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Mechanism, External Purposiveness, and Object Individuation: from Mechanism to Teleology in Hegel's *Science of Logic*

Karen Koch

Abstract

This article is an investigation into Hegel's claim that teleology is the truth of mechanism, which Hegel puts forward in the objectivity section in the *Science of Logic*. Contrary to most accounts of this section of the *Logic*, I make a case for a reading of Hegel's conception of external purposiveness according to which the latter makes a positive contribution to the structural development of the concepts of the *Logic*. I argue that external purposiveness plays a major role in understanding the Hegelian claim of teleology as the truth of mechanism. More specifically, I argue that structures of external purposiveness provide the conditions for the individuation of mechanical objects.

I. Introduction

One of Hegel's most famous claims in the *Science of Logic* is that teleology is the 'truth' of mechanism. It is difficult to understand what this claim really entails, though. At first sight, one might be tempted to understand Hegel to invert the Kantian claim on the status of mechanism and teleology as put forward in the *Critique of the Teleological Power of Judgment*. Hence, one might be inclined to understand Hegel's claim in such a way that it is not teleology that is regulative and therefore has only a heuristic meaning, but mechanism. However, far from claiming that one of these structures is regulative and entertains only a heuristic meaning, in his short discussion of Kant's antinomy of teleological power of judgment at the beginning of the teleology chapter of the *Logic*, Hegel maintains that both structures in fact pertain to reality. Moreover, both structures are supposed to pertain to the same sphere of reality and to pertain to it in such a way that teleology has priority over mechanism.

Thus, the philosophical challenge of interpreting the relation of mechanism and teleology, as Hegel advances it, consists not only in explaining how or in what way reality can be structured by both mechanism *and* teleology; the challenge consists also in explaining in what way Hegel thinks teleology has priority over mechanism.¹ There have been great efforts to elaborate on Hegel's claim that teleology is the truth of mechanism while addressing these issues.²

However, it is hardly discussed to what kind of purposiveness Hegel actually refers when he claims teleology to be the truth of mechanism. Hegel—following Kant here—distinguishes between two accounts of purposiveness: he distinguishes external purposiveness from internal purposiveness. Yet, instead of engaging in a discussion about the kind of purposiveness that is meant in this claim, scholars rather take it for granted that Hegel refers to internal purposiveness as being the structure that represents the truth of mechanism.³ Consequently, within the scholarship, there is indeed the tendency either to neglect or to downplay the role of external purposiveness within the objectivity section. The structure of external purposiveness, however, is the structure that is after all dealt with in the larger part of the teleology chapter, which in turn represents the culmination of the objectivity section. Thus, it is natural to assume that the structure of external purposiveness also contributes to the development of the objectivity section of the *Logic*.

In what follows, I investigate the positive contribution of the teleology chapter, i.e. of external purposiveness within the objectivity section. I argue that—contrary to common readings—the role of external purposiveness in understanding the claim of teleology as truth of mechanism cannot be neglected. I aim to offer a reading that is systematically interesting on the one hand: I bring forward the thesis that structures of external purposiveness provide the conditions for the individuation of mechanical objects. This claim is to be understood in an ontological way: structures of external purposiveness constitute mechanical objects. On the other hand, I aim to offer a reading that does justice to Hegel's structural argument in the *Logic*: every conceptual structure dealt with in the *Logic* does not only play a negative role in the way that it needs to be overcome by the subsequent structure, but it is also a conceptual presupposition for the subsequent structure to develop in the first place and hence, must also contribute to the conceptual development in a positive way. This should also be true for the structure of external purposiveness.

In order to present my argument, I proceed as follows: I begin by giving an outline of the relevant distinction between internal and external purposiveness as Hegel understands it. Then, I present a short survey of illuminating readings as Hegel's claim that teleology is the truth of mechanism: through an engagement with Christopher Yeomans's, Karen Ng's and James Kreines's readings, I address exegetical and systematic shortcomings of these readings relevant to the goal of my argument. The third part of my paper deals with Hegel's account of efficient

causality. There, I elaborate on the features of efficient causality that also pertain to mechanism. Afterwards, I discuss Hegel's account of mechanism to build my case. In the fifth part, I show that according to Hegel object individuation is not possible based on mechanical structures alone. I then proceed to investigate the structures of external purposiveness. My aim here is to show the extent to which Hegel understands them as structures enabling object individuation.

II. Hegel on external and internal purposiveness

Following Kant, Hegel entertains two accounts of purposiveness: internal and external purposiveness. Whereas the teleology chapter focuses foremost on what Hegel calls external purposiveness, the following chapter on the Idea of Life deals with the structures of internal purposiveness.

Hegel's conception of external purposiveness exemplifies a structure according to which the purpose is external to the object that is the product of purposive activity. There are three structural features that characterize external purposiveness: a subjective purpose, a means, and a realized purpose. According to this conception, purpose is an initially subjective phenomenon, in that it is bound to a subject, and it is mediated by a means in order to be realized as an object. The production of artefacts by intentional subjects for example does illustrate this structure of external purposiveness. Take a sword. It is a product created in a forging process initiated by a subject's activity. The final product completes the process of purposive activity. In fact, as examples of purposive products of external purposiveness, Hegel repeatedly takes up artefacts, such as a plough (*WL*: 663/12:166), a clock, or a house (*WL*: 666/12:169).

Note, however, that Hegel's conception of external purposiveness is not tantamount to a subjective-intentional model of purposiveness. There are more primitive forms of external purposiveness. Animals also instantiate structures of external purposiveness, for example in building houses or nests. Likewise, according to my reading, 'subjective purpose' is a notion entailing different kinds of subjectivity such as drives and needs but also wishes and, on a more sophisticated level, intentions. In the following, however, I only take examples from the most sophisticated case of external purposiveness, that is subjective-intentional purposiveness.

Now, throughout the teleology chapter, Hegel argues that subjective purpose remains a subjective phenomenon even though there are realizations of its subjective content. He claims that the product of purposive activity is not the objectified or realized purpose itself: 'what we have is not an objective determination but a relative one, external to the object itself' (*WL*: 666/12:168). To say that the subjective purpose is external to the object, to the product of purposive activity is nothing other than to say that its realization results in a product that is not itself

the purpose. Take again the sword. First, the purpose to create the sword is not the sword itself. The purpose to create the sword originates rather in the need to defend oneself or to have a piece for exhibition, for example. The sword itself is a means. Second, the product is something different from the purposive activity itself, which was only a means to produce it. Third, the purposive form is only imposed on the material that is used to produce the sword. The material is not by itself purposive to produce the sword but only mechanical-chemical material. To put it another way: the stuff used to produce the sword does not exist because of its being purposive to the subjective purpose in question.

Thus, according to the conception of external purposiveness, purpose is characterized as 'an external, subjective determination' (*WL*: 666/12:169) and it remains such an external determination even though there are realizations of its subjective content. That is why Hegel calls this kind of purpose also 'an *ought*' (*WL*: 669/12:172), and therefore, it may be also called 'the subjective model of purposive causality'.

According to the conception of internal purposiveness, by contrast, the purpose is internal to its product. Therefore, the purpose displays another relation to objectivity in general. This is immediately clear from the three features that characterize internal purposiveness: the living individual, the life-process and the genus. They reveal that the inner purpose determines its product from within: the realized product consists of sustaining itself due to its specific inner purposive organization (the living individual), by its assimilating relation to its environment (life-process), and by reproducing itself in terms of reproducing an entity of the same kind (the genus). Hegel takes an organism to be a product and process of internal purposiveness: an organism maintains itself through the beneficial organization of its members to each other, by transforming the environment in a way that is adequate to its needs and by reproducing offspring.

Hence, to say that purpose is internal to its product is to say that the product of the purpose is the purpose itself. First, the purpose of the preservation of the organism is the preservation of the organism itself. It is therefore essentially self-preservation. Second, the purpose is a product of a means-ends-relation of which it itself consists. The individual members of an organism are mutually purpose and means to each other and at the same time nothing else than the organism itself. Third, the purposive form of the organism is not imposed on it, but it is the very reason why the organism exists. According to this conception of purpose, the heart, for instance, exists *because* it is a means to sustain the organism.

Thus, according to internal purposiveness, the purpose 'is the realized purpose in which the side of being a means is the reality of purpose' (*WL*: 667/12:170). In other words: it is a self-reproducing entity.

III. The standard reading: internal purposiveness as the truth of mechanism

It is common to read Hegel's claim that teleology is the truth of mechanism as the claim that inner purposiveness is the truth of mechanism. However, such readings usually do not sufficiently consider the role of external purposiveness, or they fail to consider it altogether. In what follows, I discuss three accounts of the relation of mechanism to teleology that I take to be representative of such readings.

Christopher Yeomans, Karen Ng and James Kreines defend the thesis that teleology is the truth of mechanism by showing how, on Hegel's account, teleology has explanatory priority over mechanism. While Yeomans and Ng give a negative account of external purposiveness in claiming that it only provides a deficient form of explanation, Kreines does not engage in an explicit discussion of the role of external purposiveness at all. In what follows, I elaborate on Yeomans's account first.

Yeomans's account of Hegel's claim that teleology is the truth of mechanism is to be understood as stating that mechanical structures always already presuppose teleological ones, in that mechanical terms are characterized teleologically (2012: 190).⁴ To be more concrete, he argues that the belief that 'teleology is the truth of mechanism, is the claim that the identities of mechanisms are teleologically determined and thus that the relation of end to mechanism is one of intrinsic norm to the process of behavior' (2012: 233).

With respect to this, Yeomans puts forward two points: first, to the extent that mechanism relies on laws, it relies on theoretical constructs that cannot be understood in a mechanical way. Far from themselves being what Hegel claimed to be a defining feature of mechanism,⁵ namely aggregates or arrangements of mechanical objects, laws represent 'ideal states', towards which mechanical systems tend, as instantiations of these laws (2012: 228). The planets in the solar system and their planetary orbits, for instance, instantiate the law of gravity and it is the realization of such a law that grants equilibrium in such a mechanical system. The law itself, however, is not a mechanical object but a theoretical construct.

Second, Yeomans stresses with Hegel that even proponents of a pure mechanistic view of reality use implicitly teleological notions of mechanisms' functioning, that is, of the laws of functioning of that mechanism (2012: 231). He refers to the notion of striving towards equilibrium that he thinks mechanists need to use to explain the behaviour of the parts of mechanical systems, the behaviour of the planets for example (2012: 231). Yeomans argues that striving is the defining feature that distinguishes a mechanical system governed by laws from a mere mechanical aggregate. The notion of striving, however, implies that there is goal-directed behaviour. Along these lines, a law is to be understood as an ideal state that a mechanical 'system attempts to achieve' (2012: 231). Now, to the extent that there is a

goal-directed process immanent to mechanism that constitutes the mechanical system in the first place, this process must be described as a form of self-determination. Self-determination in turn must be understood in a teleological way (2012: 232).

Yeomans's conception of lawlikeness and his description of mechanical system is certainly worth discussion, for it seems to be a defining feature of lawlikeness as such that objects or systems that obey certain laws do not *tend* to instantiate laws, but they simply do or do not instantiate them.⁶ However, I refrain from such a discussion in order to proceed directly to the point most important regarding the systematic question of this paper. By using the term 'teleology' or 'teleological', Yeomans refers to the conception of internal purposiveness, not external purposiveness. For—as pointed out—according to Yeomans's Hegel, laws must be understood as immanent norms of the functioning of mechanical systems that constitute their particular makeup in that they direct the behaviour of their parts. In fact, Yeomans downplays the role of external purposiveness to understand the priority of teleology over mechanism. He argues that mechanism provides more immanent explanations of reality than external purposiveness does, whereby he refers to the term 'external purposiveness' only when he means *theological teleology*, i.e. the idea of a God setting up reality according to its own purposes (Yeomans 2012: 189, 218, 229), and that the structure of internal purposiveness however provides the immanent explanation mechanists cannot provide on their own account.

It is true that Hegel refutes a theological teleology. The structures exposed in the teleology chapter under the heading of external purposiveness, however, pertain to every subject, not only to a God. Yet Yeomans does not discuss the relevance of other subjects expressing structures of external purposiveness in his account of the priority of teleology over mechanism.⁷

Karen Ng's account is in the same vein. In her book, she focuses on the thesis that internal purposiveness 'opens up the space of reason' (2020: 234), that is, the intelligibility of reality. According to Ng, the structure of internal purposiveness is a necessary condition for the possibility of judgments and more generally of the exercise of cognitive capacities.⁸ She argues that internal purposiveness represents the form of conceptual self-determination and thus sets the standard for understanding conceptual self-determination. The understanding of conceptual self-determination in turn provides us with an understanding of how reality is intelligible and structured such that we can successfully exercise our cognitive capacities. Along these lines, mechanism, chemism and external purposiveness represent lesser forms of conceptual self-determination that presuppose internal purposiveness. Thus, Ng reads the objectivity section as developing an argument that finally culminates in internal purposiveness and not in external purposiveness. While I agree with Ng that internal purposiveness in the form of the Idea does in fact ground all the other conceptual determinations of the *Logic* (cf. Ng 2020: 165),

in contrast to Ng, I think that the structure of external purposiveness has a more substantial upshot for the objectivity section.

On James Kreines's account of the relation between mechanism and teleology, there is no real discussion at all of the role of external purposiveness. Kreines offers a reading of teleology as the truth of mechanism in terms of explanatory completeness (2015). He argues that i) mechanical explanations cannot rely on mechanical structures alone and that ii) teleology has priority over mechanism because it provides explanations of greater explanatory completeness. To elaborate on the first point: Kreines argues that even philosophers who defend a pure mechanism—that is, an account of mechanism that does not rely on concepts at all (Kreines 2015: 325–65)⁹—must, in their unfolding of mechanical structures, rely on mechanical laws that explain why mechanical objects are as they are. To the extent that these mechanical laws are themselves conceptual and not mechanical structures anymore, there cannot be a pure mechanism. With respect to the second point, Kreines initiates his argument by showing that on the basis of mechanism alone—or what Kreines calls 'pure mechanism' (2015: 38)—what a lawful or mechanical object does cannot be comprehended in terms of their own kind but must be comprehended in terms of its underlying parts. This, however, leads to a regress problem (Kreines 2015: 37–41, 200f.) since the underlying parts must be explained by presupposing further underlying parts and so forth. Thus, there is no last mechanical part that can serve as a first explainer for the whole network of mechanical objects.

In contrast to that, explanations of living beings refer to their concept—that is, to their kind: Kreines argues that 'there is a kind of stopping point' (2015: 201) in these explanations, for they refer to the concept of the living being itself. He utilizes the example of a tiger to illustrate this. The specific makeup of the body of a tiger contributes to the tiger's own end, which is immanent to the tiger, i.e. its self-preservation. This end explains why the makeup of a tiger is the way it is (cf. Kreines 2015: 201). This, however, is nothing other than claiming that its internal purposiveness explains its specific constitution. Thus, internal purposiveness or the Idea of Life 'accounts for a kind of greater explanatory completeness' (Kreines 2015: 202) than the lawful, i.e. mechanism.

In Kreines's account, external purposiveness, however, is not even considered. Kreines claims that in the teleology chapter, the disclosed structures are still *desiderata* that need to be overcome by the Idea of Life (Kreines 2015: 201, n.4). There is no discussion of the role and relevance of external purposiveness. For Kreines, Hegel's teleology chapter only seems to have negative value: it represents a structure of purposiveness that needs to be overcome.

Now, I think there are at least three reasons that speak against readings that deal with Hegel's account of external purposiveness in a rather dismissive way. First, these accounts are not doing justice to the fact that the objectivity section

culminates in a chapter that focuses extensively on external and not on internal purposiveness, the latter structure rather being the subject matter in the Idea of Life.¹⁰

The second point is a rather terminological one: Hegel understands the Idea explicitly as exemplifying the structure of internal purposiveness (*EL*: §204/20:279f.).¹¹ In the chapter on the Idea of Life he never even uses the term 'teleology' when referring to internal purposiveness. This only makes sense, for the title that Hegel gave to the chapter in which he discusses what external purposiveness *is*: teleology. I therefore understand the notion 'teleology' to refer primarily to the structure of external purposiveness. This does not mean that according to my reading, Hegel does not deal with the structure of internal purposiveness in the teleology chapter at all. By contrast, the last part of the teleology chapter is already about the structure of internal purposiveness, but this part represents a transition to the section of the Idea and to the chapter on the Idea of Life respectively. Thus, when Hegel claims teleology to be the truth of mechanism, he quite clearly also refers to external purposiveness.¹²

Third, Hegel claims that '*purposive connection* has proved to be the truth of *mechanism*' (*WL*: 652/12:155), right at the *beginning* of the teleology chapter, which then deals with external purposiveness. Only the end of the teleology chapter represents the transition to the Idea of Life and therefore the transition to the structure of internal purposiveness. Along these lines, one expects teleology, i.e. external purposiveness, to play a major role in understanding the claim of teleology as truth of mechanism, and thus, to represent the highest form of objectivity. This coincides with internal purposiveness, i.e. the Idea, as already being the *unity* of 'the concept and objectivity' (*WL*: 671/12:174). Thus, it is external purposiveness that must play the important role for the structures of objectivity as such, because internal purposiveness is already not only about objectivity but about the specific unity of concept and objectivity.

In the following sections I elaborate on my positive account of external purposiveness. I first turn to the discussion of mechanical structures that will lay the groundwork for my reading of the claim that teleology is the truth of mechanism in that I show how mechanical structures do not provide the conditions for object individuation.

IV. The cause-and-effect relation and mechanism

The mechanism chapter is the first one of the objectivity section, in which Hegel not only deals with the structure of mechanism, but also with those of chemistry and teleology. In the objectivity section, Hegel is primarily concerned with the role these structures fulfil in the constitution of objects. He unfolds the structures that must be established for something like objects to come about at all.

According to Hegel, objects are not to be identified with atoms or simple substances. They are rather unities composed of several components (*WL*: 632/12:134). In the objectivity chapter, Hegel is concerned with the unity of objects. Along these lines, mechanical objects are unities whose components are held together by pressure, impact, or magnetic and gravitational forces. Mechanical components are to be understood to exist independently from each other. Chemical objects are unities consisting of components that are held together by bases or acid relations, or more generally consisting of components that are oriented towards each other and that do not sustain themselves independently from each other.¹³ With respect to objects that are purposes, relations of purpose and means determine the composition of the unity.¹⁴

Now, regarding mechanical structures, the first thing to note is that it is essential for mechanical structures to consist of cause-and-effect relations. Mechanism centrally consists in the ‘communication’ (*WL*: 635/12:137) of cause-and-effect relations, for example in the communication of movement through impact or pressure between objects. In what follows, I will not deal separately with the part of the *Logic* in which Hegel discusses cause-and-effect relations or what one could also just call efficient causality.¹⁵ For the sake of my argument, it is important to deal only with the three features of efficient causality that also pertain to mechanism: i) cause-and-effect relations are characterized by an identical content that is transmitted in cause-and-effect processes, ii) cause-and-effect relations are characterized by being external to the objects¹⁶ that they involve, and iii) a cause is always also produced by another cause and therefore, always also effect. As we will see, my reading of ‘external’ here implies that causal relations alone do not constitute the specific objects they involve.

With respect to the structure of mechanism, it is important to specify already here that these features pertain to what Hegel calls terrestrial mechanism. For, motion in accordance with gravitational laws is not external to mechanical objects and mechanical objects with mass respectively are not independent of gravitational relations as Hegel himself holds in his account of absolute mechanics. For the scope of this paper, however, I concentrate only on Hegel’s account of terrestrial mechanics to which these features above apply. I will come back to this point in the fifth part of this paper.

To elaborate on the first feature: Hegel describes the relation that characterizes efficient causality as a transition in which a cause ceases to be a cause as soon as its effect has occurred (*WL*: 664/12:167). To be a cause is essentially to pass into the effect and to disappear in it. According to Hegel, the disappearance of cause into effect is a consequence of the fact that the cause-effect relation is only a formal relation (*WL*: 494/11:398). That means that it essentially consists of a content that does not change within the very transmission of the cause into the effect. In other words: that which is the cause is also the effect. Hegel uses the

following example to illustrate this. Rain causes the wetness of the street. The wetness of the street is nothing other than the wetness of the rain. So, rain is the cause of wetness which is its effect. According to Hegel, rain only functions as cause in so far as it has an effect that sublates the cause, while the content of the cause-and-effect relation remains the same. The example already brought up helps to unpack this sentence: the rain, which falls on the street, ceases to be the cause as soon as it turns into the effect, and that means as soon as it becomes the wetness on the street (*WL*: 494/11:399). In the scholarship, there are efforts to spell out this theory of causality as an identity theory of causality and thus to make it more plausible.¹⁷

Secondly, cause-and-effect relations are external to the objects that they involve. That is, cause-and-effect relations consist in the transmission of an identical content to an object external to this very content, such as the street in the example given above. It is true that there are cause-and-effect processes taking place with respect to the street, but these relations do not illuminate what is characteristic of a street being a street. It is not essential to the very being of a street to get wet. As Hegel states, these objects on which cause-effect relations take place are 'relationless—an *immediate concrete existence*' (*WL*: 497/11:401). In contrast, it is inherent to cause-and-effect relations that the objects being external to them form 'their *substrate*, that is to say, their essential subsistence' (*WL*: 497/11:401). In the following, I will call this claim Hegel's externality thesis.

Turning to the third feature, it is important to note that in efficient causality, an individual cause is itself an effect of another cause. It presupposes there being another cause of which it is the effect. The object, that one which communicates a movement to another object, cannot in the strict sense be identified only as a cause, because it is itself caused by another cause. The rain is the cause of the wetness of the streets but the rain itself is caused by water vapor that condenses when risen high enough in the air. Thus, the wetness of the rain has already been communicated to certain air particles and is therefore also effect—not only cause. One should, however, not conclude that a singular cause, as exemplified in the example, cannot itself actually be the cause of a certain event because the entire chain of cause-effect relations has to be included in an explanation of the event. In the given example, the rain can be identified as the cause, even if the event itself remains in a way underdetermined. Rather, Hegel's argument consists in showing that, on the basis of external causation, no object can itself be a first cause. Being a cause is not—as Hegel puts it—an '*originary determination*' (*WL*: 635/12:137) of an object. Being a cause is something that happens to the object. In other words: the object is not the origin of cause-effect relations, but only the—as one may call it—carrier of them.¹⁸ In the following, I will call this claim the 'non-originariness' thesis.

Now, according to Hegel, the non-originary nature of these objects also defines mechanical relations.¹⁹ For the main feature of mechanism relevant to my argument is that the objects subject to mechanism serve as carrier objects.

That is, they are not originated by mechanical structures. The following example shall illuminate this point: according to Hegel, the spread of warmth in the atmosphere represents a mechanical process (*WL*: 636/12:138). In his philosophy of nature, Hegel states that warmth has an expanding character. It therefore consists in the communication of attraction among particles or carrier objects that does not tear the particles apart, but instead brings them into a permanent connection (*EL*: §303A/24:3:1301). I ignore how this interpretation of heat must be understood specifically and to what extent it can be brought into harmony with the contemporary theory of expansion of heat. The object of my interest is rather that this example clarifies that heat presupposes the existence of particles—or better, of carrier objects—for its own existence, since according to Hegel, heat essentially consists in a transfer of mechanical movement. Along these lines, it is illuminating that Hegel also turns against the idea, quite common in his time, of the existence of something like a warmth substance. This idea presupposes the ‘material independence of warmth’ (*EL*: §305). According to Hegel, it is characteristic of the spread of warmth as a mechanical process that it consists in a transfer of forces that takes place on objects and thus requires the existence of these carrier objects than rather being itself one.

In the next section, I show how these features generate the problem that mechanism cannot provide for object individuation.

V. The structure of mechanism and the possibility of mechanical objects

The results of the last section imply that to mechanism also applies the externality described in efficient causality. According to Hegel, also in mechanism, the carrier objects remain presuppositions. They are themselves not constituted by the causal relations that they involve. Thus, the ‘non-originariness’ thesis implies the externality thesis: in a mechanical object, the components of a mechanical whole are given independently of this whole because no object itself is constituted by the cause-and-effect relations they carry. They are only related to one another through external forces carried out by efficient causality, but they are not related to one another through their own constitutive being. For Hegel, this externality inscribed in mechanism has the consequence that an object held together by mechanical forces is only a ‘*composition, mixture, aggregate*’:

This is what constitutes the character of *mechanism*, namely, whatever the connection that obtains between things combined, the connection remains *alien* to them, that does not affect their nature, and even when a reflective semblance of unity is associated with it, the connection remains nothing more than *composition, mixture, aggregate*. (*WL*: 631/12:133)

Aggregates are characterized by the fact that the nature of the supporting objects of the aggregate is not changed substantially when they form a unit through mechanical forces that we call an aggregate. Furthermore, if an aggregate falls apart, the unity, i.e. the mechanical object in question, has disappeared, but the nature of the carrier objects that made up this unity does not change. This immutability of the nature of the carrier objects through mechanism is what Hegel also describes as the indifference of these objects to one another (*WL*: 632f./12:135).

Thus, the non-originary nature, which implies the positing of an object by another object, essentially characterizes a mechanical object: 'the mechanical object is as such, an object only as product, for what it is, is only by virtue of the mediation of an other in it' (*WL*: 637/12:139). In this sense, mechanism is an expression of such a mediation of movements between objects; to come back to the example used to describe mechanism: warmth is a property of an aggregate, which is a state of carrier objects that are connected through mechanical transmissive forces. To sum up: cause-and-effect relations that are essential for mechanism require carrier objects for their own occurrence. The nature of these carrier objects is not determined by the mechanical processes they carry. To put it in Hegel's wording: they are indifferent to these mechanical processes.

Now, Hegel definitely has a more nuanced account of efficient causality and therefore also of mechanism. Along these lines, one could object that I concentrate too much on the first paragraph on mechanism. Thus, on my account it looks like, on the basis of the features of mechanism I presented, no durable constructions are possible since mechanism seems to consist only in the communication of movement between objects. But, of course, more durable constructions, that is natural constructions like mountains or artificial ones like houses or bridges, also involve efficient causality and are in that sense forms of mechanism. Over the course of the next two sections I argue, however, that these constructions are already informed by external purposiveness and are in this respect not formed by efficient causality alone.

We can now consider the argument that mechanism cannot provide for the individuation of objects. Note, that on the basis of mechanism alone, these carrier objects are themselves mechanical objects—objects that are also held together by mechanical forces. Note also that carrier objects, in so far as they are mechanical objects themselves, presuppose again carrier objects. Consequently, in mechanical explanations of these carrier objects one must assume again carrier objects. If these are in turn understood as mechanical objects, we assume carrier objects on a further level. Thus, due to the structure inherent to mechanism, we will not arrive at an end point here, but rather enter an infinite regress based on the previous analysis of mechanism: being a cause is not an original determination of a mechanical object, because the object is always also the product of mechanical relations. Note that this does not mean that mechanical objects do not have a causal, material origin. It only follows that mechanical structures alone do not constitute mechanical objects.

This also means that every supposedly complete explanation of the constitution of an object based on mechanism only turns out to be an arbitrary break in the chain of explanation:

For this reason determinism is itself so indeterminate as to be bound to an infinite progression; it can halt at will anywhere, and be satisfied there, because the object to which it has progressed, being a formal totality, is shut up within itself and indifferent to its being determined by another. For this reason to *explain* the determination of an object, and to this end to extend the representation of it beyond it, is only an *empty word*, for there is no self-determination in the other object to which the explanation has been extended. (*WL*: 633/12:135)

Also in mechanism, the object is never the origin, but merely the carrier of these relations. If we try to consider an explanation based on mechanism to be the most fundamental one, on which all other cause-effect relations are based, we do not explain to what extent the corresponding object, which we take to be most fundamental, is actually the origin of the cause-and-effect relation, but we only postulate it. So, on the basis of pure mechanism alone, nothing remains but an '*empty word*', since we try to give an explanation that is blocked due to the structure of mechanism.

As already emphasized in the section on efficient causality, this does not mean that explanations based on causal mechanical structures become inadequate for what they set out to explain. Mechanical explanations *are* explanations of the corresponding event. They just do not completely determine the event.

Now, the regress argument leads to a second argument. It clarifies that on the basis of mechanical structures alone, it is unclear what an individual mechanical object actually is. We said that a mechanical object should be one that is held together by, for instance, pressure and impact relations that result from mechanism. On the basis of mechanism, the components that are put together to form such an object are themselves objects that are put together again by further components. Against this background, however, it is unclear what a single object actually is, or as Stern puts it: 'not only is the structure of the object itself a merely external unity; mechanics also views the relation between objects as equally external, so that they form an unqualified plurality' (1990: 80). In other words: the individuation conditions of mechanical objects are unclear. It is external to them to be part of a mechanical object, just as it is external to them to be mechanical objects themselves. This, however, is not an epistemic thesis. The individuation conditions of mechanical objects are not unclear due to epistemic limits of rational subjects. It is an ontological thesis: the structure of mechanism is of such a structure that it does not provide the conditions for object individuation.

In this vein, it is striking that Hegel determines matter to be concrete and continuous. In §298 of his natural philosophy he writes:

Wherever the question of material parts arises, one should not think of them as atoms or molecules, i.e. as separated and self-subsistent, but as merely quantitatively or contingently distinguished, so that their continuity is essentially inseparable from their distinctness. (PN: §298R/20:295)

The claim of matter to be concrete and continuous has two implications: first, what a material part *is* is not just dependent on the object it is currently a constituent of, but also on the objects it could *be a constituent of*.²⁰ Second, that which is a material object and that which has to be regarded as part of a material object is not given by the basic structure of matter.²¹ Now, the basic structure of matter, according to Hegel, is based on the basic structure of mechanism. The mechanical forces of repulsion and attraction are constitutive for the creation of matter (EL: §262/20:254), i.e. the essential determinations of matter are mechanical relations, which underlines the argument given here.²²

Note that I do not take this unclearness of the individuation conditions of mechanical objects in any way to be a defect of mechanism. It merely expresses the ontological structure of mechanism and as such it is this ontological structure that opens up the possibility of understanding in which way mechanism is permeated by teleology in that it is teleology that provides the conditions for the individuation of mechanical objects.

Now, in the mechanism chapter, Hegel distinguishes between terrestrial mechanics and celestial or absolute mechanics. The structures I have outlined so far pertain only to terrestrial and not to celestial mechanics. Thus, one could object that I do not do justice to this distinction, and that this distinction, however, is relevant in so far as the latter mechanics has ‘the *true singularity* of the object [the mechanical one]’ (WL: 640/12:142) as its object. Whereas in terrestrial mechanics, objects are in fact mere aggregates on the basis of mechanism alone, in celestial mechanics, they form a somewhat organized entity. So, one could assume that there is object individuation on the basis of mechanism itself—at least in celestial mechanics. On the one hand, however, the structural relations attributed to celestial mechanics do not undermine what has been said so far, for the scope of terrestrial mechanics is not abolished by celestial mechanics but integrated into a broader structure. Terrestrial mechanical objects do remain in a relation towards each other that is characterized by the features described in section IV. Thus, the externality thesis remains intact: ‘Externality’ is the fundamental feature of mechanical objects of terrestrial mechanics (WL: 641/12:143). According to Hegel, the structures of terrestrial mechanics do have validity on their own²³, and I provided an argument about the way these structures alone do not constitute

mechanical objects. On the other hand, even in absolute mechanism, the question of object individuation is not sufficiently answered by structures of mechanism alone. As we have seen in section three, there are efforts to give a plausible reading of why even absolute mechanism relies on structures of purposiveness. Even if we might need to refer to an account of internal purposiveness in this case, however, this does not undermine the role of external purposiveness developed here.

My suggestion is that, with respect to terrestrial mechanism, what is in each case a mechanical object is dependent on what subjects behaving in a purposive way determine as mechanical objects. Here, external purposiveness provides the conditions for object individuation and that is—so goes my suggestion—why the objectivity section culminates in the teleology chapter: there are no objects without such teleological structures. The constitution of objects is ontologically dependent on teleological structures. It remains to be seen, though, how teleology accounts for the conditions of object individuation of merely material objects, and that is what I aim to show in the next part of the paper.

VI. External purposiveness and the individuation of objects

Coming back to the structure of external purposiveness, and to the three structural moments of external purposiveness, subjective purpose, means and realized purpose, it is easy to see that the intentional activity of subjects to realize their subjective purposes as entities in the objective, i.e. mechanical world is the paradigmatic case of such a kind of purposiveness.

According to this case, a purpose is a subjective-conceptual representation held by a subject, which the subject seeks to realize through its purposive activity. The subjective purpose of a subject is therefore not given in the mechanical world but is first external to it. Thus, in describing subjective purpose as ‘not given’ I refer to the feature of subjective purpose that it is something not yet realized in the mechanical world. Nevertheless, the purpose is related to this world, ‘its activity [is] [...] directed to an external objectivity’ (*WL*: 658/12:161). In other words: it is conceptually true of purposes being purposes that they are drives or strivings to realize themselves in an objective world. Thus, the defining feature of a subjective purpose is the state of not yet being realized and being bound to a subject that strives to realize this very purpose.²⁴ The intention to build a house, for example, can be such a purpose. The house is first of all an entity anticipated in a representation that the subject intends to realize in the mechanical world by appropriate means.

Now, we can already understand the conceptual-subjective representation of the house held by the subject as a form of object individuation. Recall that, according to Hegel, an object is not comparable to something like atoms or simple

substances, but it is a unity of components arranged in a specific way. It is the representation by a subject that serves as a kind of blueprint of a house to be realized. The blueprint establishes the form of a house, that is guided by its specific purpose—to protect from stormy weather, for instance. Thus, in this blueprint, a house is a certain unity consisting of specific components arranged in such a way that they serve this purpose and thereby determine the form of a house. The blueprint represents what a house essentially is. In choosing specific means to realize a house, the subject then individuates a particular house according to this blueprint as a mechanical object in the world.

One could object that this does not stop the infinite regress as it applies in mechanism. This is correct but does not affect the argument. As I have argued, the infinite regress in mechanism is caused by the mechanical components being externally determined. This does not hinder object individuation by external purposiveness but allows it. It allows us to see in which way mechanism ‘naturally offers itself to the connection of purpose’ (*WL*: 657/ 12:160). For the structure of external purposiveness is nothing else but the external determining of mechanical components. Teleological structures account for object individuation in such a way that mechanical components are put together in a purposive way that in turn serves as blueprint for constituting the object. Purposive causality is essentially determined by the fact that the concept is the ground of reality or—in Hegel's terminology—‘substance’ of the object (*WL*: 657/12:160). That is, that which is the object is determined by the concept. The concept is substance of an object in so far as it grounds the determinate unity that makes an object what it is, but the teleological structures do not account for the underlying mechanical components as such.

Now, obviously, not every object and especially not every mechanical object is an artefact. Thus, there is the worry that, according to my reading, the difference between an artefact and a mechanical object might disappear, and consequently, that I run the danger of turning all mechanical objects into artefacts. So, what is the difference between the object individuation that turns artefacts into artefacts and that which turns mere mechanical objects into mere mechanical objects?

It needs to be stressed that the case of object individuation just illustrated is not the only case of object individuation resulting from what I called the paradigmatic case of external purposiveness.²⁵ Thus, it does not cover all cases. It is a defining feature of this paradigmatic case that purposive objects, i.e. artefacts, are realized by a structure Hegel calls the ‘cunning of reason’ (*WL*: 663/12:166). This structure consists in the exploitation of mechanical processes to produce a purposive product. If a subject has the purpose of building a house, for instance, it uses mechanical processes to produce the purposive unity, the house. The realization of this purpose is in the unity of the components from which the house was built, but only in such a way that these components themselves are consumed by

mechanical processes, for example by pressure conditions, to which they are exposed in the purposive unity (*WL*: 666/12:169). They are used up by causal mechanical processes through the unity into which they have been brought by a purposively acting subject. Thus, the cunning of reason consists in using mechanical processes to form something that they are not, that is a purposive unity such as a house.

While in the production of artefacts this structure of the cunning of reason is clearly given, this is not the case in the individuation of mechanical objects as mechanical objects. Here, mechanical objects are not manipulated to realize a specific purpose. The case of theoretical cognition makes this clearest. In scientific experiments subjects individuate mechanical objects and try to gain knowledge of what they are and not to manipulate them.

Note, however, that theoretical cognition, according to Hegel's account, is not only an epistemic process of distinguishing objects but there is an ontological tinge to it. Theoretical cognition has—broadly speaking—a structure that consists in comprehending the mechanical world, i.e. mechanical objects, by thinking about them, and by this, theoretical cognition transforms them into concept determinations, that reveal what is essential about them. In this vein, in the passages on the Idea of Cognition of the *Science of Logic*, Hegel uses the notion 'transform' (*verwandeln*) to describe both theoretical and practical cognition (cf. *WL*: 696/12:199). Theoretical cognition, however, does not transform its objects according to specific practical purposes and through the cunning of reason.²⁶ Thus, there is a clear difference between these two kinds of object individuation but, on Hegel's account, both entail an ontological dimension.

It then remains to be seen how or in which sense theoretical object individuation is still teleological. Note that scientific or theoretical investigation is not only a goal-oriented action itself, but it is also always already embedded in more complex structures of the subject's own needs and drives. Subjects aim to gain knowledge for the sake of truth. The search for truth is embedded in structures of need satisfaction. Consequently, objects are always individuated in accordance with the subject's own needs and drives.

That does not mean, however, that object individuation is completely arbitrary or subjective, in the sense of private. Although I will not argue for this point in this paper, it is worth noting that, according to Hegel, subjective purposes are embedded in a larger social-life world context²⁷ that determines them. Subjective-intentional purposes of a subject are purposes within the social context of life in which the subject finds itself, and are not deliberately chosen by the subject alone. To this extent, object individuation does not depend on particular subjects alone but on the social structures within a larger life context. Moreover, recall that the form of external purposiveness that I have emphasized is only one form of external purposiveness. Even if in the teleology chapter the subjective-intentional

conception of purposiveness is clearly the focus of Hegel's exposure of the structures of external purposiveness, that does not mean that all structures of external purposiveness are such intentional structures. Thus, the examples chosen to explicate the structure of external purposiveness refer only to one case of object individuation. The individuation of mechanical objects does not solely depend on the structures of subjective-intentional purposiveness of individual subjects. It is rather grounded in a more primitive form of external purposiveness. According to Hegel, animals also act purposively in the sense of external purposiveness. Animals also create artefacts such as nests (*PN*: §362/20:362). An instinct-guided activity is already one in which a subject is externally purposive, in so far as it shapes objects found in its environment according to its needs, 'it gives the material of these externalities [of the objective world] an outer form appropriate to the purpose [of the animal]' (*PN*: §362/20:362) and turns objects from its environment into artefacts. Thus, Hegel attributes the structure of external purposiveness to the living in general and not only to intentional-thinking subjects.

The claim that the structure of external purposiveness is a condition of object individuation does not entail that the individuated object is teleological itself. My thesis rather entails that mechanical stuff is combined by structures of external purposiveness in such a way that it forms a unity in accordance with the needs of subjects.²⁸ A tornado, for instance, is individuated in such a way that its individualization fits their need of self-protection. A mechanistic explanation of a tornado is, however, not teleological according to my reading. Rather, it is an explanation about the causal forces at stake in specific natural processes, and thus purely mechanistic.

Even though the needs and drives of subjects are finally embedded in the subject's own self-preservation and therefore in structures of internal purposiveness, object individuation of mechanical objects and artefacts is a case of external purposiveness because material stuff is combined in such a way that it serves the subject's own ends. The material stuff does not exist *because* it can be individuated by subjects in accordance with their own needs. On Hegel's account of internal purposiveness, however, organic material, the heart for instance, exists precisely because it serves the organism's purpose, its self-preservation.

My thesis thus entails that there are no objects without teleological structures. This is equivalent to saying that there are no objects without subjects. In this latter sense, the thesis might sound quite Kantian, namely in its constructivist take. However, firstly, my claim does not imply that Hegel is committed to the appearance/thing in itself distinction. Second, I think Hegel does take up Kantian features. I believe the teleology chapter covers a critique of the Kantian account of object constitution as well as of his conception of external purposiveness. More precisely, Hegel criticizes Kant's account of object constitution by showing i) that every object constitution is embedded in structures of external

purposiveness, and ii) that Kant's main conception of purposiveness, according to which a purpose is bound to a subject and therefore subjective and external to the object and thus is external purposiveness, finally presupposes the reality of inner purposiveness in nature, which Kant denies. Such a discussion, however, is not my focus in this paper. If it is such an immanent critique, though, Hegel himself needs to share the assumptions essential to the Kantian conception of purposiveness, so that he is able to show how they are embedded in structures of life, and that is what, I think, he does in taking the Kantian main account of purposiveness as the paradigmatic case of external purposiveness in the teleology chapter.

VII. Conclusion

I have argued that the being of individual mechanical objects is ontologically dependent on structures of external purposiveness. Since the being of individual mechanical objects depends on these structures, Hegel can call teleology the truth of mechanism. Contrary to common accounts drawing on this Hegelian claim, I argued that it is unfortunate to neglect the structures of external purposiveness in explaining the claim of teleology as the truth of mechanism and that there are good exegetical and systematic reasons to articulate such a claim. This is not to deny, however, that structures of external purposiveness finally presuppose structures of inner purposiveness, and thus have to come into play for grasping the whole metaphysical picture Hegel draws.

Understanding Hegel's claim of teleology being the truth of mechanism in this way does not only make a case for a positive contribution of external purposiveness, but it also leads to a reconsideration of the aims of the objectivity section as a whole in so far as it shows the extent to which the very being of mechanical objects depends on subjective structures. In this way, I hope to have made a case for external purposiveness, a structure that is not given its due in the secondary literature on the *Science of Logic*.²⁹

Karen Koch
Freie Universität Berlin, Germany
karen.koch@fu-berlin.de

Notes

¹ The antinomy of the teleological power of judgment, as presented by Kant in his *Critique of the Power of Teleological Judgment*, provides the background of Hegel's account of the relation between mechanism and teleology. There are certainly more interesting things to say about the way Hegel

responds to Kant's antinomy and more generally about the relation between Kant and Hegel in this respect that I cannot address in this paper.

² See, for example, Yeomans (2012: 189–235) and Kreines (2015: 35–54, 199–218).

³ See, for instance, Yeomans (2012), Kreines (2015) and Ng (2020).

⁴ Yeomans's account is embedded in an investigation into the proto-structures of human agency. With respect to the *Logic*, Yeomans examines the role of causation, mechanism, and teleology, inter alia, for Hegel's theory of agency.

⁵ Cf. section III of this paper.

⁶ Thanks to an anonymous reviewer for pointing this out. In order to discuss this point properly one would have to engage in Hegel's concept of lawlikeness and its relation to contemporary understandings of this term, which exceeds the scope of this paper.

⁷ This does not mean that the structures of external purposiveness do not play a role in Yeomans's theory of action (see Yeomans 2012: Ch.11). The point, I want to stress here, is that they are not relevant for understanding Hegel's claim of the priority of teleology.

⁸ Ng reconstructs Hegel's account of intelligibility as presented in the *Logic* against a specific Kantian background. According to her reading, Kant already defended the thesis that the principle of purposiveness opens up the intelligibility of reality. Ng argues that also in Kant it must be the principle of purposiveness that must be seen to play such a role; even if Kant did not acknowledge that. Cf. Ng (2020: Ch.2).

⁹ Cf. also Kreines (2017: 315–21).

¹⁰ To be clear, I think scholars are right in pointing out that the teleology chapter prepares the structure of internal purposiveness in the Idea of Life. It is true that the account of external purposiveness needs to be grounded in that of internal purposiveness. However, I think that the teleology chapter does not accomplish only a negative role or a role that can be neglected within the *Logic*, as usually considered.

¹¹ Abbreviations used:

EL = Hegel, *Encyclopaedia of Philosophical Sciences in Basic Outline. Part 1: Science of Logic*, trans. T. F. Geraets, W. A. Suchting and H. S. Harris (Indianapolis: Hackett, 1991)/*Enzyklopädie der philosophischen Wissenschaften im Grundrisse (1830)*, (Hamburg: Meiner, 1992).

PN = Hegel, *Philosophy of Nature*, Vol. I–II, trans. M. J. Petry (London: Allen and Unwin, 1970)/*Enzyklopädie der philosophischen Wissenschaften im Grundrisse (1830)*, (Hamburg: Meiner 1992).

WL = Hegel, *Science of Logic*, trans. G. di Giovanni (Cambridge: Cambridge University Press, 2010)/*Wissenschaft der Logik. Zweiter Band. Die subjektive Logik (1816)*, (Hamburg: Meiner, 1981).

¹² In the following, I use the notion 'teleology' as synonymous to 'external purposiveness'.

¹³ There is a categorical difference between the structure of mechanism and that one of chemistry, in so far as Hegel understands chemistry as a self-standing structure. Nevertheless, I will not shed light on the role of chemistry and thus on the transition from mechanism to chemistry and again on the transition from chemistry to external purposiveness here. Instead, I will

put both structures under the umbrella of mechanical structures as Hegel himself does at the beginning of the teleology chapter (*WL*: 652/12:155). There, Hegel argues that both structures can be put under the same umbrella in so far as they are structures in which objects are externally determined. For a specific investigation on the structures of chemism, see Burbidge (1996).

¹⁴ Hegel takes mechanical and chemical structures to be instantiated not only in material structures, but also in mental structures (*WL*: 631/12:133). According to Hegel, learning by heart, for example, is considered to be a mechanical process (*EL*: §463R/20:461), and falling in love for instance is considered as a chemical process (cf. *EL*: §333/20:337). I think it is significant that mechanical and chemical relations do also pertain to immaterial objects. However, for the sake of my argument here, there is no need to take this difference into account.

¹⁵ On the causality chapter in the *Science of Logic*, see Meyer (2017). I am much indebted to Meyer's interpretation.

¹⁶ Hegel does not use the notion 'object' in the causality chapter of the *Science of Logic*, since this notion is not introduced before the section of objectivity. With respect to the causality chapter, it is more accurate to utilize the notion 'substance'. Since I am neither concerned with the causality chapter as such nor with the difference between the causality chapter and that one of mechanism, but only with the features that pertain to efficient causality and to mechanism, I neglect this aspect in this paper.

¹⁷ Cf. Meyer (2017). As Meyer puts it, according to an identity theory of causality, the nature of causal relations is characterized by the identity of properties of the substances that these causal relations involve (2017: 116).

¹⁸ This terminology is borrowed and transformed from Meyer, who, in his interpretation of the causality chapter in the *Science of Logic* describes finite substances as carrier substances of causal relations; cf. Meyer (2017: 107).

¹⁹ Of course, there is a qualitative difference between what Hegel calls his objective logic, to which the chapter on causality belongs, and what he calls his subjective logic. However, as Yeomans has also pointed out, there is an overlap between these two logics in so far as in the section of objectivity of the subjective logic, Hegel is concerned with objectivity. Thus, determinations already discussed in the objective logic must also at least be indirectly addressed in the objectivity section. Along these lines, Yeomans diagnoses a substantial overlap between the objective logic and especially the section on objectivity in the subjective logic in that Hegel here runs through issues already relevant in the objective logic (cf. Yeomans 2012: 190). As further evidence, he points to Hegel's explicit association of mechanism with causation—the one I am concerned with in section IV and V of this paper.

²⁰ Many thanks to an anonymous reviewer for pointing to this.

²¹ Lindquist (2018: 386).

²² In the quantity section of the *Science of Logic*, Hegel states that the moments of discretion and continuity are grounded in these mechanical forces. Attraction is said to be the moment of continuity, while repulsion denotes the moment of discretion (cf. *WL*: 154f./21:176f.). On this part

of the quantity section, see, for example, Houlgate (2018: 146–59) and Stekeler-Weithofer (2002; 2019: 706–53, 707–17).

²³ Falkenburg, for instance, argues that the conception of terrestrial mechanics consists in an abstraction from the absolute mechanics dominated by gravitational force, but this does not mean that terrestrial mechanics does not have its own validity—even if it consists in such an abstraction. Cf. Falkenburg (1987: 212f.).

²⁴ I discuss the metaphysical implications of this feature of subjective purpose in Koch (2021).

²⁵ Along these lines one could argue that this case is also the paradigmatic case of object individuation. Artefacts would be paradigmatic objects then. In contrast to that, Dina Emundts argues that organisms are the paradigmatic objects, cf. Emundts (2012: 348–402). However, one might find it difficult to call them only *objects*, since this is not doing enough justice to the fact that Hegel thinks of them also as subjects. Emundts does not consider the artefact case, but I think on her reading, she would accept that artefacts are objects in a more robust sense than mechanical objects.

²⁶ The process of gaining theoretical knowledge is of course more complex. Hegel does not think, for example, that in theoretical cognition the subject is just passive and receptive. On the contrary, it also plays an active part in that, in the process of gaining knowledge, it converts the objective world into conceptual determinations (cf. *WL*: 696/12:199). Thomas Khurana gives illuminating insights into Hegel's understanding of the process of gaining theoretical knowledge, including with respect to the subject's standpoint in gaining philosophical knowledge of nature and with respect to the subject's standpoint in gaining knowledge of nature in natural sciences such as physics. Cf. Khurana (2017: 301–8).

²⁷ Cf. Stekeler-Weithofer (1992: 400).

²⁸ Correspondingly, in his philosophy of nature, when referring to the environment of specific living being, Hegel uses the phrasing of this environment being their own individuated nature (cf. *PN*: §361/20:361).

²⁹ I presented earlier versions of this paper at a workshop on teleology in Hegel organized by Edgar Maragat and James Kreines and at a workshop at the University of Potsdam organized by Anton Kabeshkin. I would like to thank them and all participants for their feedback. I would also like to thank Caroline Bowman, Dina Emundts, Mathis Koschel, Jake McNulty and two anonymous reviewers for their thorough reading of the paper and their comments.

Bibliography

- Burbidge, J. (1996), *Real Process: How Logic and Chemistry Combine in Hegel's Philosophy of Nature*. Toronto: University of Toronto Press.
- Emundts, D. (2012), *Erfahren und Erkennen. Hegels Theorie der Wirklichkeit*. Frankfurt: Klostermann.
- Falkenburg, B. (1987), *Die Form der Materie. Zur Metaphysik der Natur bei Kant und Hegel*. Frankfurt: Athenäum.

- Houlgate, S. (2018), ‘Das Sein. Zweyter Abschnitt. Die Quantität’, in M. Quante and N. Mooren (eds.), *Kommentar zu Hegels Wissenschaft der Logik*. Hamburg: Meiner.
- Khurana, T. (2017), *Das Leben der Freiheit. Form und Wirklichkeit der Autonomie*. Frankfurt: Suhrkamp.
- Koch, K. (2021), ‘Purposiveness in Nature: Hegel and Spinoza on anthropomorphism and backward causation’, in *Intellectual History Review* 31:3: 463–78.
- Kreines, J. (2015), *Reason in the World*. Oxford: Oxford University Press.
- Kreines, J. (2017), ‘From Objectivity to the Absolute Idea’, in D. Moyar (ed.), *The Oxford Handbook of Hegel*. Oxford: Oxford University Press.
- Lindquist, D. (2018), ‘Hegel’s “Idea of Life” and Internal Purposiveness’, in *HOPOS: The Journal of the International Society of Philosophy of History* 8:2: 376–408.
- Meyer, T. (2017), ‘Hegels wesenslogisches Kausalitätskapitel als Identitätstheorie der Kausalität’, in M. Quante and B. Sandkaulen (eds.), *Hegel-Studien*. Hamburg: Meiner.
- Ng, K. (2020), *Hegel’s Concept of Life. Self-Consciousness, Freedom, Logic*. Oxford: Oxford University Press.
- Stekeler-Weithofer, P. (1992), *Hegels analytische Philosophie. Die Wissenschaft der Logik als kritische Theorie der Bedeutung*. Paderborn: Schöningh.
- Stekeler-Weithofer, P. (2002), ‘Die Kategorie der Quantität’, in F. Schick and A. Koch (eds.), *G.W.F. Hegel. Wissenschaft der Logik*. Berlin: Akademie.
- Stekeler-Weithofer, P. (2019), *Hegels Wissenschaft der Logik. Ein dialogischer Kommentar*. Hamburg: Meiner.
- Stern, R. (1990), *Hegel, Kant, and the Structure of the Object*. London: Routledge.
- Yeomans, C. (2012), *Freedom and Reflection: Hegel and the Logic of Agency*. Oxford: Oxford University Press.