

10

The Logical Form of a Living Organism: Hegel, Naturalism and Biological Autonomy

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Abstract

This chapter investigates Hegel’s philosophical account of living organisms and its import for current philosophical conversation on life. In part one, I will address Hegel’s stance towards the distinction between the manifest and scientific images of life and living organisms. I will argue that Hegel’s philosophical views cannot be reduced to an analysis of common sense or the manifest image framework but rather investigate and integrate categories coming from the natural sciences of his period. This gives new meaning to the idea of Hegelian naturalism. In part two, I argue that this is particularly notable in the case of “organization”, a notion central to Hegel’s understanding of living beings. I will first briefly survey and contextualize the role this notion played in debates that took place around Hegel, especially in the work of comparative anatomist George

Cuvier, reconstructing Hegel's conception of "organization" in detail. I will then show that organization plays a fundamental role in Hegel's thought. I will close by pointing to a potential resonance between Hegel's views and a current conceptual framework in theoretical biology that aims to elaborate the notion of organization in a theoretically viable and scientifically sound way.

Introduction

Hegel's account of life and living organisms has been demonstrated to be a key element of his system of thought shaping not only his so-called philosophy of biology (Gambarotto-Illetterati 2019, Brinkmann 1996, Sell 2017, Kabehskin 2021a, Spahn 2007, Sell 2013, Furlotte 2018, Westphal 2020) but also his conception of reason and thinking more generally (cf. Kreines 2015, Ng 2020, Pippin 2018) and his views on practical and political philosophy (Quante 2001, Sedgwick 2001).

One of the central inspirations for the recent rediscovery of Hegel's insights on living phenomena is the neo-Aristotelian conception of life (Thompson 2008). This account has attracted considerable attention for recovering Hegel's "scandalous" (Ibid., 25) idea that life is a *logical* concept. It argues that our understanding of something like living involves distinct kinds of thoughts exhibiting a particular logical form (which is not empirically determined) and expressed in specific sorts of judgments¹.

While Neo-Aristotelianism has successfully helped illuminate several parts of Hegel's account and put his ideas back on the philosophical agenda, it is not completely in accordance with Hegel's views and in fact brings to light some important tensions (Rand 2013). In this chapter, I will focus on two of those tensions in order to foreground and revive two tenets central to Hegel's thought on organisms that tend to be obscured by the

Neo-Aristotelian perspective – and which result in a picture of Hegel that remains only partial, missing some of his insights that are of interest for current concerns.

The first tenet is metaphilosophical and regards Hegel's view on how philosophy should deal with what one might call the scientific image of life and organisms. While Neo-Aristotelians explicitly restrict their conceptual analysis to our ordinary, common-sense (or manifest image) conception of "life", Hegel's criteria for a good philosophical account of organism, I will argue, implies alignment with the categorial framework of the natural sciences. I will show how Hegel's interest in the concepts developed in the biological studies of his contemporaries is explicit in both his general metaphilosophical statements and his specific analysis of animal organisms. Part one of this chapter is devoted to outlining this stance and demonstrating that not only it is difficult to find a distinction between manifest and scientific image in Hegel that resembles the one underlying Neo-Aristotelian accounts but also that continuity with the scientific account of life is a point on which Hegel and Neo-Aristotelianism part ways.

Secondly, if one looks closer at how the scientific, categorial framework that Hegel scrutinizes, elucidates and ultimately *integrates* into his philosophical conception shapes his account, another more specific tension in Hegel's views on living beings becomes visible: while for Neo-Aristotelians like Thompson, notions such as "organisation" and "self-organisation" are essentially flawed and do not enable an intelligible grasp on the notions of life and living organisms, Hegel's account gives a central place to the notion of "organisation". In part two, I will show how "organisation" underpins Hegel's account of life, playing a more fundamental role than the notion of *Gattung* or species – which is instead fundamental for Neo-Aristotelians. I will first provide some historical context and

textual evidence for this claim, surveying the role “organisation” played in the debates of Hegel’s time and investigating the views on this topic put forward by one of Hegel’s heroes, George Cuvier. I will then reconstruct Hegel’s view on the issue. My analysis will primarily focus on Hegel’s conception of reproduction (*Reproduktion*), understood as “self-maintenance” – and not as generation of an individual of the same *kind* – and will show that it plays a basic role in Hegel’s understanding of living being.

A counterargument to this historical and textual evidence might be that, if organisation is fundamental to Hegel’s understanding of organism, it is only a weakness in his system. However, in the final part of the paper, I will briefly argue that if we look at the nuances of his view, the notion of organisation appears less hopelessly flawed than most neo-Aristotelians seem to assume. As some scholars (Cooper 2020, Maraguat 2020, Westphal 2020) have noted, Hegel’s view resonates with some ideas in contemporary theoretical biology which may help illuminate the issue of self-organisation in a useful way². I will briefly outline the basic characteristics of such views to show how they can help clarify not only Hegel’s account of function but also his understanding of organism more generally.

1. The Manifest and the Scientific Image of Organism

Michael Thompson has offered an influential Neo-Aristotelian account of the type of logic characterizing the conceptual framework we use to make life intelligible. Thoughts about living beings, he argues, are expressed by special kind of judgments (“natural historical judgments”), which have a distinct logical form. This form is non-empirically determined and entails implicit reference to particular life-forms.

Life-forms are implicit objects of thought in much of what we say and think about individual organisms as we come upon them in experience—indeed, in almost everything we say and think about them. (Thompson 2018, 201)³.

Leaving aside the details of such an account, which have been much discussed in the scholarship, what is important for my purposes is one of Thompson’s central metaphilosophical commitments: the claim that his analysis focuses on our *ordinary* conceptual framework for thinking of living beings, i.e., that it illuminates the conceptual features of

the special conception of a *life-form* or “*species*” that enters, frequently only implicitly, into ordinary, natural or pre-scientific thought of things as alive (Thompson 2008, 199)

Following this assumption, Thompsons’ analysis, as he states elsewhere, is “a kind of exposition of certain aspects of the ‘manifest image’” (Thompson 2008, 10). In his view, the Manifest image is an autonomous sphere that is in an important sense conceptually independent from the one developed by natural sciences⁴. In Thompson, the sharp distinction between manifest and scientific image thus gets combined with the idea that the manifest framework could constitute “a space for the operation of philosophy *pure and simple*” (Thompson 2008, p. 5, *my emph.*). This assumption is reflected into Thompson’s choice of terminology, including his central notion of “life form” (which he prefers to the more scientifically laden notion of “species”):

This conception of a species is no doubt different from and less determinate than any likely to be deployed in a developed biological science (thus my preference for the word “life-form”)
(Thompson 2008, 199)⁵

These methodological commitments underlying his Neo-Aristotelian analysis, however, do not come without costs⁶. For those interested in the Hegelian import of this approach, Thompson’s “restriction to the ‘ordinary’ ” (Thompson 2008, 200) and his idea of a “pure and simple” domain of philosophical scrutiny and clarification that is unaffected by empirical findings appear difficult to square with Hegel’s methodological commitments and might affect the apparent harmony between Hegelism and Neo-Aristotelianism, at least at a metaphilosophical level⁷.

In fact, looking at Hegel’s texts, it is difficult to find a sharp distinction between a philosophical analysis of “life” belonging to the manifest categorial framework and something like an analysis of the notion of “life” belonging to scientific one. A full discussion of the topic would involve immense complication, since it would require accounting for the relation between the *Science of Logic*, i.e. the part of Hegel’s philosophy that articulates a domain of pure thought, and the *Philosophy of Nature*, which thematizes how these thoughts appear in the form of externality. For my purposes, it is sufficient to note that in the *Encyclopaedia*, and especially in his *Lectures on the Philosophy of Nature*, Hegel appears committed to the idea that the task of the philosophy of nature is less the elucidation of the categories of an alleged manifest image than conceiving a philosophical framework for understanding nature and its structure, which include the scientific, categorial dimension.⁸

As numerous scholars have highlighted, Hegel makes this well-known point in several passages (such as EZ §246) and repeats it in his *Lectures*. In 1828 (*Nachschrift Hueck*), for instance, he tells his students:

Physics thus proceeds to comprehend nature in thinking, to find the universal and the necessary; therefore physics contains a number of categories, that logic considers more closely (GW, 24,2, 941, my transl., my emph.)⁹

He repeated similar claims in another series of *Lectures* (on *Philosophy of Spirit*, 1827/28), stressing the importance to philosophical analysis of the categories employed by the natural sciences (what he calls their “metaphysics”): “Empirical sciences often contain more metaphysics than they know” *Die Erfahrungswissenschaften enthalten oft mehr Metaphysik als sie wissen*, GW 25, 2: 772). Philosophy’s task is to critically scrutinize and integrate them into a correct account¹⁰.

Whatever interpretation one might give to this relationship between philosophical analysis and the categories of the natural sciences – “strong apriorism”, “weak apriorism,” or “a posteriorism”, depending on which method one sees for obtaining such categories and articulating their content¹¹ – it appears that Hegel’s position is difficult to square with a strong division between the “manifest image framework” and “scientific image framework” or with the idea that philosophy must focus only on one of them¹². At a general level, which is the one that interests us at the moment, the point is quite simple: Hegel’s philosophical account presented in the *Logic* cannot be restricted to the forms of thought that are implicit in our common sense or the manifest image framework. Rather, it includes categories and frameworks that belong to the scientific image. This also applies to the

notions of “organism” and “life” as they are developed in the *Philosophy of Nature* and the *Science of Logic*; these ideas have more to do with an analysis of the scientific image (of Hegel’s time) than with the manifest one (Ferrini 2009, 2010)¹³.

This methodological tension between Hegel’s thought and views inspired by Neo-Aristotelian assumptions is further increased by the fact that, as we will see, the natural scientific account of organism at the period was dominated by the notion of “organisation”. Hegel draws extensively from this context and locates the notion at the center of his account: this puts him at odds with Neo-Aristotelian attacks on the category (Thompson 2008, 35ff). The notion of “organisation”, Thompson argues, is not adequate for approaching life for two reasons. On the one hand, it is often too abstract to be employed to demarcate the living, which makes it an “empty metaphor”¹⁴. On the other, the strategies used to restrict its definition often specify it in mereological terms such as “organized complexity,” which frame it in terms of the arrangement of parts. Thompson notes

Is it perverse, though, to remind ourselves that fresh corpses are not alive, and yet have presumably lost little in the respect measured on the relevant physical scale? (Thompson 2008, 36)

This leads Thompson to dismiss the notion of “organisation” as a possible candidate for making life intelligible. This dismissal, however, risks to being too quick. Before showing that a simple mereological interpretation of “organisation” is not the only one possible (and arguing that current work in theoretical biology offers a coherent interpretation of the concept with explanatory import for some particular features of living beings), let me turn to Hegel’s text and its context to highlight the centrality of the notion within his views and the context in which they were developed.

2. Organisation in context: Hegel and Cuvier

As various scholars have highlighted, over the course of the 18th century “organisation” progressively emerged as a key notion for understanding living phenomena. It appeared in various contexts, including the research programs of naturalists in France and Germany (Cheung 2006, 2010; Zammito 2017; Figlio 1976; Duchesneau 2018, Köchy 1995). Indeed, “organisation” became a technical term in various disciplines, and starting from 1770s, the notions of “*Lebendigkeit*” and “*Organisation*” became increasingly intertwined – to the point that “organisiert” und “lebendig” were understood as synonyms (Toepfer 2011 II, 757ff).

Historians have tracked this development, showing that it was marked by a progressive shift in meaning from referring to the simple *disposition of parts* in a living individual towards a particular kind of *processual* grasp of the notion. In addition to the Dutch physician and physiologist Herman Boerhaave, the central figures in the first phase of this evolution include Buffon and Charles Bonnet (Toepfer 2009, Cheung 2010). Buffon, for instance, made a clear distinction between what he called “organized matter” (*matière organisée*), or *living* matter, and a kind of matter lacking organization (“sans organization”), which was therefore labelled brute matter (*matière brute*) (Ibid, 94; cf. Buffon 1749, 245). Bonnet made a similar conceptual distinction: he considered organisation the hallmark for distinguishing between “living” and “non-living” entities – which he called “être brut” and “être organisé” (Bonnet 1764, 54). His views on what he referred to as “tout organique” framed organisation as a principle of the disposition of

parts¹⁵. In Bonnet, however, organization did not “involve necessarily a dynamical understanding, since the expression refers only to the static disposition of parts in a body” (Toepfer 2011, II, 759).

In Germany this discussion crystallized around Kant’s famous account of organization in the *Critique of Judgement*. Kant also found “organisation” a constitutive feature of organisms. In some passages, however, he defines the notion in a way that makes it applicable to inorganic entities, such as crystals, which are produced via chemical processes through the accumulation of matter (KU §58, cf. Jones 2000, 28). On the other hand, in other texts Kant uses the notion in a more restricted and technical sense reflecting a distinctly dynamic and relational understanding, suggesting that “organisation” only properly applies to organic beings (“I myself derive all organization from organic beings”; Kant, AA VIII, 179 [214]). In his famous definition in *On the use of teleological principles in philosophy*, he famously claims

The concept of an organised being is this: that it is a material being which is possible only through the relation of everything contained in it to each other as end and means (and indeed every anatomist as well as every physiologist actually starts from this concept) (AA 8: 181)

The discussion around Kant has grown extensively, in part because he introduced this notion in close connection with the ideas of “purposiveness” and “natural purposes”, claiming that natural purposes (*Naturzwecke*) are organisms or “organized being” (cf. KU §66).

I will leave aside for a moment the subtle debates regarding the epistemological conditions for identifying something as a natural purpose and focus instead on how Kant

understood “organisation” in terms of “means” and “ends.”¹⁶ Indeed, Kant’s notion evolved in several directions that became relevant for Hegel¹⁷ – also becoming central as a *classificatory* principle for taxonomizing living beings. The figure most associated with employing the notion in this way is George Cuvier, who made the idea of classifying the animal kingdom according to different *kinds* or *types of organisation* influential¹⁸. Cuvier’s ideas about organization were expressed in his *Leçons d’anatomie comparé* (1805), followed by the 1817 work with a telling title *Le Règne animal distribué d’après son organisation* (“The animal kingdom, arranged according to its organization”). These ideas were taken up by many scholars, including Hegel, who often mentioned and praised Cuvier in his *Lectures*. Cuvier’s insights are therefore interesting for understanding the conceptions of organism at stake during the period¹⁹.

Notably, Cuvier fully embraced the idea that the key to understanding living beings was looking at their *inner structures*. He thus turned away from Linnean interest in the external features of organism towards “the law or organisation of animals and modifications that such organisation undergoes in different species” (Cuvier 1817, p. v). Cuvier’s focus on inner structures was premised in the assumption that organisation and animal economy are central to understanding the phenomenon of life, which Cuvier defined as the capacity to “resist for a certain amount of time the laws that govern inanimate bodies (*corps bruts*)” (Cuvier 1805, 2, my transl)²⁰. To better grasp his basic insight, one must start from what Cuvier calls the *conditions d’existence* (“conditions of existence”) of the being at stake, for this is what grounds and guides the inquiry of the comparative anatomist:

“Natural history has a rational principle which is distinct to^[1] it..., that of^[1] the conditions of existence... Nothing can exist unless it combines together the conditions which make its existence

possible; therefore the different parts of each being must be coordinated in such a way as to make possible the ^{SEP}whole being, not only in itself but also in its relations with those around it. The analysis of these conditions often gives rise to new general laws” (Cuvier 1817, p. 6)²¹

Both this principle and the “conditions of existence” build upon Cuvier’s basic ontology of organism²². In fact, Cuvier didn’t conceive of living individuals as ultimately constituted by specific mereological parts but rather as distinct sorts of processes involving transformations of particular chemical elements or fluids.

In a word, all animal functions seems to be reducible to transformations of fluids; and the very secret of this admirable animal economy resides in the way that these transformation happen (Cuvier 1805, 1817)

These processes or transformations relate to each other in a particular way that enables them to “resist” death: this is what Cuvier calls “organisation”. In particular, each process constitutes the condition for another to occur in a way that is “sufficient for them to exist” (Cuvier 1817, 18) or generates the unity that allows for life. Single activities are understood to take place in sequences, as sub-processes of a global, processual whole which Cuvier describes as “something like a circle” (*espèce de cercle*) (Cuvier 1805, 23). This particular structure constitutes what Cuvier calls the “form” of the organism and enables the whole of process to *live*.

Although Cuvier never completely adhered to his own principle and often recurred to standard morphological analysis (Farber 1976, 102), his basic intuition constituted a processual understanding of living beings understood in terms of organisational form: “the

form of the living body is more essential than its matter” (Cuvier 1817, 13; cf. also Cheung 2000, 25).

This general idea resulted in a notion of “typus” (*type*) with a particular twist. Given the above-mentioned views, Cuvier attempted to isolate particular *types* of organization as the basis for his taxonomical enterprise²³.

Starting from this background, Cuvier formulated two well-known, additional principles, which guided his inquiry: his famous *principle of the coordination of parts* (which conceives functional units in terms of the interdependence of various members, with the activity of each enabling and constraining successive ones) and the principle of the *subordination of characters* (a hierarchy of functions in which primary ones are the necessary conditions of existence and others are secondary or of third-order, Cuvier 1805, I, 17).

By isolating the various hierarchical orders of functions, Cuvier claims to identify four orders of animals that correspond to four *types* of organisation. In each, “the modification of each of their primary functions determines an influence on all others” (Cuvier 1805, 18).

Even if these views do not come without conceptual problems, they are worth noting, because, as I will show, they also underpin Hegel’s account, which conceives organization as a key “taxonomical principle” (GW 24,2: 932, 1160; 24,1: 175) for understanding living beings, especially the animal organism²⁴.

3. Hegel and organisation

Some elements central to this conceptual framework can already be found in Hegel's Jena writings, and they remain at the core of his views until the later *Philosophy of Nature*. In Jena, Hegel appears to have defined animal organisms in terms of organization – to the point of claiming that “This organic unity and perfect organisation *is* the animal” (*Diese organische Einheit und vollkommene Organisation ist das Tier*) (JS I, p. 139, cf. also *ibid* 143).

How should we understand this discussion of “organisation”? Looking at the texts, it is not difficult to see that Hegel takes up several of the views sketched above. He holds that the basic ontological feature of organisms is that they are processual in nature (GW 6: 206 ff.); in particular, they must be understood as systems of various nested processes. This view can also be found in his later Berlin lectures, where he claims that organisms are “essentially process” (GW, 24,2 925) and that “the organism is ... the infinite self-stimulating and self-sustaining process” (PN §336)²⁵.

Organisation is thus predicated upon processes, not mereological parts. To address the structure of such processes, and hence the meaning of organisation, Hegel makes some further distinctions. First, he introduces organisation using the image of a circle: “the process of individuality is a closed circle (*Kreislauf*)” (JS III, 138) or “the closed circularity of the living” (*der in sich beschlossene Kreislauf der Belebteyns*) (GW 6, 217). Second, in his 1821-22 *Lectures*, Hegel stresses that there is a distinct feature differentiating chemical processes from organic ones, namely that the latter does not “know an end” or have “end status”:

If the very chemical process, in which we see such activity, such restlessness – and which can only determine a change *because* of it – could continue, it would be something alive. However, in this

manner, life gets lost in the product of the chemical process. Life could thus be defined as a chemical process that goes on permanently. However, this sublates the very character of the chemical process itself. (GW 24,1: 413)²⁶

What does it mean for life to be a chemical process that is “circular” and “made persisting” (*permanierend gemachter*)? Here, Hegel does not seem to defend the implausible claim that every process sufficiently extended over time should be dubbed “life” (for instance, although continuous, the water cycle cannot be said to be living, nor for Hegel are the planets *living*, despite their continuous movement)²⁷. Rather, Hegel’s idea is that life processes are continuously generated *in a particular way* which enables them – to use Cuvier’s terms – to resist death for a certain amount of time. Life-processes are self-maintaining, albeit in a way that needs to be qualified (Brinkmann 1996).

Hegel clarifies this general picture by distinguishing between two *kinds* of elements involved in such self-maintenance. Life processes, he claims, consist of two conceptually distinct items, which he calls “means” and “material” (“the internal has means and has material ... these means are ... the organs, the members”, GW 24,2, 948).²⁸ The circular activities making up an organism can be seen as the work of the former, i.e., the members, upon the latter, i.e., the material. He maintains that, in order to be maintained, each organ relies on “material” produced by the activities of other organs in such a way that the whole process is circular and closed. In Hegel’s description of the organismal self-maintenance,

Every member, that is, every part of the organism maintains itself, and it does so at the expense of the others. This indeed happens reciprocally. In this manner, each member awakens the others for the purpose of determination and thus each member makes itself an end and in so doing, it is also a means for the others (GW 24,1, 454)²⁹

This view that every member is both “Zweck” and “Mittel” serves as the foundation for Hegel’s doctrine of reproduction (*Reproduktion*) – a term that Hegel borrows from physiology and which refers to the inner self-maintenance of the organism. In this sense, organs have a particular status: even if, at bottom, they are themselves processes³⁰, they stay in a particular kind of relation to both the material, on the one hand, and each other, on the other. Each organ acts upon a certain material in such a way that the products of this activity enable the functioning and maintenance of other organs and, eventually, contribute to their own preservation. In his 1828 *Lectures*, Hegel presents this view in the following way:

Every organ secretes and what is secreted is taken up from other organs, the other organs nourish themselves from the secretions, every organ is *Zweck und Mittel*... so is the life of an organ in itself this activity. ... Through this process every organ is maintained as a member of the whole (GW, 24,2, 1153)

This seems to apply to all parts of what get defined as an ‘organism’: as Hegel states, “even the bones are captured in this life, they are constantly reproduced” (“*selbst die Knochen sind in dieses Leben hineingezogen, sie werden immer reproducirt*”, GW 24,1 454, cf also GW 6, 222). Organs act upon material in a causal way, without themselves being affected (in a relevant time scale) by the process, but they do so in such a way that the products of their activity are ultimately relevant (as “conditions”) for their own subsistence. This confers the processes with a particular kind of closed unity and functionality (I will say more on this in a moment).

What is interesting is that Hegel also claims that reproduction, understood in this organisational way, is the basic feature of the organism: it is the fundamental system of the living, a primary form (GW 24,1 158) on the basis of which the other systems of the organism – such as sensibility and irritability – become intelligible (GW 24, 2: 926; WDL 12.186 – 683)³¹. Hegel’s account of this form of unity – as the active maintenance of a closed system thanks to the work performed by single parts on some material – *precedes* his discussion of an individual reproducing itself as a member of a particular species (*Gattung*) and, in an important sense, seems conceptually independent from it. Many passages show that, from the Jena period on, Hegel’s recurring discussion of animal organism as “producing itself” (“*sich selbst hervorbringende*”) or a “purpose that creates itself” (“*es existiert als Zweck, der sich selbst hervorbringt*”, JS III, 138 ff.) should not primarily be understood as the production of another individual of the same *species* or kind – via sexual reproduction – but rather in terms of the self-maintenance of a closed system of activities. Hegel’s conception of self-production must thus be spelled out in terms of a processual organisation of the kind described above. Hegel stresses this as the essential and definitional feature of the living individual: “The organism is reproductive, and it is *essentially* so, or this its actuality, it creates itself” (*Der Organismus ist reproduktiv, dies ist er wesentlich, oder dies ist seine Wirklichkeit; er bringt sich selbst hervor*”, JS III, 140). The same point can be made adopting terminology that Hegel employs in Jena: we can distinguish, he claims, a “Kreislauf der Selbsterhaltung” from a “Kreislauf der Gattung” (JS III, 127). The first has its own intelligibility, independent of the second, since it seems one can identify a living, organised system by the closed (circular) structure upon which its parts are mutually dependent for their maintenance³². This does not exclude that, to

further articulate an understanding of living beings, one must rely on the notion of *species*. In fact, Hegel conceives of the two dimensions of *Organisation* and *Gattung* as deeply interconnected³³. However, his treatment of reproduction and functionality appears to support the claim that, contrary to Neo-Aristotelian interpretations, the notion of *organisation* is fundamental to his account of life and, borrowed from the contemporaneous biological sciences, constitutes a central tenet of his philosophical conceptualisation of living entities.

4. Hegelian organisational accounts

So far, I have argued that, from a methodological point of view, Hegel's account is marked by sensitivity to categorial frameworks drawn from the natural sciences of his period. I have tried to show that *organisation* is part and parcel of such a framework and that Hegel articulates his understanding of living beings by mobilizing this notion, developing intuitions that were part of a tradition extending from French physiology through Kant and Cuvier. If this argument holds, I would like to conclude by foregrounding how the core features of Hegel's account of the living organism, including his central claims about organisation, anticipate the basic insights of contemporary Organisational Accounts in theoretical biology (Mossio 2015, Mossio-Montevil 2015, Kaufmann 2002).

Organisational Accounts are a set of positions that stress the "autonomy" of living systems and conceive of "organisation" – and in particular "organisational closure" – as their defining features. Organisational accounts distinguish between two kinds of elements in living systems: *processes* and *constraints*. Constraints act causally on processes and enable

them, without themselves being part of such processes³⁴. However, the product of a process is in turn the condition of existence for the initial constraint. Accordingly,

the existence of each constraint depends on the existence of the others, as well as on the action that they exert on the dynamics. In this kind of situation, the set of constraints realizes self-determination as organizational closure. (Mossio-Montévil 2015, 181)

I do not have space here to go into the details such a view, which offer a consistent notion of “organisation” for the biological domain. It is sufficient to note that the origins of this position have been traced back to Kant by the founding fathers of biological autonomy (Weber-Varela 2000; Van de Vijver 2006). Current theorists have also identified Piaget, Hans Jonas and cybernetics, together with Robert Rosen and Stuart Kaufmann, as figures belonging to what has been established as a standard genealogy (Moreno-Mossio 2015, Mossio-Bich 2017). If my argument is correct, however, Hegel (and Cuvier) can also be seen as contributing to this tradition. Hegel can be understood as elaborating a particular version of the idea of “organisational closure” which makes room for what current organisational theorists label the distinction between “processes” and “constraint” (Mossio-Moreno 2010). In Hegel’s terminology, such a distinction would constitute a differentiation between “material” and “means”, with some means acting on some materials in a closed way. Hegel’s view is inscribed in a particular process ontology of the living, which has been shown to be a metaphysical framework in line with current organisational views (Meincke 2019). This parallel between current views and Hegel’s theory of the organism has recently been noted to appear in various forms, especially with regards to function (Maraguat 2020; Cooper 2020), and could be extended to more general

views about living beings (Westphal 2021). Focusing on this line of inquiry might make space for a more naturalistic understanding of some Hegelian views that aligns with scientific discourse (in accordance with the metaphilosophical *desiderata* exposed in part one of this chapter), as well as provide a more viable understanding of the notion of “organisation”. This might also allow a Hegelian strategy inspired by organisational views to come into view and offer an account of teleology and biological normativity in nature (Corti forthcoming) that enables us to reassess Hegel’s account beyond Neo-Aristotelianism.

Conclusions

Hegel’s philosophical account of living organisms makes visible his metaphilosophical attitudes towards the manifest and scientific image. Hegel’s view draws from the scientific framework: it is processual in nature and is part of a tradition that puts “organisation” at the center of our understanding of life. Hegel understand this notion not in terms of the disposition of parts but rather as a process with a fine-grained structure. I have suggested that it is compatible with current Organizational Accounts in theoretical biology, which might help to illuminate part of Hegel’s theory.

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¹ In the words of Thompson (2008, 25 and 32), “the concepts *life*, *organism* and *life-form* really are logical determinations”.

² This part of my analysis is inspired by a methodological stance that John Zammito calls the “the mutuality, not opposition, of historicism and presentism” (Zammito 2004, 427).

³ Judgments involving reference to life-form exhibit a distinct form of generality and involve a normative dimension: “like a practice, a life-form is of course associated with a standard or measure of good and bad—here, typically, of sickness and health, of deformity and defect, of what is missing and what is there in excess, and so forth. The deployment of such concepts is an essential part of the representation of things *as alive*, but the application of any of them to an individual organism once again presupposes a look to its species or to the natural form of life it realizes: legs that are

perfectly sound in one kind of animal would be grossly deformed in another, body temperatures that are “normal” in one would be feverish in another, and so forth” (Thompson 2008, 201-2).

⁴ Cr. Thompson, (2008, 4): “The impression might form that in truth these concepts [life, action, L.C.], are all constructions of those special sciences, and are properly the possession of them. ... None of our spheres would constitute a space for the operation of philosophy pure and simple. One of my chief ends in composing this work is to contest this thought. The distinctions in question are not empirical. My more general purpose is simply to elucidate these concepts—to orient myself and the reader among them and the things they capture, together (as will emerge) with certain associated *forms of thought, judgment or predication* and the concomitant forms of representation in speech” (Thompson 2008: 4-5).

⁵ In another passage, Thompson seems to suggest that scientific concepts are logically derivative from notions in the Manifest Image (Thompson 2008, 66).

⁶ One of the most discussed consequences, which I will not address here, is that such an analysis of “life form” or “species” is out of tune with natural scientific theorizing on “species” – to such an extent that it is difficult to still qualify “Aristotelian naturalism” as a kind of “naturalism” (on this cf. Andreou 2006, Millgram 2009; Woodcock 2009; Millum 2006; Fitzpatrick 2000; Lewens 2010; Odenbaugh 2017 and Moosavi 2019).

⁷ Regarding Thompson’s Hegelian credentials, see his claim that “the project of an ‘analytic’ or ‘analytical’ Hegelianism ... (however well- or ill-advised such a thing might be) must see itself as aiming at a form of analytical Aristotelianism” (Thompson 2008, 12). Terry Pinkard (2012, ch. 1) reads Hegel as advocating a particular form of “disenchanted Aristotelian naturalism”.

⁸ One might argue that Hegel’s stance on the Manifest Image of organism is presented in his 1807 *Phenomenology of Spirit* and not in the *Science of Logic* and *Philosophy of Nature*. In particular – the objection might go – it is in the phenomenological chapter on Observing Reason that natural or ordinary consciousness treats living beings as normal “things”. However, it is worth noticing that “natural consciousness” in the *Phenomenology* should not be straightforwardly equated with

common sense or the manifest image framework. The categorial framework and self-understanding presented in *Observing Reason* is presented as an inadequate conception of common sense, and it turns out to also be an inadequate candidate for grasping reason and its relation to life –and so eventually has to be abandoned. I would like to thank Cinzia Ferrini for pushing me to clarify this point.

⁹ ‘Die Physik also geht darauf, die Natur denkend zu fassen, das Allgemeine und Nothwendige zu finden; so enthält die Physik eine Anzahl von Kathegorien, die die Logik näher betrachtet’. (GW, 24,2, 941)

¹⁰ Cf. also the 1821/22 *Lecture on Philosophy of Nature*: “This kind of metaphysics within physics is thus a fact, and it cannot be otherwise for it is a human that relates to nature and humans are essentially a thinking beings. Humans' representations are necessarily informed by thoughts (*Diese Metaphysik in der Naturwissenschaft ist also ein Faktum, und es kann nicht anders sein, denn es ist der Mensch, der sich zur Natur verhält und dieser ist wesentlich denkend. Seine Vorstellungen sind nothwendig durchzogen von Gedanken*)” (GW24,1: 190). On this point cf. Stern (2009), 4.

¹¹ These are the various positions in the recent debate on Hegel’s *Philosophy of Nature*. For this taxonomy cf. Stone (2005, 2018) Rand (2007), Burbidge (1996, 2007).

¹² Cf. also the 1825-26 *Lectures*, where Hegel repeats that “physics as thinking observation of nature is on the same ground with Philosophy of Nature” (*Die Physik als denkende Betrachtung der Natur steht auf dem selben Boden mit der Naturphilosophie*) (GW 24,2 761). Hegel doesn’t seem to think, as Thompson appears to suggest in some passages above, that considerations of scientific theories and concepts are “properly the possession” of the natural sciences and thus outside or beyond the scope of philosophy. The empirical import of the vocabulary used in the *Science of Logic* has been recently challenged by Kabeshkin (2021a), who argues that apparently “empirically laden” notions in the *Logic* – such as “impression”, “sensibility” or “soul” – are not used by Hegel in their literal sense but mostly as “metaphors” (“mere examples” or “illustrations” of more abstract relations, cf. Kabeshkin, p. 9). This argument allows one to salvage the ‘purity’ of

the *Logic* and avoid charging Hegel with simply importing categories from new physiological theories. I do not agree with a reading that frames such notions as abstractions or mere examples. However, if one keeps the question of *derivation* of concepts separate from the question of the *content* of these concepts, my stance might be compatible with Kabeshkin's views. For an attempt to see the categories of the *Logic* as performing a kind of analysis that is completed over the course of the argument, cf. Redding (2019).

¹³ Here a lot hinges on what one means by the Manifest and Scientific frameworks. For my purposes, a general characterization of the latter as the framework developed by natural scientific explanations will suffice. This is also Thompson's understanding of the term. If one wants to more closely distinguish between images, this need not be done by using the method of postulation as the demarcating principle (as some interpreters take Sellars's original notion of SI to do). Rather, one can also focus on the basic logical subjects of each categorial framework. I would like to thank Anton Kabeshkin for pushing me on this point.

¹⁴ "Is the administration of the University of Pittsburgh more highly organized than, say, a Buick or the Hope diamond, or more complex than the rules of chess?" (Thompson 2008, 36). Also "we can have little reason to think that there is any one consistent measure of more-and-less in respect of it."

¹⁵ On Bonnet's understanding of organization, cf. Cheung (2004; 2008, 42).

¹⁶ As Hunemann (2006, 655) notices, the notion of "natural purpose" in the *Critique of Judgement* gets defined in various ways – using the vocabulary of means-ends but also of parts-whole – and concerns three distinct features: inner function organization (tied to physiological activities), the power of reproduction (and preserving some 'original organisation'), and adaptation. Here I will focus mainly on the first of these aspects. As Kant states in the passage following the one quoted above, it seems that the concept of "purpose" is *entailed* in the previous definition: "Therefore a basic power that is effectuated through an organization has to be thought as a cause effective according to *ends*, and this in such a manner that these ends have to be presupposed for the

possibility of the effect.” (Ibid). For the debate around Kant, cf. Ginsborg (2001, 2012), Zammito (2006), Breitenbach (2006), McLaughlin (1990).

¹⁷ For the relation between Kant’s and Schelling’s notions of organisation, cf. Nassar (2020)

¹⁸ Cuvier developed ideas originating from Bonnet and Kielmeyer – and was a student of the latter in Stuttgart in 1785-6. Bilingual in French and German, Cuvier corresponded with Kielmeyer throughout his life. The ways in which such views on organised bodies came to be relevant in the German research landscape will not be part of this paper. On this issue, cf. Lenoir (1980), Outram (1986).

¹⁹ Cuvier’s views have been studied in relation to his functionalism and put in relation to Kant (Hunemann 2006). Here I will focus on Cuvier’s ontology of organism, arguing that this is an important element for grasping his functional account. For an analysis of Hegel and Cuvier on functionalism, cf. Scholz (2020).

²⁰ Cuvier shares Bichat’s conception of life as “resisting death” and defines it as the capacity to resist the law “for a certain amount of time” in a way that, as we will see, is also at work in Hegel.

²¹ On the possible derivation of this notion of “conditions d’existence” from Kant, cf. Outram (1986, 344ff.) and Huneman (2006), according to whom “Cuvier might be regarded as a follower of Kant” (Ibid, 660).

²² In what follows, I will try to show that “existence” is not merely a synonym of “survival” or “adaptation”. Cf. Hunemann (2006).

²³ On Cuvier’s notion of *type*, cf. Eigen (1997) and Cheung (2000, 22).

²⁴ For an analysis of their role in Schelling’s views, cf. Kabeshkin (2017), Heuser (1989, 1986).

²⁵ In some passages in JS I (132) and the *Lectures*, which both date to 1821-22 (GW 24,1: 148, 432ff.), Hegel also seems to understand plants as basically processual in nature.

²⁶ ‘Wenn der chemische Prozeß, an dem wir diese Thätigkeit, diese Unruhe sehen, und der nur deshalb eine Veränderung setzen kann, sich fortsetzen könnte, so hätten wir an ihm ein Lebendiges. So aber geht es im Produkt verloren. Das Leben kann in so fern bestimmt werden als permanierend

gemachter chemischer Prozeß; damit ist aber das Charakteristische des chemischen Prozesses überhaupt aufgehoben.’

²⁷ For the claim that Hegel is not a vitalist, cf. Kabeshkin (2021b).

²⁸ “The differentiation embodied in those organs is not one that pertains just to external reflection; such organs are rather the vital point of animal individuality”, WDL, 12.218 (717)

²⁹ “Jedes Glied, jeder Theil des Organismus, erhält sich, und zwar auf Unkosten des Andern Dies ist so durchaus gegenseitig. Indem jedes so das andere erweckt für die Bestimmtheit, so macht sich jedes Glied zum Zweck und eben so ist es Mittel für die andern”.

³⁰ According to Hegel’s framework, “Im Organismus ist nichts Bleibendes”, so that “fortdauernd wird jedes Glied erzeugt und schließt sich selbst aus” (GW, 24,1 454; cf. also PN, §341A; cf. also GW 24,2, 1141; GW 24,1, 132). For this reason, one can say even of organs that their “existence is the process in itself” (PN §342 A).

³¹ “Sensibility, Irritability and Reproduction. The first two are abstract moments, the last one is the infinite combination (*unendliches Zusammenfassen*) of both” (GW 24,2: 926); “The system of reproduction constitutes the animal” (*das System der Reproduktion macht das Thier überhaupt aus*) (GW, 24,1: 175).

³² “The process of individuality is a closed circularity” (“*der Prozeß der Individualität ein geschlossener Kreislauf*”, JS I, 138).

³³ In Jena, Hegel claims that “*Die beiden Bewegungen sind, wie gezeigt, ein absoluter ununterscheidbarer Kreislauf*” (JS I, 127). Hegel then followed Cuvier in maintaining that the organized form of an organism seems to need to be specified as an organisation of a particular kind.

³⁴ The paradigmatic case is that of enzymes, which “act on processes (enzymes catalyse reactions) and, at the same time, they are produced by other efficient causes (enzymes are produced by other metabolic processes within the cell)” (Mossio-Bich 2017, 14 fn 15)