Research Article

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Hegel's Theory of Time

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Abstract: While sharing some features in common with presentist accounts of time, Hegel's theory of time fundamentally offers an alternative to standard A-Theories, B-Theories, and C-Theories of time. While compatible with Kantian ideality of time on the one hand and spacetime in the theory of general relativity on the other, Hegel's theory of time reaches beyond both a transcendental form of sensibility on the one hand and a paradigm for material motion in physics, on the other. Further, while Hegel's theory of time provides reason to reject such theories of time as the Moving Spotlight, Growing and Shrinking Block, and a range of others, my interest here is in making comprehensible Hegel's theory of time itself. I will argue that according to Hegel's theory, the past and the future exist as constitutive of the now, and the now is not separable from space, but rather is itself spatial becoming. Stemming from his underlying logic of actuality and becoming, Hegel espouses the view that history (the past) and future possibility are present and constitutive of the "now." Understanding his theory of time will also help shed some light on a systematic feature found across his philosophy of nature and mind. Additionally, while his theory presents an elegant notion of time within his philosophy, it also offers an intuitive and productive solution for a traditional identity problem of concrete particulars across time and intervenes in contemporary philosophy of time.

Keywords: philosophy of time, nature, becoming, potentiality, persistence, identity

It seems to me that there are two foundational tenets at the heart of Hegel's philosophy of time, and it is these on which my account will focus. The first is: (i) *Time is the becoming of space.* The second is that the dimensions of time (past, present, and future) are not self-external temporal parts, in contrast to numerical models in which temporal parts can be represented as integers on a line; rather, the relations of temporal dimensions have their identity (i.e., explanatory ground) in the "singularity" of the "now." Put succinctly: (ii) *Past, present, and future are internally constitutive features of space now*.

I suggest that Hegel's theory of time offers a contrast to a range of contemporary accounts, from the growing or shrinking block theories of time, on which past, present, and future are external moments existing separately from each other, to fourth-dimensional indexing of three-dimensional space. In general, it offers an alternative to the traditional A-, B-, and C-models of time. While sharing some features in common with contemporary forms of presentism, Hegel's theory also seems to be compatible with contemporary paradigms of time in physics on the one hand, and the ideality of the forms of sensibility defended by Kant on the other. What is of particular interest, however, is the substantial significance of Hegel's theory of time not only for traditional questions of time, but also for a broader metaphysics and epistemology of actualities, processes, identity, self-consciousness, and ethical life. I will not engage with most of these broader implications, but they stand in the background, recommending a more careful reconsideration of Hegel's theory of time.

Hegel's theory of time bears at least three further significances. First, I suggest that Hegel's theory of time is not fundamentally at odds with the basic commitments of general relativity and simultaneously offers an alternative to accepted norms in contemporary philosophy of time. There are thus a variety of reasons to

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rethink Hegel's theory of time, both regarding its place within his system and in relation to current scholarship and debates in philosophy of time, metaphysics, and mind. Second, his notion of time as becoming offers a productive contribution to the history of philosophy by drawing on Aristotelian notions of actuality and a broadly Heraclitean metaphysics of becoming, such that Hegel's theory of time carries forward several ancient traditions of thought into a modern context. Third, his account of time contributes to his broader philosophy of the constitutive nature of actualities, which spans his *Logic*, his philosophy of *Nature*, and his philosophy of *Mind*. It thus contributes meaningfully to a systematic understanding of a productive form of Constitutivism.

1 Becoming and the Now: Two Tenets of Hegel's Theory of Time

In his major work on the metaphysics of nature, Hegel begins by identifying space and time both as (i) "pure forms of sense" and as (ii) the shapes of concrete existence.[1] Both of these initial identifications will turn out to be only partially accurate on his view, or rather, limitedly true on their own. The first is a carry-over from Kant's conception of space and time as the pure forms of sensibility.[2] Hegel accepts this view, but as a problematically one-sided definition, since it defines space and time via their ideality.[3] Identifying them with concrete existence is also one-sided (though on the opposite side), in that it defines them through their reality in material existence as if their reality were opposed to or separable from their ideality. Here, we might take as an anachronistic example Einstein's definition of time as a measure of movement relative to one's frame of reference. On Hegel's view, this would be a concept of time as a shape of concrete existence. Both definitions are one-sided on their own (albeit on opposing sides). Hegel's theory of time takes time as an "actuality" (ideal and materially existent).[4] His aim is something different, namely, an inner unification that touches as much on the nature of identity in self-consciousness[5] as it does on the existence of matter in the fabric of spacetime; however, that aim must for the present account remain a loose regulative heuristic. A brief note on the idea of a fabric of spacetime is in order. Clearly, Hegel did not predict Einstein's notion of the fabric of spacetime. However, Hegel's logic necessitates that even in a vacuum all concrete particulars necessarily stand in degrees of mutually determining relation such that it can never be the case that something exists in absolute separation from something else.[6] Notably, Hegel was not unique in this kind of intuition. Newton himself wrote:

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1 *GW* 20.§258. All citations of Hegel are to his complete works: Hegel, *Gesammelte Werke*, ed. Hartmut Buchner and Otto Pöggler (Hamburg: Felix Meiner, 1968–), designated by the abbreviation *GW*.

2 Kant, *Critique of Pure Reason*, A42/B60. For a good account of the similarities and differences between Kant's and Hegel's views of the ideality of time and its empirical reality, see Emundts "Kant and Hegel on Time.".

3 Kant, *Critique of Pure Reason*, A28/B44.

4 *GW* 11.338-339. Gentry, "Hegel's Logic of Negation;" Outlining the basis for his identification of the ideality and reality of time would take us too far into his account of the "becoming" (*werden*) of abstract universality, concrete particularity, and actuality (*Wirklichkeit*) in *Science of Logic,* which establishes the logical method by which such a metaphysical identity is justified (on his view), so I will not discuss this point further, except to note that in the following analysis we should resist reading Hegel as offering a "mere" idealist conception of time; nor should he be taken as a realist about time. The chief aim of his *Logic*, which grounds his philosophy of nature and time, is to close the gap between the necessary forms of mind and the concrete existence of material reality and to show an identity that is adequately grounded against the charges of radical skepticism.

5 Hegel, *Philosophy of Nature*, §258 Remark.

6 *GW* 11.338-339. This leads him to critique both aspects of Newton's thought including unmooring calculus from the systematic determination of an underlying logic (*GW* 21.270–3), while retaining a host of unsystematically derived philosophical presuppositions about the natural world. Hegel writes that Newton's law of attraction "has no other content than the phenomenon itself" and is at once "posited" as law yet supposed to ground determinate relations of material objects (*GW* 11.305); Relatedly, he critiques Leibniz's notion of the substantiality and independence represented by monads in his monadology (*GW* 12.134–6). On Hegel's view, what excludes the validity of something like an absolute vacuum or absence of material relation in which objects are wholly independent (i.e. not reciprocally determining) stems from a "condition" derived from his Logic: "Force is thus self-repelling contradiction; it is active; or it is self-referring negative unity in which the reflected immediacy or essential in-itselfness is posited as being only a sublated or a moment" (*GW* 11.361). Put differently, force is not absolute in itself, but rather a relation between

> That Gravity should be innate, inherent and essential to Matter, so that one Body may act upon another at a distance thro' a Vacuum, without the Mediation of anything else, by and through which their Action and Force may be conveyed from one to another, is to me so great an Absurdity, that I believe no Man who has in philosophical Matters a competent Faculty of thinking can ever fall into it.[7]

There is thus a real sense in which even Newton intuitively recognized the conceptual gap and need that would be filled by Einstein's notion of the fabric of spacetime.[8] Similarly, Hegel's *Logic* leads him to embrace (counter to most in his time) an identity of spacetime and a rejection of the idea that anything can exist in a space that is not inherently in relation to other concrete particulars, including acting on them and being acted on.

Behind Hegel's philosophy of time stands his philosophy of actuality (*Wirchlichkeit*), which broadly and partially applies Aristotle's notion of the relation between *dunamis* (potentiality) and *entelekheia* (actuality) to a more foundational Heraclitean metaphysics of "becoming".[9] This constitutive notion of becoming runs through Hegel's philosophy of nature and mind, or what he calls *Realphilosophie*. In what follows, I am not speaking about his account of becoming in the *Logic*.[10] Thus, when Hegel defines time as becoming, this should not be understood as a pure logic of becoming found in the *Science of Logic*, but rather as spatial, or "real" becoming.[11]

For the present purpose, we can understand Hegel as holding two key tenets of time. The first is this: (i) "It is not *in* time that everything comes to be and passes away; rather time itself is the becoming, this coming-to-be and passing away, the *actually existent abstraction* from which everything is born and by which its offspring is destroyed".[12] Time as the "becoming" of actuality in nature is, according to Hegel, such that "what is not in time is that in which there is no process".[13] The second is this: (ii) "The dimensions of time, present, future, and past, are the becoming of externality"; these dimensions are not actually self-external, but form a single identity in the now. They are, constitutively, *internal*, such that a "vanishing into singularity, is the present as *Now*".[14] The "posited identity of space and time" is a "spatial singularity," and "it is this only as the spatial *Now*, as time".[15] So, temporal dimensions are relative moments of the becoming of the now; and time is the constitutive becoming of the spatial now.

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reciprocally interacting wholes. In other words, on Hegel's view, force is exerted by one object on another and a presupposition of this logical possibility is the resistance of the other object as other, and reciprocal exertion of force with presupposed "otherness," and hence a unity of mutually determining wholes.

7 Newton, Papers, 302–3.

8 Henry, "Newton and Action at a Distance."

9 Aristotle, *De Anima* II.415b9–14; *GW* 20.§378; *GW* 30,1.63, 94, and *GW* 30,2.546, 30,2.620–21. Texts of Aristotle are cited from *The Complete Works of Aristotle: The Revised Oxford Translation*, ed. Jonathan Barnes, 2 vols., Bollingen Series LXXI (Princeton: Princeton University Press, 1995). McTaggart developed what he claimed was a Hegelian theory of the "unreality" of time, but which had little or no basis in Hegel's actual claims about time. Unfortunately, because McTaggart was one of the most influential early theorists on time (providing the framing for A-Theories and B-Theories) interest in Hegel's actual theory of time seems to have died with McTaggart's own theory of the "unreality" of time. McTaggart, "The Unreality of Time."

10 Gentry, "Hegel's Logic of Purposiveness;" Gentry, "Hegel's Logic of Negation."

11 It is true that Hegel holds that any concept that has actuality is temporal (Gentry, *Freedom and Actuality*), but this is not because time is an absolute ideal condition. Rather, a feature of any genuine concept is that it must be capable of manifestation in concrete particularity, and in such a case it is temporal – or more accurately, spatiotemporal. For two interpretations of Hegel on time that are opposed to my own and stand on opposite sides, refer to (McTaggart, Unreality of Time) assertion of the unreality of time in Hegel (1908), and Bartsidi's discussion of the "unconditioned" nature of time that mediates the finite and infinite: "Sans être lui-même conditionné, le temps est 'son propre concept': il relève d'une forme d'éternité médiatisant les rapports du fini à l'infini" (Bartsidi, "Raphaël Authier, figures de l'histoire, formes du temps," 138–40).

12 Hegel, *Philosophy of Nature*, §258 Remark

13 *GW* 20.§258 Zusatz. If a condition of a thing's actuality is that it have an inner process, as Hegel seems to think, then it seems that something like Plato's Forms will fail to meet the conditions of being an actuality, precisely because they can have no inner process, and by extension cannot be temporal (GW 21.99, 106).

14 *GW* 20.§259.

15 Ibid., 20.§261.

Unlike Kant, who saw space and time as two distinct forms of sensibility – both as pure forms of intuitions (the conditions of sensibility)[16] and as formal intuitions,[17] where the former picks out the ideality of space and time as conditions of experience[18] – Hegel sees space and time as an ultimately inseparable unity. This unity of space and time is an "intensive quantum" or "potentiality," the process of becoming of an actuality.[19] We should read Hegel here as embracing a concept of *spacetime* (though he does not use the term).[20] On his view, there is no space without time and there is no time without space. He holds that space and time form an identity such that an adequate explanation of one is not possible in separation from the reality of the other, since they are two features of the same singular identity.

Space he takes to pick out the pure *quantity* of a point.[21] All points have quantity: to be a point is to have a "quantity" equal to 1, but to have a quantity of 1 is to be infinitely "divisible," even if the point has no mass. We can speak intelligibly of 1/10,000 of a photon, even if a photon is massless. Likewise, a non-material part can theoretically be divided infinitely. This is the nature of a spatial point, even of pure points in thought, or at least this is the view Hegel develops in his *Science of Logic*.[22] Hegel sees divisibility entailed by "potentiality" (*dunamis*) in the Aristotelian sense,[23] because it terminates in an end, in the single concrete point. By contrast, the unending series of a number line "can never be completed" and has no end in a concrete particular,[24] and so cannot be said to be "potentiation".[25] This means that conceptual models based on quantitative measures, integral relations, or a Lebesgue measure, will fit more readily with space (even pure intuitions of space), since it is the self-external relation of parts.

However, such models immediately introduce errors when applied to time, which, if Hegel is right, picks out the pure *quality* of a point, and so conceptual models based on intensive magnitude, inner process, or becoming will fit more readily with the actual nature of time.[26] If we understand space and time as forming an identity, then problems arise for conceptual models that presuppose that the content must necessarily accord with a numerical model. This lack of fit with Einstein's theory of relativity has been a well-noted problem among a range of theories of time. If Hegel is right, then this lack of fit between such theories of time and Einstein's theory of relativity should not be surprising since a common practice in theories of time is to take conceptual models and terms that work for static quantity relations (arbitrary space or infinite numerical series)[27] and apply them to processual quality relations (e.g. thoughts, feelings, and actions of a person have infinite possibilities). However, on Hegel's account, these qualitity relations do not conform to the fixed lindea nature of the numerical models, because they always begin and end with a singular: the person).[28] Stemming from this, Hegel distinguishes two concepts of infinity: the *problematic quantitative infinity* and the *necessary qualitative infinity*. The former is not experiential and is grasped only through negation of completion; the latter is experiential and is grasped in the identity of an actuality. So, we cannot experience mathematical infinity, but we can experience an individual person, and a person embodies qualitative infinity. A person embodies an unending potential for differentiation in actions, thoughts, and feelings, yet always manifests in a determinate and experiential, actual individual or singular now of this particular person.

It is common in theories of time, and in problems of the identity of concrete particulars across time, to puzzle over how to make sense of the qualitative in terms of the quantitative. Applying Hegel's point, we ought

16 Kant, *Critique of Pure Reason*, A42/B60.
17 Ibid., B136.
18 Ibid., A28/B44.
19 *GW* 21.279, 321. See Hegel on "intensive quantum" versus "extensive quantum" (GW 21.334).
20 This is evidenced in claims like "space is negated time; just as sublated space is immediately the point, which developed for itself is time" (*GW* 20.§259).
21 *GW* 20.§254.
22 Ibid., 21.188.
23 Ibid., 21.321.
24 Ibid., 21.240.
25 Ibid., 21.279.
26 Ibid., 20.§258.
27 Ibid., 21.136.
28 Ibid., 21.125.

to question whether the model itself is based on or smuggles in problematic and unsubstantial assumptions. By contrast, Hegel's theory of time denies that temporal parts can be adequately represented quantitatively (such as by a numerical timeline). If Hegel is right that space and time form an inseparable identity, then a conceptual model based on either type of measurement (quantitative or qualitative) alone will result in problems of incongruity of the kind that are often debated regarding competing theories of time. Thus, Hegel's theory does not suggest that we apply two separate models, one to time and one to space, but rather that we should rethink the assumption that a model that fits nicely with one of them (or at least for certain ways of engaging with it) is thereby adequate to both. Numerical models and terminology may be ideally suited to formalizing space through equations and physical laws, without thereby being the best model for understanding spacetime as a whole (beyond the mere paradigmatic interests of physics, e.g. in the theory of general relativity). The concept of time is central to more than just physics; it also matters for metaphysics and epistemology, for self-consciousness, and for philosophy of mind, action, and identity, and ethics. A concept of time that serves paradigmatic needs in theories in physics falls short of the larger relevance of time (some of which is touched on by Kant). It is this broader notion of time, encompassing each relevance (physical and as a form of sensibility) that Hegel is after. As such, while compatible with the current paradigm of time in physics, his theory of time is not reducible to this.

To understand what Hegel means by "becoming" and "now," a brief word on purposiveness in his philosophical corpus is in order. There is a large body of literature that recognizes the significance of purposiveness across Hegel's system, from his logic to his philosophy of mind,[29] from his aesthetics to his ethics.[30] There is also no question that purposiveness plays an important role in his philosophy of nature, specifically in his conception of organisms, or organic life forms.[31] However, it is much less clear whether purposiveness plays a meaningful role in his physics, or philosophy of "mechanistic" nature. While he does not appear to draw significantly on purposiveness in his physics, there are a few passages that speak to the relationship between the two. In the *Logic*, which precedes and conditions all concepts of the real, Hegel states that logical "purposiveness … is the truth of mechanism".[32] Such a claim might appear to entail a monistic mereological ontology, in which mechanistic wholes or parts in nature are merely parts of a larger internally purposive whole (à la Spinoza). On such an interpretation, it might be claimed that wholes that are not internally purposive do not actually exist (except in a homonymous sense of "existence"), since only internally purposive wholes are actual wholes; however, it seems to me that Hegel directly rejects this view in his critique of Spinoza.[33]

Alternatively, we might understand Hegel as identifying two separate spheres of nature: (i) the mechanistic (what Hegel calls *physics*, which would include theories of physics in the contemporary sense) and (ii) the teleological (what he calls *organics*), the latter having priority over the former because of its continuity with the forms of self-consciousness and self-conscious activity.[34] If we adopt this second interpretation, then it appears that Hegel's effort to offer an internally unified conception of both nature and self-consciousness fails by its own standard, since it retains two irreconcilable stems of nature. One stem follows mechanistic laws, and the other follows organic laws of generative differentiation and growth according to a thing's purposive form, in a way analogous to the inner purposiveness of the mind as an identity of productive negation, self-formation, and activity.

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29 *GW* 12.154–91. Hegel begins his philosophy of mind with the statement: "The books of Aristotle on the soul … are by far the most admirable, perhaps even the sole work of philosophical value on this topic. The main aim of a philosophy of mind can only be to reintroduce this principle into the theory of mind" (Hegel, *Geist* §§378–412); cf. Aristotle, *De anima*, book 2; Ng, *Hegel's Concept of Life*, 128; Pippin, *Hegel's Idealism*; Gentry, *Freedom and Actuality*; Koch, *Denken in Zwecken*.

30 For example, Alznauer, *Hegel's Theory of Responsibility*; Novakovic, *Hegel on Second Nature in Ethical Life*; Gentry, "Hegel's Logic of Purposiveness."

31 *GW* 20§§343–45.

32 Ibid., 12.157.

33 Hegel criticizes Spinoza's monism (and Schelling's romantic/idealist version of it) for failing to retain adequate differentiation of singulars and the autonomy of individuals from the whole (GW 21.82, 324, 381).

34 The following passage suggests itself as evidence for this interpretation: "Teleology possesses in general the higher principle … a principle of freedom which … is absolutely withdrawn from the *external determining* of mechanism" (*GW* 12.157).

There is a third interpretation that both draws meaningful support from Hegel's physics and suggests itself as a viable alternative amidst the rival theories of time. I understand Hegel's philosophy of nature to stem from his expansive notion of actuality, placing physical mechanics in the same continuum as organisms and self-consciousness (contra the second view) without resulting in a monistic, mereological ontology (contra the first view). The following claims about his theory of time both support that view and are hopefully rendered more intelligible in light of that broader framing. Thus, I read his constitutive theory of time as an account of one of the most basic features of mater and material relations as well as his account of self-consciousness. It contributes to his broader unification of inorganic and organic nature, as well as the relationship between nature in general and self-conscious thought.

When Hegel writes that it "is not *in* time that everything comes to be and passes away, rather time itself is the becoming, this coming-to-be and passing away, the *actually existent abstraction* from which everything is born and by which its offspring is destroyed",[35] I suggest that we should read him as saying that time is a concept abstracted from the "process" of space. That is, *becoming* in nature is time, and "what is not in time is that in which there is no process".[36] This means that we can distinguish space from time if and only if we can distinguish space from the process or becoming of space (Friedman 2002). Any space which has no process or becoming has no time or is not in time. Part of Hegel's point is that space is such that time cannot be separated from it. Process is inherent to space, and time is merely the becoming of space.[37] Spacetime is quantitatively self-external, yet is qualitatively a process or becoming.

2 The Advantages of Hegel's theory of Time in Less Abstract Terms

What does this mean in less abstract terms? It means that the dimensions of time – that is, past, present, and future – are not mutually external moments existing separately from each other (in contrast to a growing or shrinking block theory of time); nor is time to be understood as a fourth-dimensional indexing of three-dimensional space such that all concrete particulars possess not only spatial properties *X*, *Y*, etc., but also tensed properties X-t_1, X-t_2, etc.[38] Instead, the past, the present, and the future exist only as distinctions internal

35 Hegel, *Philosophy of Nature*, §258 Remark.

36 Hegel, *Philosophy of Nature*, §258 Zusatz. If we understand time to be the becoming of space, then what is space? Hegel understands space to be the "side-by-sideness," or self-externality of what exists in actuality (§254). Such a concept of space is more receptive to quantitative models, if points are external to one another and can be equated or calculated as mutually external static parts. Yet even this, Hegel immediately argues, is an inaccurate characterization of space: "The difference of space is, however, essentially a determinate *qualitative difference.* As such, it is, first, the negation of space itself, because this is immediate differenceless self-externality, the point. But the negation is the negation of space, i.e., it is itself spatial. The point, as essentially this relation, i.e., as sublating itself, is the line, the first other-being, i.e., spatial being, of the point. The truth of the other-being is, however, negation of the negation" (*GW* 20.§256). And: "Negativity, as point, relates itself to space, in which it develops its determinations as line and plane; but in the sphere of self-externality, negativity is equally *for itself* and so are its determinations. … Negativity, thus posited for itself, is Time" (*GW* 20.§257). To make these passages fully intelligible would require an account both of the method of Hegel's *Logic*, which he takes to ground these concepts and relations in his philosophy of nature, and of the "triplicity of negation," or logic of negativity. Suffice it to say that Hegel defines *becoming* in terms of the logic of a multilayered negation. To put it succinctly: the negativity of space is its own *becoming*. Thus, when Hegel says that time is this negativity of space, he is claiming that time is the becoming of space, where space is not understood as something separate from time, but as that whose becoming *is* time. He then clarifies that the usual view that "everything comes to be and passes away in time" depends on an abstract concept of "empty time and empty space: in other words, these abstractions [from what exists] are posited and represented as if they were for themselves. But it is not *in* time that everything comes to be and passes away; rather, time itself is the becoming, this coming-to-be and passing away, the actually existent abstraction" (*GW* 20.§257). In the context of my argument in this article, I suggest that we understand these passages to mean that time is the becoming of space, and space is such that its process is one of becoming, and this becoming is time.

37 There is some good recent literature on Hegel's philosophy of nature and mechanical parts which explains why Hegel rejects a static notion of physical properties in favor of a metaphysics of the "relation" (or process) of physical parts to each other (Kabeshkin, "Hegel's Metaphysics of Nature," 789).

38 Kuhn and Portner, "Tense and Time".

to the "becoming" of the now, where the "now" is a concrete particular that is spatiotemporal. Put differently, "the dimensions of time, present, future, and past, are the becoming of externality".[39] These dimensions are ways of picking out what it is for something to exist in actuality. What it is to be spatiotemporal is to have a process of becoming, and that becoming can be measured in terms of past, present, and future.

If this is right, then what we mean when we say that something is past is that it is present in the now as a constitutive part of the whole's having come to be what it is. Likewise, if something is future, it is present in the now as a constitutive part of the whole's potentiality, or what it might become. Whether we are speaking of atomic parts or larger wholes, whether we have in view an inorganic object like a rock or an organic object like a plant, and whether we mean an object outside us in nature or the actual self-consciousness of a person, each of these is a concrete particular such that the past is contained in the spatiotemporal concrete particular as the becoming by which it is what it is, and the future is contained in it as the potentiality of its becoming. Thus, time never ceases to be the intensive quality of a spatiotemporal concrete particular.

There are several advantages to this view. First, it avoids the problem of the identity of a concrete particular across time[40], since saying "across time" misconceives time as external, when in fact the history of a concrete particular (its future and its past) are always carried in the now as constitutive of what it is. Second, it rejects models that attempt to treat time as a quantitative linear structure in which each moment is self-external to prior and subsequent moments; instead, every moment is the growth of concrete particulars within and in relation to other spatiotemporal wholes. The fabric of spacetime on this view is a set of relations between concrete particular spatiotemporal wholes, and these wholes range from the most minute particles up to the largest whole (the fabric of the expanding universe). Such a view thus finds more promise in models from quantum field physics than models that take the individuality of particles to be ultimately separable from spacetime as a whole. In short, whatever the scale of the concrete particular in view, whether it is an electron, a probable (weak nuclear force-communicating) boson, posited dark matter, antimatter, dark energy, or spacetime as a whole, the underlying claim about time on Hegel's theory persists. While his theory entails heuristic restrictions that influence scientific investigations, it does *not* determine in advance that which requires experiential data.

This model of growth entails that each preceding moment is retained or carried forward in the whole. Each previous moment continues to exist as the past of the now (intensive quality) and each future moment exists as the potential of the now. This means that it also avoids the challenges of identity stemming from time-indexed properties faced by B-theories of time, according to B-theories, tensed judgments of past, present, and future are ultimately reducible to tenseless facts about equally real objects (whether past, present, or future);[41] they thus permit a self-identity of a concrete particular to which we ascribe different time-indexed moments. Hegel's theory does not permit the assumption that there is a concrete particular separable from its temporal becoming; as a consequence of his view of time, $X\text{-}t_2$ is not the same as $X\text{-}t_3$, since $X\text{-}t_2$ is constituted by $X\text{-}t_1$, whereas $X\text{-}t_3$ is constituted by both $X\text{-}t_1$ and $X\text{-}t_2$. At the same time, it does not make sense to speak of a lack of identity as the result of distinct temporal moments, since on Hegel's theory there can be no concrete particular in distinction from temporal constitution. To separate time-indexed properties from the concrete particular is to fail to understand the identity of spacetime, where time just is the inner development of space, its constitutive becoming. Time is the inner history or constitution of the given actuality. This constituting may be a side-by-side movement of space (stretching and contracting) or an intensive change, such as the fusion of atoms, but whatever is in view, time is not separable from space, but just is the very becoming of space.

Hegel offers a critique of a proto-B-theoretical account of time-indexed selves or temporal fourth-dimensionalism,[42] stating that "there would be as many souls as material points," where "soul" means the animating life form or identity of the concrete particular. "One must not be deceived by the show of mutual externality [i.e., $X\text{-}t_1$,

39 *GW* 20.§259.

40 Thomson, "Parthood and Identity across Time," 201–220.

41 For more on common aspects of B-theories, refer to Sider, Four-Dimensionalism, chap. 2. For a good defense of presentism, refer to Tallant, "Defining Existence Presentism;" cf. Hinchliff, "A Defense of Presentism in a Relativistic Setting."

42 For a defense of four-dimensionalism, refer to Sider, *Four-Dimensionalism*, 148–50.

X-t_2], but must understand that mutually external points form only one unity".[43] In other words, the supposed "mutually external points" are rightly understood as moments of an intensive magnitude of becoming in one and the same concrete particular. The identity of the whole remains what it was all along: a processual becoming of a spatiotemporal concrete particular. In short, it seems that on Hegel's theory, the past does not cease to exist, nor does it exist as a metaphysical reality outside the now; rather, it is an intensive quality of the now, as is the future. Likewise, space is that which is self-externalizing; this self-externalizing is negativity, and this negativity is a becoming or time. Thus, time is the becoming of space – or put differently, time is the process of space. Since there is no space distinct from its process, there is no space distinct from time. Insofar as space shrinks or expands, or slows down or speeds up – in other words, whether we have in view the movement of particles or the expansion of space – so too does time, since time is the becoming of space. This at least is what is entailed by Hegel's theory of time, stemming from the basic commitment to the two claims with which we began: (i) *Time is the becoming of space*, and (ii) *Past, present, and future are internally constitutive features of space now*.

3 Time (Past, Present, and Future) and Becoming: A Critique of Temporal Persistence

Hegel's theory requires a fundamental rethinking of our approach to the concept of time. By viewing time in a leaner fashion as sequential moments on a number line, such that each temporal point can be numbered (e.g. years, days, seconds, and zeptoseconds), Hegel thinks that we problematically limit our grasp of some concepts by the terms and models we presuppose. Schematizing a concept like time with topological or numerical imagery and models predetermines the kind of content we can draw on in developing a theory of time. Cautioning against pre-emptively applying such a model to ideas like time, Hegel writes: "*The simple elementary figures and numbers, on account of their simplicity, can be used as symbols* without fear of misunderstanding; but even so, these symbols are too heterogeneous and cumbersome to express [the fullness of] thought".[44] Such symbolism is helpful for expressing certain kinds of content, but, as Hegel goes on to say: "*With richer notions these means become completely inadequate, because their external* juxtaposition and their contingent combination do not accord at all with the nature of [full reality]. … [and], the fluid character of [reality] is dissipated in such an external medium, in which each determination is indifferent to and outside the others".[45] Instead of conceptualizing time using numerical imagery or models, Hegel's internally constitutive concept of time takes it to be a qualitative and constitutive feature of concrete particulars. Somehow, time is the "becoming" of space, and spatial becoming is time.

A key question here is this: What could it mean for the entirety of one's past, present, and future temporal moments to be contained in the concrete particular existing only in the now, and how does this priority of the now differ from what is in view with the similar presentist claim? Consider an oak tree. If we understand the mature oak as one and the same concrete particular as the acorn from which it grew, but deny that the oak is the aggregate of its past and future "nows," and deny that the past and future exist, what meaning is left in this claim? I submit that on Hegel's view the "now" of the oak is all that exists. Yet the past also exists, but only through the now: it exists as the constitutive history of the concrete particular in the now; thus, it neither ceases to exist nor does it exist "somewhere" else, but rather exists as the constitutive becoming of the concrete particular in the now. (And likewise, the future exists as the potential of the concrete particular in the now.) The concrete particular in the now has an intensive quality of having had a past. That past is not externally related to the now, as if moments could be set side by side; rather, the concrete particular is what it is only through the becoming of itself through its past nows (i.e. its spatiotemporal history). Thus, the oak bears within itself the acorn. The acorn did not simply cease to be and get replaced by the sapling, which was in turn

43 *GW* 20.§248.
44 *GW* 20.§259.
45 Ibid., 20.38–39.

replaced by the mature oak; rather it *became* the sapling, which became the mature oak. This constitutive becoming of space is a fundamentally different kind of alteration from those proposed by numerical models. Numerical models depend on the replacing of one part by the next in a quantifiably regulative set of relations; by contrast, Hegel's theory not only denies the adequacy of such numerical models, but avers that they introduce contradiction precisely through their inadequacy to the nature of the internally constitutive becoming of space. This is not to say such models have no value; however, they cannot be assumed to be universally adequate, and they are inadequate and harmful as a model of what time really is. This harm is seen most clearly in the resulting long-standing identity problems with the persistence of concrete particulars.[46]

Drawing the conclusion from Hegel's theory of time, then, there is no problem of the persistence of one and the same concrete particular across time. The problem is instead with the inadequacy of the very concept of "persistence across time." The oak tree is constituted by its past growth such that every past moment is what constitutes the present whole. This means that talk of "numerical identity" with past selves is itself the bizarre and inherently problematic description. There is no distinct past self to be set beside the present self; rather, the present self contains the past self within it as its own constitutive history, which is necessarily carried forward into the now, since the now could not be what it is without that inner process or history. Similarly, just as the past exists as the internal constitutive history of the present now, the future exists as the constitutive potentiality of the present now. The spatiotemporal identity is the inner growth of a single concrete particular; its identity is a becoming, that is, its past and future growth. There is no time in distinction from this becoming of space. This continuity of growth, or the becoming of space, is the identity of the concrete particular.

Thus, for Hegel, whatever is actual now cannot be known in separation from its constitutive becoming. Put differently, that part of its history that was not contingent but was the real path by which the actuality of the now came to be is internally constitutive of the actuality of the concrete particular in its present state. Thus, in Hegel's view, "world history" itself will play a central role in the actualization of the nature of human self-conscious life, in part due to this conception time as the becoming of the actuality of space now.[47] Although the carrying forward of the past as the constitutive becoming of space now is particularly relevant to understanding actual wholes, Hegel sees time as the becoming of space as constitutive of even arbitrary, contingent existence. Hegel's concept of spacetime does some uniquely heavy lifting, since it displays in its very nature the underlying method of intelligibility that structures contingent and necessary wholes in life, the form of matter in the universe, and the form of intelligibility. This notion of becoming that defines his account of spacetime is central to his notion of the logic of all actualities in both nature and mind. This does not mean that all actualities are necessarily only spatiotemporal, but rather that the form of spacetime as the becoming of an actuality in the now displays the form of all intelligible actualities: constitutive becoming through manifestation in singular (individual), intensive quantums.

4 An Internally Constitutive theory of Time and What it Entails for Temporal Concrete Particulars

To say that Hegel's theory of time is a theory of time as self-constitutive is to say that time should be understood as a form of constitutive spatial becoming, where this becoming is internally constitutive for a discrete, non-arbitrary spatial whole. As such it is an inherently relative notion of time to the given spatial whole, since becoming is not uniform and identical, but is individual and internal. If a concrete particular is understood as a demarcated spatiotemporal whole, then on Hegel's view, there is no "space" *in* which concrete particulars exist; rather, they are the becoming of space, and thus are temporal. There is no space that is not becoming, and so there is no space that is not temporal. Likewise, there is no time that is not spatial, since time is just the

46 Balashov, *Persistence and Spacetime*.
47 *GW* 20.§548–50, 26,3.§341–47.

becoming of space. In this becoming of space, the past is carried forward into the present as the constitutive history of the becoming of that space, and the future is the potentiality of the becoming of that space. It is one and the same intensive spatiotemporal whole that is constituted by its past, present, and future as the becoming of what it is. This is what it means to have a view of time as internally constitutive.

Hegel's theory questions the assumption that time can be adequately represented by numerical models of change. On his theory, numerical models already make important assumptions about the externality of temporal moments, which leads to problems in equating a concrete particular *xy* at t_2 to *xy* at t_1 or t_3 such that it can be claimed that the individual is one and the same thing while also accounting for the relevant change. These problems are intrinsic to models that accept that time can be represented as numerically distinct moments that mark spatial instances or that pick out tensed features of a spatial whole. But if time is taken to be internally constitutive of space (i.e. the becoming of space now), then it cannot be adequately represented by such numerical models. Instead, the past of *xy* is contained within the now of *xy* as the inner constitutive history of its becoming what it is now. Likewise, the future of *xy* is contained in *xy* as the potential of such an *xy* with the particular past by which it became what it is now. This constitutive past of an *xy* includes everything from subatomic decay, fusion, cellular differentiation, and genes, to velocity through each moment of *xy*'s past. It also includes all the external relations and events through which *xy* was brought about, including the failure of such relations to bring about *xy*. Where that *xy* is a self-conscious whole, it includes the inner unity, relation, growth, and decay of self-consciousness (feeling, reflection, disposition, etc.). There is thus no problem in saying that the ship of Theseus is the same even after all of its planks have been replaced, since it is the ship that underwent the replacement of its parts to become and to be the *xy* it is now (and so too of a person).

According to the theory, however, we have already made a category mistake when we ask, "Is the ship of Theseus at t_1 the same as the ship of Theseus at t_{10}?" For this presupposes the ability to separate the becoming of *xy* from what *xy* is and to quantify and equate moments of becoming through non-arbitrary numerical symbols. Suppose we divide the "becoming" differently by splitting the ship into four parts and then completely rebuild each part. Now each of the four undergoes the replacing of planks until every part is new. Which one of the four ships is the ship of Theseus? This is the same kind of category mistake as in the case of cutting a worm in half and asking which one is the true worm: after all, if the worm is cut in half, each time it regrows we would have to claim that, say, eight distinct worms are all actually one and the same worm, or else randomly prioritize one of them over the other seven, since they cannot all be the same particular worm (since they take up different spaces, have distinct cells, and move differently). On Hegel's theory, however, there is no special problem with these concrete particulars. Each of the eight worms and its future growth is that which was cut in half and had however many past moments of being cut in half. They are not identical to each other. It does not matter how many distinct concrete particulars can claim a similar and related development; each one is a unique becoming of space with its past and future constituting the inner purposiveness of the now. From the moment the worm is cut in half, we have two worms related to a past in which they were one and the same worm, but they are now not one and not the same.

If we call the becoming of space "time," and if all space has such a process of becoming, then a concrete particular *xy* as a spatial object has time as its constitutive, essential form. It is temporal, not as a mark, but in virtue of being spatial. This means that it is not true that concrete particulars exist *in* time (except insofar as we mean that one spatial whole can exist within another spatial whole); rather, what it is to be a concrete particular is to be a thing that undergoes spatial becoming, that is, a temporal whole. Spacetime is the form of concrete particulars, and concrete particulars are the coming-to-be of spacetime.

On this view, then, time is an internally constitutive part of all concrete particulars, since a concrete particular could not be what it is without spatially becoming what it is, and that becoming is time. Time on this view does not exist apart from spatial becoming; it *is* spatial becoming. Moreover, what can count as an *xy* is not limited to inorganic objects or organic objects or self-conscious objects. The fabric of spacetime is itself also a concrete particular, whether that fabric is represented as a highly dense moment expanding into the known universe or as having other movement and fold relations; whatever model we use to represent it, it is an *xy*. It may be that our effort to model spacetime as an *xy* is itself mistaken, but insofar as spacetime is conceived of as

a fabric of spatiotemporal relation, it is being conceived of as an *xy*, and so Hegel's theory would apply equally to spacetime itself as a larger concrete particular.

This also means that insofar as spatial becoming differs from one concrete particular to another, time also differs. This is compatible with the basic position of general relativity, as argued above.[48] For example, the temporal relativity that occurs for a person travelling at 0.001 percent of the speed of light is already anticipated (even if not explicitly articulated) by the view that time just is the spatial process of becoming. If parts of an atom slow relative to those parts that are not travelling as quickly, then, on Hegel's view of time as just outlined, we ought to say that time too has slowed relative to those parts that are not travelling as fast. This suggests that there is a compatibility between Hegel's theory of time and Einstein's relativity, which, while not a central point in my thesis, might helpfully evidence degrees of adequacy in Hegel's notion of time as the constitutive becoming of space, since many prominent theories of time appear incompatible with general relativity. For him, this notion of time is bound up with, on the one hand, a much larger project of the intelligibility of mind and nature that can adequately answer the charges of radical scepticism,[49] and on the other hand, his philosophy of mind as a certain kind of activity.[50] For time just *is* the processual becoming of space.

My point here is simply that there is no obvious problem; in fact, there is a natural fit between Hegel's theory of time and the basic commitments of the theory of general relativity.[51] Moreover, providing an explanation of the fabric of spacetime and spacetime function relations (or "laws") such as gravity depends on a conception of space as being in process, a becoming that is describable as contraction, expansion, etc. That is, gravity is not actually a force acting on or between material parts in spacetime, but is rather the effect of the very fabric of spacetime being variously determined by mass. Thus, we have observed the light waves of stars and galaxies bending around black holes, which are thus visible to us when their "direct" line of sight should make them hidden from view, as a result of the photons bending around the black hole. However, the photons are not bending as a result of being acted upon by a force called gravity; rather, they are travelling straight toward us. While they move in a straight path from one perspective, the path itself is a curvature of spacetime. And it is so because it is determined by the becoming of spacial wholes (i.e. the relative mass of objects along the way). So, even the path that the photon takes and its relative time to reach us evidences a relative becoming of space: and this relative becoming of space is what Hegel is calling time. This is the constitutive identity of spacetime. This at least is one example of a prediction generated by the theory of general relativity and validated by observation. Thus, instead of positing that there are spatial parts and that external forces act on these parts and influence their place in a temporal framework (all of which suggests mutually external parts of various kinds), Hegel's theory seems to be compatible with general relativity. An example of this compatibility with relativity is the idea that spacetime is in a state of becoming such that any particular part of spacetime is becoming in ways different from other parts. This compatibility with general relativity contrasts

48 This claim that Hegel's theory is compatible with Einstein's theory of general relativity is not a central point of this article, nor am I the first to argue it; see, for example, Wandschneider, Raum, Zeit, Relativität. Hegel has in view far more than time as a principle in modern physics. I intend merely to note that in tracing Hegel's complex *Science of Logic* and *Philosophy of Nature,* it can be tempting to assume that he is operating with the outdated physics of his own time. However, Hegel was out of step with, and diametrically opposed to, the dominant views in physics and philosophy of nature in his age (e.g. the Leibniz-Clarke debate (Yakira, "Time and Space, Science and Philosophy in the Leibniz-Clarke Correspondence.")), with the exception of those of a few notable contemporaries such as Alexander von Humboldt. Hegel drew conclusions from his science of logic and philosophy of nature that are more compatible with contemporary physics. Drawing such conclusions about the identity and the non-fixed relativity of spacetime, in contrast with the prevailing views of his age, should lend credence to the underlying *Logic* by which he is drawing these conclusions, anticipating twentieth- and twenty-first-century physics, though what he is after is something more than time as a principle in modern physics.

49 *GW* 21.60–70; Forster, *Hegel and Skepticism*, 9; cf. Franks on the "Agrippan Trilemma" and radical skepticism (*All or Nothing*, 18); Gentry, *Freedom and Actuality*.

50 Ng, *Hegel's Concept of Life*, 128.

51 Challenges of compatibility between A-theories (even including presentism) have been widely discussed. For example, Saunders, "How Relativity Contradicts Presentism," 277–92; cf. Deasy, "What is Presentism?," 378–97.

with A-theories such as the Moving Spotlight or the Growing Block.[52] Hegel's theory does not take time to be constant, but rather relative to the becoming of space, since space itself is not constant but is everywhere in distinct (and so relative) processes of becoming (moving, constituting, differentiating, determining, and being constituted).

5 Conclusion

Whereas presentism typically acknowledges a lack of fit between its own theory and the theory of relativity, the Hegelian theory of time, as I have presented it, seems not to suffer from such a lack of fit. That is, there are no obvious conflicts between general relativity and Hegel's claim that time is the becoming of the spatial now. However, this is not my claim or concern here: my claim in relation to general relativity is only that Hegel's theory faces no obvious problems of fit, and has some clear benefits in relation to other problems, such as the identity and persistence of concrete particulars, and ultimately notions of identity in a philosophy of mind. Moreover, Hegel's theory of time is a wider-reaching and more consequential notion of time which should not be reduced to a concept for a paradigm in physics.

My purpose in this article has been highly limited in scope. I have aimed to clarify two features of Hegel's theory of time as a contribution not only to understanding Hegel's philosophy in its own right, but also to showing that it is may be compatible with a prominent strand in contemporary philosophy of time and could potentially contribute relevant insights. Hegel's theory of the internally constitutive nature of time as spatial becoming also offers a basis for further critique of common assumptions underlying problems of the persistence of concrete particulars across time. I have not argued that Hegel's theory is more adequate than contemporary theories of time, but only that it offers an alternative that addresses some difficulties that are faced across theories of time, while remaining compatible with key developments in physics, and that it also offers insights into a more fundamental and encompassing philosophy of becoming and actuality that has implications for larger issues in epistemology, mind, identity, action, and rational agency.[53]

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52 For example, Skow, "Relativity and the Moving Spotlight;" Sklar, "Time, Reality, and Relativity." More recently, Ross Cameron has defended an A-Theory account (the Moving Spotlight) that nevertheless holds that the past, present, and future are simultaneously and equally real, and each temporal moment has temporal distributional properties that make it the way it is (Cameron, *The Moving Spotlight*, 137–8). See also Kristie Miller's excellent critique of Cameron's Moving Spotlight theory (Miller, "The Moving Spotlight Lights, and Having Lit, Moves On"); and for a helpful comparative analysis of the A and B theories, refer to Zimmerman, "The A-Theory of Time, The B-Theory of Time, and 'Taking Tense Seriously';" cf. Gentry, "Measuring the Present."

53 Gentry, *Freedom and Actuality*.

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