluation of its rich and complex content, as well as an appreciation of its systematic function and task, difficult to achieve.

The present collection addresses this gap by offering a systematic reading of the Philosophy of Nature and its key topics, emphasizing the methodically and coherently organized unity of this part of Hegel's tripartite philosophy and its harmonious relation to two others. The idea of the whole and its organic development, so pervasive throughout Hegel's system, could not be grasped properly without revealing the aims he associates with his philosophy of nature. Similarly, it would be a mistake to approach the Philosophy of Nature as merely an "empty otherness"

outdated scientifically and void of any independent philosophical significance. Hegel never intended his Philosophy of Nature to be a rival to the empirical sciences but rather developed it as an independent philosophical discipline capable of grasping nature and natural things through reason, as opposed to the natural sciences whose results belong to the domain of the understanding. Important in its own right, Hegel's *Naturphilosophie* generates a philosophically sophisticated account of nature as a complex process of formation, leading toward organic life.

0.2 Theoretical Roots and the Evolution of Hegel's Views of a Philosophy of Nature

0.2.1 Influences and Inspirations

As a representative of the post-Kantian tradition, Hegel develops his views of the philosophy of nature, being inspired by the consistent efforts of his contemporaries to come up with a plausible picture of the natural world and the kinds of relations existing between and within natural objects. While well informed in the advances of the sciences of his day, Hegel and his thought are certainly situated in the context of post-Newtonian scientific developments manifested through the expansion and blossoming of "Romantic science." Comparatively "new" phenomena such as electricity, magnetism, and chemistry that turned out to be inexplicable in terms of Newtonian forces served as an impetus for further scientific explorations, providing material for philosophical reflection. Hegel's own views depicted in his studies of the philosophy of nature are very much representative of a scientific outlook of his day. It suffices to recall that the idea that electricity and magnetism serve as a bridge between mechanism, organic life, and consciousness, which is so prominently featured in Hegel's writings, is essentially a product of "Romantic science" considered by many at that time to be plausible. Perhaps the most significant result of Romanticism in science was an introduction of a new "organic" conception of nature, which stood in sharp contrast to its Newtonian (mechanistic) counterpart that prevailed in England and Continental Europe at the time (Beiser 1992; 2003; Richards 2002; Klancher 2013). This is the idea that determined the development of post-Kantian *Naturphilosophie*, championed by Schelling and later advanced by Hegel. When scholars of German idealism point to an influence that Romantics' scientific views had on the emergence of Hegelian and Schellingian thought, they afford the most important role to Schiller's theory of nature and Goethean science (Hoffheimer

1985; Richards 2002; Beiser 2005, 23–27, 37–46; Nassar 2010; Förster 2012, 168–72, 254–58, 265–76). It was indeed Schiller who first drew the attention of his contemporaries to nature as an object of a true inspiration, insisting, "our culture should lead us along the path of reason and freedom back to nature" (Schiller 1993, 180). Goethe and his conception of natural science ("morphology") served as a strong impulse for the development of a new *Naturphilosophie*, offering a concept of natural order that more closely corresponds to the emerging picture of a nature now seen to be dynamic and ever-changing, to nature's "infinitely free exercise of life" (*Lebenstätigkeit*) (Goethe 1987, 413).

Both Schiller and Goethe, whose works Hegel first encountered while in Frankfurt and continued to follow closely thereafter, had a profound impact on his philosophical development and the maturation of his thought (Hoffheimer 1985, 242–44; Förster 2012, 320, 360, 362, 370f.). In the realm of natural philosophy, one of the most profound influences on Hegel, with enduring effects for decades, was his friend and fellow student at the Tübingen Seminary (*Stift*), Friedrich Schelling. Some commentators have even credited Schelling with the "invention" of post-Kantian *Naturphilosophie*. While this assessment is somewhat problematic, especially since Goethe had already produced several writings on the subject by 1800, introducing significant concepts in natural philosophy, Schelling's role as a central and pivotal figure in the natural philosophy of that era cannot be overstated. Hegel's growing interest in a philosophical exploration of nature at the outset of his academic journey can be largely attributed to his collaboration with Schelling in Jena from 1801 to 1803. Their initial programs in *Naturphilosophie* shared numerous similarities and fundamental overlaps. However, their divergent views on the philosophy of nature and its place within their systems marked a significant contrast between the thinkers. It was Hegel's dissatisfaction with Schelling's portrayal of nature as a "series of stages" that motivated his own search for "understanding the necessity of the various forms of nature," the project he launched in Jena (*Enc.* 2 §249A).

0.2.2 Tracing a Pathway to the Encyclopaedia *Philosophy of Nature*

0.2.2.1 Dissertatio Philosophica de Orbitis Planetarum

Hegel's first work on topics directly relevant to his interest in natural philosophy is his *Dissertatio philosophica de orbitis planetarum* (1801). Commenting on this early publication, scholars tend to primarily focus,

often exclusively, on a notable mistake made by Hegel within it. It pertains to his erroneous dismissal of astronomers' predictions – founded upon the Titius–Bode arithmetical sequence, commonly known as the Bode law – regarding the existence of an eighth planet situated between Mars and Jupiter. Even J. H. Stirling, who was among the few early proponents of Hegel's philosophy of nature, expressed regret in 1873 that the *Dissertatio* was ever written, acknowledging the presence of serious flaws in the work (Stirling 1977, 100).[3] However, while this "grave miscalculation" of Hegel's stands as a fundamental point of the text, it is far from being the sole or even the most significant outcome of this work. Within the text, Hegel formulates some elements of his *Naturphilosophie* for the first time, and many of the ideas he presents in this work remain largely unchanged in his subsequent writings, including the *Encyclopaedia* Philosophy of Nature.

A key concept among these notions is the organic perspective within natural philosophy, which entails the idea of the universe as a coherent organic entity. This organic viewpoint conceives of the universe as a whole, emphasizing the interconnectedness of the natural realm and stressing a continuity between inorganic and organic nature, life, and (human) mindedness. All these components harmoniously coexist within an organic unity, where their interrelationships are governed by the whole. These organicist views fundamentally shape and inform Hegel's stance toward the empirical sciences. He holds that in physics, it is crucial to proceed from a holistic approach to nature, and advocates the comprehension of the solar system as a complex living entity within the field of astronomy. Hegel's anti-reductionism, clearly visible in his later versions of the *Encyclopaedia* Philosophy of Nature, directly emanates from his organic convictions.

Another salient topic addressed in the *Dissertatio* pertains to Isaac Newton and his foundational physical laws and principles. Hegel's understanding of Newton and his ideas about matter and motion, initially formulated in the *Dissertatio*, persist consistently, in largely unchanged form, throughout his academic trajectory.

Considerable attention within the *Dissertatio* is devoted to scrutinizing the relationship between mathematics and physics. Hegel criticizes Newton's mathematical demonstration of Kepler's second law of planetary motion, rebuking the amalgamation of mathematical considerations with

[3] Cited in Ferrini 2014, 2n6. In the 1817 edition of the *Encyclopaedia*, Hegel acknowledged the inadequacy of his attempt to establish a law governing the distances of planets from the sun. In the subsequent editions of the *Encyclopaedia* (1827 and 1830), he omitted any reference to his dissertation.

physical ones. He cautions against the utilization of mathematical techniques in physics when driven solely by mathematical expediency and procedural efficiency.[4] Interestingly, the *Dissertatio* outlines the core directions of Hegel's subsequent critique of the force concept. Within this context, Hegel emerges as an original thinker, introducing several ideas later adopted by Schelling. Notably, Hegel's interpretation of the interplay between Kepler's and Newton's mechanics, as delineated in the *Dissertatio*, eventually found resonance in Schelling's work (*SW* I/4: 330; 432; see also Closs 1908).

0.2.2.2 The Jena System Drafts

During his time in Jena, Hegel showed a profound interest in the philosophical inquiry into nature, initially allocating to the philosophy of nature a much more prominent role and position compared to its eventual place in his mature system (Beiser 2003, 138–39). The systematic works produced during this phase include three Jena Drafts of a Philosophical System that contain substantial surviving fragments delving into the realm of philosophy of nature. The most thorough exploration of this subject can be found in two key documents from this period: The First Systematic Draft of *Naturphilosophie* from 1802–3 (*Erster Entwurf eines Systems der Naturphilosophie*) and *Jenaer Realphilosophie* from 1805–6 (see *GW* 5; *JS III* / *GW 8*). Both these documents are based on manuscripts of lectures that Hegel delivered during his time in Jena. These writings stand as foundational records of his evolving ideas on the philosophy of nature during this early period of his intellectual development.

The distinguishing feature of all the Jena iterations of Hegel's philosophy of nature lies in his initiation with the concept of "ether." This concept, coupled with the notion of "matter" (*Materie*), forms the foundational framework through which he scrutinizes natural phenomena, as well as their interplay and processes.

Hegel introduces "ether" as something akin to a materialized Absolute, which unfolds itself within space and time. This "absolute matter" (as he calls it) becomes the crux of his exploration, where the philosophy of nature endeavors to interpret diverse natural phenomena in their interactions with each other as distinct manifestations of this absolute matter. Hegel's aim goes beyond merely demonstrating that each natural

[4] For a very informative discussion of a specific content of Hegel's 1801 *Dissertation* see Ferrini 2014, 1–2.

phenomenon represents a particular expression of absolute matter. He seeks to establish that nature embodies a cohesive and structured arrangement, where every natural phenomenon constitutes an integral element within a systematic sequence of natural occurrences. This approach serves two main purposes. It (1) reaffirms an organic (organicist) view of nature while advancing the idea of its underlying systematic organization; and (2) allows for the perception of the natural order as shaped by specific principles emerging from the structural attributes of absolute matter, rather than being externally imposed.

These foundational principles persist consistently throughout all versions of Hegel's philosophy of nature from the Jena period. Variations in these versions primarily stem from the incorporation of newly available scientific information resulting from the advancements of contemporary science. For instance, the 1802–3 manuscripts lack a developed section on organic life, yet Hegel introduces it in his 1805–6 lectures in response to several scientific developments such as the emergence of paleontology and the evolution-based ideas gaining ground within biology.

0.2.2.3 The Phenomenology

While the *Phenomenology of Spirit* (1807) does not directly deal with issues central to the philosophy of nature, it contains two sections that are somewhat pertinent to its themes and can also shed light on how Hegel positions it within his mature system. One such section is the chapter titled "Force and Understanding, Appearance and the Supersensible World" (III). In this chapter, Hegel explores the relation of natural scientific cognition to its object. Distinguishing between the essence and the phenomenon, consciousness as the understanding reduces the realm of phenomena to the stable existence of matter, conceiving of it as the action of force. Even more significant is the chapter titled "Observing Reason" (V.A), where Hegel outlines some primary ideas of his philosophy of nature. This chapter traces the progression of consciousness from mere perception to the universality of thought. The advancement occurs through the discovery of forces and laws operating within nature, and this process describes our self-conscious cognitive engagement with the world, informed by the findings of empirical sciences.[5] While in the Philosophy of Nature Hegel presents an unfolding development encompassing the transitions from the

[5] For a detailed discussion of this chapter and its significance for Hegel's mature philosophy see Ferrini 2009b.

inorganic to the organic and thinking life, in the *Phenomenology* he is more concerned with the gradual progression of forms of consciousness and the specific structures of consciousness in relation to nature.

It is also noteworthy that in the *Phenomenology*, Hegel distances himself from Schelling's reductionist approach, which seeks to explain the organic unity of both inorganic and organic nature by relying on quantitative forces and laws that drive the organized inner productivity of nature's development. This divergence illustrates Hegel's distinct perspective on the relationship between nature and consciousness and the underlying principles that shape their interactions.

0.2.2.4 The Encyclopaedia

Hegel develops his own philosophy of nature as a system of qualitatively differentiated stages, the first exposition of which he gives in his 1817 *Encyclopaedia of the Philosophical Sciences* that in its entirety represents his mature philosophical system. Presented as the second part of the system, and positioned between Logic (the ideal part) and the Philosophy of Spirit (the real part), the Philosophy of Nature now acquires its systematic place as the domain of the "self-externality of the concept" (*SL* 536/*GW* 12: 39). Its primary objective is to grasp the (logical) Idea in the externality of the natural world by giving its theoretical (philosophical) account. Yet Hegel's engagement with the philosophy of nature extends beyond its merely systematic or architectonic function. His interest is deeply rooted in the pursuit of formulating a comprehensive conception of nature that would explain it as an organic unity characterized by an intrinsic dynamic structure capable of self-generation.

Hegel expands his philosophical treatment of nature in his 1827 and 1830 editions of the *Encyclopaedia*. While his view of nature and his understanding of the aims of his philosophy of nature remain relatively consistent, notable revisions are introduced in successive editions of the work. One significant change is a marked shift in his understanding of the relationship between reason and the empirical world that occurred between 1817 and 1827 (Ferrini 1998). Additionally, specific concepts, such as chemism, undergo revisions in the later editions (see Houlgate 2005, 116–20; Houlgate 2022, 1:400n16). Furthermore, Hegel adjusts his elucidation of what John Burbidge calls "his account of the logic of nature" (Burbidge 1996, 96–102). His revisions take into account emerging scientific findings, leading him to acknowledge that empirical phenomena cannot be solely deduced through logical means. He recognizes that

understanding natural phenomena requires empirical exploration, observations, and experiential engagement, including scientific experiments. This shift in his perspective offers a more nuanced and justified position regarding the role of the empirical sciences in comprehending nature and its intricate processes. By incorporating empirical methods, Hegel's appreciation for scientific investigations becomes more substantiated and well-defined within his philosophical framework.

What undergoes even more significant alteration is largely the exposition of details (*Enc*. 2P, 1: 65). Significant textual expansions introduced in the 1827 and 1830 editions include additional chapters and elaborations on various topics in the form of Remarks. Hegel further develops and refines his ideas on physics, chemistry, geology, and organic life, offering a more comprehensive and detailed examination of natural phenomena. In the successive editions, he also takes into account advancements made in various scientific disciplines, such as astronomy, biology, paleontology, and geology. Along with making his work relevant to the scientific context of his time, it also led to some shifts in philosophical emphasis, such as more rigorously stressing the interconnections between the physical and organic aspects of nature, as well as highlighting the organic unity and continuity of natural processes.

It is noteworthy that for a number of consecutive semesters from 1819–20 to 1825–26, Hegel taught the philosophy of nature at the University in Berlin, a fact that demonstrates his continuing engagement with the subject matter.[6] In his *Lectures*, he discussed an impressive range of topics. In comparison, the *Encyclopaedia* includes only a few of them, mainly in Remarks. Still, the differences between the editions of the *Encyclopaedia* version of this part of his system reflect the persistent development of his thought in this area.

Consequently, the Philosophy of Nature offers a wealth of stimulating material that demands careful scrutiny and precise interpretation. A careful reading of this text reveals a fundamental coherence in Hegel's philosophical endeavor. Many themes and concerns introduced in the Philosophy of Nature resurface and find treatment in other works and aspects of his mature system.

Within the Philosophy of Nature, Hegel raises significant inquiries about the natural world and its dynamism, contemplating the extent to which scientific cognition can grasp its complexities. Additionally, he explores the relationship between philosophy and science, displaying a

[6] Recently published, Hegel's *Lectures on the Philosophy of Nature* provide valuable supplementary material, setting the stage for a more insightful philosophical exploration of Hegel's *Philosophy of Nature*. See: *VNat1-GW*; *VNat2-GW*; *VNat3-GW*.