

FOUR-DIMENSIONAL OBJECTS AND THE PHILOSOPHY OF NATURE:
MARITAIN AND SIMON'S TIMELY CONTRIBUTIONS
TO ANGLO-ANALYTIC METAPHYSICS

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Attuned to developments in the experimental sciences of their day, Jacques Maritain and Yves R. Simon were acutely aware of their implications for the philosophy of nature and metaphysics. Seeing the necessary distinctions between these three areas of inquiry, they maintained that the philosophy of nature needed to guide the investigations of empirical science. At the same time, they knew that these developments raised new problems for the philosophy of nature. Among such developments was Albert Einstein's theory of special relativity, out of which he ultimately maintained that time was a fourth, constitutive dimension of reality. Shortly thereafter, philosophers sought to incorporate these ideas into ontology. In particular, the status of the temporal persistence of concrete particulars became a pressing question and continues to be one to this day.

Contemporary four-dimensional ontologies, usually referred to as perdurantist ontologies, hold that concrete particulars do not fully exist at any one time, but are instead spread out in time, existing only partially in the present. Proponents of this view maintain that it is wrong to think that there are three-dimensional substances that move through time. Instead, time is said to be as much a part of an object's constitution as are its spatial dimensions. A person, for instance, is best thought of as an entity spread out in time like a worm, or, to be more precise, a spacetime worm. The entirety of the spacetime worm is the whole of which the person "now" existing is a part. Lacking an adequate philosophy of nature, defenders of a three-dimensional, substance ontology find it difficult to respond convincingly to the question, "What prevents this four-dimensional view from being true?" After all, it comports with the latest science.

The success of relativity theory notwithstanding, there are good grounds for rejecting the perdurantist ontology. In what follows, we will see how the philosophy of nature as proposed by Maritain and Simon reveals why this four-dimensional ontology is neither inevitable

nor preferable to a three-dimensional substance ontology like that of Aristotle and Thomas Aquinas. As a first step towards this end, we will begin by assessing a leading four-dimensionalist account, one representative of the four-dimensionalists' revolutionary claims about concrete particulars.

I. THE CASE FOR AN ONTOLOGY OF FOUR-DIMENSIONAL OBJECTS

In his recent text, *The Ontology of Physical Objects: Four-dimensional Hunks of Matter*¹, the Anglo-Analytic philosopher Mark Heller proposes a four-dimensional, perdurantist ontology, which he considers more consistent with educated common-sense than the standard, three-dimensional, endurantist ontology.² Heller notes that the four-dimensional ontology originally had its positive project in the work of David Lewis, and its destructive project, seeking to undermine the three-dimensional view, in the work of Peter Unger. Heller offers his own constructive and destructive projects in this work.

1. Heller's Negative Argument

Heller's chief complaint with the standard ontology is that it is impermissibly vague and imprecise.³ He maintains that the persistence conditions for objects in the standard ontology are almost always conventional,⁴ and are only treated as if they were essential.⁵ In failing to specify the necessary persistence conditions of an object, the three-dimensional ontology devolves into arbitrariness.⁶ This vagueness

¹ Mark Heller, *The Ontology of Physical Objects: Four-Dimensional Hunks of Matter* (Cambridge, Massachusetts: Cambridge University Press, 1990).

² *Ibid.*, x. The endurantist view maintains that a physical object exists in its entirety at every moment of its existence, while the perdurantist view holds that a physical object exists in its entirety only in the sum of its temporal parts, which are spread out through its temporal life.

³ See *Ibid.*, xi, 10.

⁴ See *Ibid.*, x. Heller gives an example of how we speak loosely when we say something exists at X. For example, one may say a piece of paper is in a drawer when a corner of it is sticking out (pp. 13-14). I should note that "conventional" is opposed to "essential" in this debate; a conventional object is merely a product of human conventions, and does not entirely exist apart from them.

⁵ *Ibid.*, 39.

⁶ *Ibid.*, 43.

renders arbitrary both the static account of an object's constitution as well as its persistence in time.

Heller holds that the static, three-dimensional view's vagueness exposes objects to the Sorites paradox. This paradox begins by observing that no heap of sand would cease to be a heap with the subtraction of one grain. But continued removal of grains ultimately eliminates the heap. It seems that one's estimation of what still constitutes a heap in the face of a gradually decreasing heap is a vague one. Heller takes people to be merely conventional objects. And he argues that an implication of the Sorites paradox is that people have no ontological difference from heaps,⁷ since no physical object may resist the arbitrariness that the Sorites paradox reveals in our definition of physical objects.⁸ Thus, the unity of objects can only be conventional, as "any two objects go together to compose another object."⁹ We may note that Heller's analogy of the human person and a heap of sand shows an atomistic presupposition, as a substance ontology would rule out such an analogy.

Heller locates a second arbitrariness in the standard ontology in its specification of persistence conditions for objects. He describes something of a Sorites paradox for objects persisting in time, when he points out that causal connectedness, even in living organisms, is vague. With regard to one's conventions, e.g., the beginning of human life, some arbitrary judgment need be made.¹⁰ He notes that describing the relation between the island of Manhattan and the civic borough of Manhattan is rather complicated. The physical object that is Manhattan seems to be more or less constant. But without identifying the temporal dimension of an object as a constituent of its being, it is difficult to see how the antecedent island is related to the borough.

2. Heller's Positive Account

Heller maintains that non-arbitrary conditions for objects, which he calls four-dimensional hunks of matter, may be identified. While the standard ontology may base essential properties only on our

⁷ Ibid., 48.

⁸ Ibid.

⁹ Ibid., 49.

¹⁰ Ibid., 50.

conventions, the four-dimensional ontology purports to give an object's essential properties based on the object's nature.¹¹ In short, Heller takes the man Descartes to be a conventional object, but not his hunk of matter.¹² By specifying an object's four-dimensional matter and leaving everyday objects to convention, Heller thinks one can prevent one's ontology from succumbing to the Sorites paradox.¹³ This more precise specification of an object is likewise to be preferred to one that leaves undefined an object's fourth dimension, and hence leaves an object's perspectival relations as brute facts.¹⁴

In his constructive project, Heller defines a physical object as "the material content of a region of spacetime."¹⁵ This view regards the temporal dimension of an object as ontologically fundamental, on par with its spatial dimensions. An object is seen as the sum of its temporal parts, as well as its spatial parts. No one object fully exists here and now, since an object is temporally too large to exist at one moment.¹⁶ Hence, I am not Andrew Jaspers in 2010, but some of my temporal parts are existing in this time, just as my temporal parts are existing in 1980. The four-dimensional spacetime worm that each object is may be understood to have sub-regions, where the divisions of the temporal parts are themselves objects.¹⁷ A spatiotemporal part could not exist for less time than it does, and is not merely conventional, since time precisely divides it from other parts of itself or of other physical objects. Each four-dimensional hunk has its spacetime boundaries essentially.¹⁸ Heller argues that this ontology coherently explains the continuity of the island of Manhattan and the borough of Manhattan. Though the objects are spatially co-extensive, the borough of Manhattan is temporally smaller than the island of Manhattan. They are temporally coincident entities, as a part to a whole.¹⁹ Again, we may

¹¹ Ibid., 59.

¹² Ibid., 65.

¹³ Ibid., 66.

¹⁴ Yuri Balashov, "Persistence and Space-Time: Philosophical Lessons of the Pole and Barn," *Monist* 83, no. 3 (2000): 13.

¹⁵ Heller, *The Ontology of Physical Objects*, 7.

¹⁶ Ibid., 13.

¹⁷ Ibid., 11.

¹⁸ Ibid., 28, 53.

¹⁹ Ibid., 33-34.

note that this problem of relating temporally discrete objects seems not to be a problem for a substance ontologist, who can point to an enduring substance with changing accidents.

Faced with an ontology of a potential infinity of discrete temporal parts of objects, the atomistic metaphysician must consider the relation between these parts, both spatial and temporal. Heller resists the claim that temporal parts seem to come into existence *ex nihilo*, as in an occasionalist ontology.²⁰ He notes that the three-dimensionalist is no less faced with having to account for the temporal continuity of a person, i.e., how the me of yesterday is the me of today.²¹ For the four-dimensional view, Heller locates the continuity between an object's temporal parts in the "the causal mechanisms together with the material configuration of matter at any given time that affect which parts will exist at the next moment."²² Unity of consciousness is explained by this causality of processes, without appeal to an enduring substance, brain, or person.²³ This view gives no ontological privilege to material person-parts, but allows that temporal person-parts in general may have a stronger connection, if they are configured in a relevant way.²⁴ Also, though he speaks only of physical parts/stages of objects, Heller agrees with David Lewis that if a man has a non-physical part, the person-stage would include this too.²⁵

3. The Turn Towards Idealism

Having indicated the tensions in Heller's four-dimensional, atomistic ontology, I will show further tensions that arise from its idealism. Heller explains that he employs idealistic premises in a realistic account.²⁶ He treats physical objects as if they exist, stating that he is "offering an account of what physical objects would have to be like if there were any."²⁷ He holds that actual objects may have

²⁰ Ibid., 25.

²¹ Ibid., 22.

²² Ibid., 18.

²³ Ibid., 25.

²⁴ Ibid.

²⁵ Ibid., 1.

²⁶ Ibid., xii.

²⁷ Ibid.

structures independent of our conventions, and that perhaps no object “really has its identity conditions solely in virtue of conventions.”²⁸ Heller admits that conventional objects do not have the necessary persistence conditions, but the physical objects that underlie them do, if they exist.²⁹

The idealistic cast of Mark Heller’s ontology, like most contemporary Anglo-Analytic accounts, is not unlike some of the forms of the science of nature that Jacques Maritain and Yves R. Simon encountered in their day. In *Science and Wisdom*, Maritain explains that the physico-mathematical analysis he encountered was a result of the expulsion of the philosophy of nature after Kant, which led to an agnosticism about anything that cannot be represented in the physico-mathematical way.³⁰ This form of analysis then had a mechanistic philosophy laid upon it, together with a metaphysics fitted to its procrustean bed.³¹

Since it is generally agreed that one’s science of nature and metaphysics ought to be rooted in the observable real, it is in a sense understandable that a mechanistic philosophy and metaphysics would stem from the exclusive, physico-mathematical analysis of phenomena. Though their accounts of the philosophy of nature have important differences, Maritain and Simon concur in maintaining that the physico-mathematical analysis of phenomena must not be presumed to be the only form of knowledge about nature. They show that such a reduction leads to equivocation between beings of reason and real being, confusion between levels of abstraction, and an inability to understand natural causality. In what remains of this essay, I will sketch Maritain’s and Simon’s understandings of the role of the philosophy of nature with an eye towards providing a critique of Heller’s four-dimensional ontology and William Lane Craig’s response to the same. Furthermore, I will suggest what the philosophy of nature has to offer contemporary Anglo-analytic metaphysics.

²⁸ Ibid., 42.

²⁹ Ibid., 43.

³⁰ Jacques Maritain, *Science and Wisdom*, translated by Bernard Wall (London: Geoffrey Bles, 1954), 41.

³¹ Ibid., 44.

II. MARITAIN AND SIMON ON THE PHILOSOPHY OF NATURE

In *Philosophy of Nature*, Maritain describes three levels of abstraction: the mathematical, the physical (resulting in the philosophy of nature, or physics in the classical sense), and the metaphysical.³² Maritain insists that these levels of abstraction are not just different in degree, but specify different orders of being, whose relation is analogical.³³ When analyzed, the three, heterogeneous levels terminate in different levels of intelligibility: physical knowledge in the sensible, mathematical knowledge in the imaginable, and metaphysical knowledge in the pure intelligible.³⁴ Maritain notes that among Descartes' mistakes is the attempt to reduce all sciences to the same degree and method.³⁵ Maritain locates the philosophy of nature and the empirical sciences in the same degree of abstraction, but notes that they refer to different universes of intelligibility.³⁶ Both modes of inquiry aim at mutable being and are inseparable from sense data.³⁷ However, whereas natural science properly ends in the observable realm, the philosophy of nature ends in mutable, intelligible being.³⁸

Maritain acknowledges that the sciences of phenomena aspire to the real, and thus need an ontological completion that they cannot attain by their method; they are right not to posit essences.³⁹ The sciences of phenomena properly restrict themselves to the observable and measurable realm. But these details of phenomena require an organizing essence or form of the being under investigation. By its empiriological method, it cannot directly measure or demonstrate an essence, but can only infer it. Maritain explains the necessity for this

³² Jacques Maritain, *Philosophy of Nature* (New York: Philosophical Library, 1951), 13-14.

³³ *Ibid.*, 24.

³⁴ I am indebted to Richard Cain, who pointed out that contemporary mathematics often posits n-dimensional concepts, which are beyond the imaginable. It appears to be correct that mathematical knowledge is not co-extensive with imaginable being in all cases.

³⁵ *Ibid.*, 25.

³⁶ *Ibid.*, 102.

³⁷ Maritain, *Science and Wisdom*, 55.

³⁸ *Ibid.*, 60.

³⁹ *Ibid.*, 52.

ontological completion in the example of the body and soul: in a living human, body and soul are correlative notions such that the nature of the one is inevitably distorted without reference to the other. So, too, does the lack of a philosophy of nature to complement the sciences of phenomena promise to distort the true nature of every phenomenon that they investigate.⁴⁰ Thus, the philosophy of nature and sciences of phenomena are mutually required for a complete understanding of mutable beings, but must be distinguished to avoid distortion.

- Yves R. Simon, in *The Great Dialogue of Nature and Space*, similarly warns against equivocation between the orders of abstraction. He notes that Aristotle held that there is an essential difference in abstraction from the physical to the mathematical, since they are about mutable vs. immutable being, respectively. Hence mathematical conclusions should not be taken to have direct physical implications.⁴¹ Simon takes it to be one of the primary marks of Cartesian idealism that “the physical world is made of things already treated by the abstractive power of the mathematical mind.”⁴² He sees this idealistic move as ruling out a philosophy of nature, because the mathematical analysis, though greatly reductive, does offer a consistent, closed system. One makes the critical move from realism to idealism if one grants that all reality can be mathematically abstracted “without residue,”⁴³ for it is only by means of the residue of what is left out in the abstraction that the link between mathematical abstraction and real being can be maintained. Engineers and architects know this only too well, ever mindful that even as the strength of their computer models flows from mathematical abstraction, their weakness lies hidden in the residue of what it leaves out. The confusion of orders of abstraction has the consequence in mathematical abstraction of making all real beings into beings of reason.

⁴⁰ Ibid., 57.

⁴¹ Yves R. Simon, *The Great Dialogue of Nature and Space* (Albany, New York: Magi Books, 1970), 12-13. This is verified in Gödel’s time-travel thought experiment, which is mathematically intriguing but physically impossible. See William Lane Craig, *The Tenseless Theory of Time* (Dordrecht, Netherlands: Kluwer Academic Publishers, 2000), 89-90.

⁴² Ibid., 16.

⁴³ Ibid., 42.

Simon defines a being of reason as something existing in the mind in the capacity of an object, and not as a habit, disposition, thing, or end.⁴⁴ Unlike these, a being of reason is not a real being outside of the mind. For instance, one cannot realize the concept “predicate” in reality.⁴⁵ But this is not to say that a being of reason may not have a foundation in reality. It is only to say that if it does, it must necessarily exist in a real being. For instance, the thought of one’s mother is a being of reason, but its foundation is her real being. Simon describes the double priority that a real being has over a being of reason. First, a real being has a causal priority, since “every being of reason is made in the image of a real being.”⁴⁶ Second, it has a priority of finality, since “a being of reason has as its function the knowledge of real being.” Simon regards this priority of finality as abolished in mathematics,⁴⁷ which is not a science of real being.

In *Philosophy of Nature*, Maritain thinks the exclusive use of the physico-mathematical mode of analysis in science risks converting the objects of the empirical sciences into *entia rationis*, beings of reason.⁴⁸ Only a philosophy of nature that employs an ontological analysis is capable of construing them as *entia realia*, real beings. The physico-mathematical analysis subtly removes empirical objects from the physical real, and transplants them in the realm of the imaginable real.⁴⁹ This idea of science can only end in a mathematics of nature.⁵⁰ Furthermore, it cannot construe natural causality, and so it cannot account for the “connections and relations which constitute the laws of phenomena.”⁵¹ Describing only the links between phenomena without hazarding any explanations, it sets everything up as an *ens rationis*, and loses any claim to the reality of nature.⁵² A metaphysics or philosophy of nature that only relates to reality through mathematical/imaginable

⁴⁴ Ibid., 94, 98.

⁴⁵ Ibid., 97.

⁴⁶ Ibid., 175.

⁴⁷ Ibid.

⁴⁸ Maritain, *Philosophy of Nature*, 105.

⁴⁹ Ibid., 28.

⁵⁰ Ibid., 41.

⁵¹ Ibid., 52.

⁵² Ibid., 53.

being places two limitations on its possible objects. It will be unable to grant any ontological privilege to persons over, say, rocks and snails. And it will be unable to give an account of how objects persist in reality, since it renders unknowable natural causality.

Maritain proposes that the solution to this analytical impasse is to employ an ontological analysis in tandem with the natural sciences' empiriological analysis. This acknowledges the philosophy of nature's dependence on the sciences for the data that they gather. Maritain maintains that ontological analysis honors sense perception better than does empiriological analysis.⁵³ Ontological analysis does this by aiming at discovery of the nature of the intelligible object, while it foregoes explanation of the detail of phenomena.⁵⁴ Unless one undertakes this analysis, aimed at the natures of the intelligible objects of changing beings, empiriological analysis must remain a closed system that does not push through to real ontology.⁵⁵

Yves R. Simon discusses the role of mental contributions in the construal of objects in the philosophy of nature. He proposes the problem of understanding the motion of a flying arrow. The senses only grasp the place of the arrow in discrete moments. However, one may understand the "before" and "after" of the arrow's flight by a unity that the mind reads into the phenomena, between its actualized and unactualized potentiality.⁵⁶ Simon holds that the before and after exist in reality, but they are only connected through the mind's contribution of the concept of unity.⁵⁷ He notes that such mental contributions present the temptation of projecting unity unduly onto nature. An example of this would be positing an artificial unity of global motion and time that leads to their stopping altogether.⁵⁸ But Simon maintains

⁵³ Ibid., 83.

⁵⁴ Ibid., 95.

⁵⁵ Ibid., 107.

⁵⁶ Simon, *The Great Dialogue of Nature and Space*, 90.

⁵⁷ Einstein also saw the necessity of these mental contributions, which required him to abandon Mach's phenomenalism. See Craig, *The Tenseless Theory of Time*, 67.

⁵⁸ Ibid., 108.

that the contribution of reason does not necessarily subjectivize nature when the objects that are unified are there in their own right.⁵⁹

For Simon, the existence of these mental contributions, in particular, and of the philosophy of nature, in general, point to the need in each natural science for an empirical science that makes its concepts observable, and of a rational science that makes its concepts intelligible. These sciences within each science must studiously respect their bounds and refrain from intermingling concepts.⁶⁰ Though the philosophy of nature must have this empirical basis, Simon writes that “scientific facts cannot as such be assimilated into philosophy.”⁶¹ He cites Bergson, who observes that if one delegates the facts to the scientist, the philosopher picks them up already saturated in terms, descriptions, and scientific judgments; the judgment work is mostly already done. Scientific facts need be philosophically treated, which allows them to be objects of a philosophy of nature. For instance, the scientific (indirect) observation of a molecule can provide the equivalent of a sensation that may then be made into a philosophical fact.⁶² Such a philosophical fact may be the existence of inanimate, organized substances. Scientifically-observed facts, Simon writes, can allow progress in the philosophy of nature, without making philosophy of nature a scientism.⁶³ Simon resists the notion that all intelligibility is lacking in a non-ontological understanding of things, which he calls an “ontological integralism.”⁶⁴ Instead, he says that philosophy and science may have a common object, e.g., the human person, and though their “definitions are of unequal depth,” both can grasp a real aspect of its being.⁶⁵

III. CRITIQUE OF MARK HELLER’S ONTOLOGY

Now let us reconsider Mark Heller’s four-dimensional ontology, and show why Anglo-analytic philosophers would do well to concern

⁵⁹ Ibid., 109.

⁶⁰ Ibid., 143.

⁶¹ Ibid., 151.

⁶² Ibid., 157.

⁶³ Ibid., 158.

⁶⁴ Ibid., 168.

⁶⁵ Ibid., 173.

themselves with Maritain and Simon's proposal of the philosophy of nature and its refined distinctions. As was shown above, the four-dimensional view depends on empirical science's exclusive use of the physico-mathematical analysis of nature. This leads to absurdities that countenance a far greater vagueness than those which it purports to avoid. To be fair, Heller's charge of vagueness seems to be against a three-dimensionalist, physico-mathematical ontology like Descartes'. However, his suggestion that the four-dimensional view eliminates vagueness and is sufficient for an account of nature ironically betrays a profound insufficiency and ontological vagueness. And though the perdurantist may claim to be agnostic about the essences of the objects he treats, his agnosticism is belied by the constitution and persistence conditions that he assumes in his implicit recognition of essences.

A first type of vagueness derives from the reduction of all physical objects to hunks of matter. This leads to arbitrariness in the four-dimensionalist's construal of discrete objects, relegating all objects of experience to merely conventional status. Such an approach yields a universe of arbitrary, undetached parts, as van Inwagen suggests.⁶⁶ In a sense, this vagueness is necessitated by the narrow scope of the physico-mathematical analysis. But the ontological completion of the philosophy of nature proposed by Maritain and Simon explains how real beings, like living people, are essentially different from beings of reason, such as the undetached, spatiotemporal parts of their bodies. The implicit recognition of the essences of physical objects is seen in the scientist's study of organisms according to species, rather than arbitrary spatial parts like the northern half of the Eiffel Tower.⁶⁷

A second type of vagueness of the four-dimensional view stems from its inability to explain intelligibly the persistence of objects through time. It is easy to see that if objects have no formal, organizing principle in any moment, then their persistence in time is even more inscrutable. One can claim to be agnostic about the correlation between events in this ontology, but why one thinks to correlate precisely these two events, e.g., two successive heartbeats of a person, rather than two other events, e.g., a person's heartbeat and a dog's barking, shows that some recognition of essences is presupposed. There can be no "greater"

⁶⁶ Peter van Inwagen, "The Doctrine of Arbitrary Undetached Parts," *Pacific Philosophical Quarterly* 62 (1981): 123-37.

⁶⁷ *Ibid.*, 123.

causal connectedness in an indiscriminate array of spatiotemporal parts beyond their mere proximity, which opens up every part to the danger of bleeding into a proximate part.

The philosophy of nature that Maritain and Simon propose does not succumb to the problem of the Sorites paradox. This is because not all objects have the loose association of parts typical of a pile. Real beings in nature, especially substances, typically display an organization that is revealed in the ontological analysis that permits a limited subtraction or addition of parts. This organization of a real being does not devolve into an indiscriminate array of its logical parts, or to its ontological merging with proximate beings of reason. The philosophy of nature construes natural causality within the framework of real beings persisting and presenting themselves to other real beings.

IV. GENERAL CRITIQUE OF PERDURANTISM

The critique of positivism offered by Maritain and Simon is at the same time a critique of the foundation of special relativity theory, which was born out of Machian positivism, or “verificationism.”⁶⁸ Simon notes that Kant revised time into a pure being of reason, with no before or after, “rather like one more dimension of space.”⁶⁹ This revision of the concept of time along the lines of space laid the basis for the conception of spacetime, upon which special relativity theory depends. However, neither Mach nor Einstein ever offered an explanation of why space and time should be reducible to each other.⁷⁰ Even granting that time dilation occurs, i.e., clocks in motion run slow, this relation does not yield a unitary concept any more than the correlation between temperature and pressure yields the concept temperaturepressure.⁷¹

And neither is the spacetime concept indispensable to explaining time dilation or length contraction. Hendrik Lorentz predicted these effects in Einstein’s day without employing the spacetime concept. One

⁶⁸ Craig, *The Tenseless Theory of Time*, 69.

⁶⁹ Simon, *The Great Dialogue of Nature and Space*, 137.

⁷⁰ William Lane Craig also points out that the positivists reduce absolute time to physical time. Thus, time itself does not necessarily lag because the physical instrument of a clock lags.

⁷¹ Craig, *The Tenseless Theory of Time*, 114.

can see that the spacetime concept is a sure instance of an alleged fact that philosophers like Heller take to be well-established by the empirical scientist, but which in fact begs serious philosophical questions, a move against which Bergson cautions in the reference above. Among the many philosophical problems raised by the spacetime concept is that certain beings, e.g., thoughts, occur in time and not in space. Also, the spacetime concept implies a problematic reduction of absolute time to the physical time recorded by clocks.

Taking the spacetime concept to be ontologically normative is an instance of projecting an unreal mental contribution of unity into nature. This is tempting, since the measurement of time is a being of reason with a foundation in the real.⁷² But the residue of the real is forgotten when time is imagined not to have a before or after, or to be directionless like space. If temporal succession was only perspectival and a contribution of the mind, then not only would time dilation be possible, so also would time travel and biological-growth reversal. But biological reality shows conclusions like these, typical of thought experiments in General Relativity Theory, to be purely mathematical/imaginative conceits that are impossible in reality.

V. THE NEED FOR THE PHILOSOPHY OF NATURE

Three corrections that a philosophy of nature offers to contemporary Anglo-analytic metaphysics are the being of reason/real being distinction, degrees of abstraction/universes of intelligibility distinction, and ontological analysis. The first two distinctions are closely related, and would be at odds with the Cartesianism of any Anglo-analytic ontology. But the focus on concrete particulars, e.g., "hunks of matter," shows an assumed priority of physical being over imaginable being. Thus, it would not seem to be too much for the Anglo-analytic philosopher to grant the validity of these distinctions. The third correction, that of granting an ontological analysis, is at odds with the Kantian idealism of these ontologies, and requires that one grant that essences are in principle knowable. This might be too much for some Anglo-analytic metaphysicians to concede. However, the first two doctrines go a long way towards resolving otherwise insoluble

⁷² Simon, *The Great Dialogue of Nature and Space*, 132.

“thought experiments,” which are often insoluble only because of their equivocations among the order of beings.⁷³

The philosophy of nature also offers ontological analysis that resolves the false dichotomy of materialism and metaphysics. This impasse can be seen in William Lane Craig’s recent critiques of four-dimensionalism and perdurantism.⁷⁴ Although his critiques are largely sound, he is unable to offer an acceptable alternative to positivism due to his conflating metaphysics and the philosophy of nature. Craig is correct in thinking that metaphysics has a regulative role over science. He is also aware that a theory may apply only to geometry and not to physics. But he does not articulate the reason for these different universes of intelligibility. Maritain and Simon make such an explanation possible.

For instance, the philosophy of nature can take the scientific fact of a human embryo and see that its essence is a self-organized, animate, human being in development. From this, the metaphysician can determine that it is a being in act with varied potencies, as well as an essence with received existence. The moral philosopher can examine the rights and obligations of this being, discovered and defined in the philosophy of nature. The philosophy of nature alone can determine fundamental concepts in the ontological vision of nature, including substance, causality, and finality, which remain, despite changes in the sciences themselves.⁷⁵ The intermediate analysis of the philosophy of nature may be more amenable to the natural scientist than metaphysics, because its judgments terminate in the sensible realm. The philosophy of nature is thus needed to clarify common concepts from which metaphysical debates may begin. Without them, the metaphysician makes judgments that terminate beyond experience to what is inextricably observable. The empirical scientist is understandably mystified at such a leap.

⁷³ Heller addresses the “Descartes-minus” problem; see *The Ontology of Physical Objects*, 19. This problem is resolved when one notes that Descartes’ undetached leg is a being of reason, which only creates confusion because the problem treats it as a real being.

⁷⁴ Craig, *The Tenseless Theory of Time*.

⁷⁵ Simon, *The Great Dialogue of Nature and Space*, 209.

By failing to distinguish the philosophy of nature from metaphysics, Craig encourages a metaphysical integralism, which may press the scientist into scientism as the only apparent alternative capable of adequately treating the details of physical phenomena. Maritain recovers what Aristotle and Aquinas grasped: that the philosophy of nature and metaphysics are essentially distinct. They have different objects: the one is involved with the sensible and the other is not.⁷⁶ Metaphysics cannot grasp immaterial realities unless it also grasps material ones through the philosophy of nature. And without the philosophy of nature, metaphysics cannot render guidance to the sciences from above; the two have to go their separate ways.⁷⁷

Finally, the renewal of the philosophy of nature against the Cartesian reductivism and Kantian idealism noted above is equally necessary for three-dimensional mechanistic ontologies, as it is for four-dimensional ontologies. And just as Maritain noted that the process sciences of his day presented new affinities with the philosophy of nature, given their greater synergy over ancient or medieval science,⁷⁸ we can see that four-dimensionalism as a geometrical-mathematical model may unintentionally exaggerate the real/ideal difference. Ironically, in doing so, it might ultimately help bring home the necessity of rooting empirical science in the real and act as an impetus for going beyond a mathematics of nature to a philosophy of nature.

VI. CONCLUSION

In this paper, I have maintained that the four-dimensionalist ontology typified by Anglo-analytic philosopher Mark Heller is fatally flawed in many respects. It confuses the orders of abstraction, equivocates between real beings and beings of reason, and is unable to construe natural causality. This ontology can neither give ontological privilege to people over rocks, nor can it account for either the constitution or persistence of any one physical object. Perdurantism and special relativity theory in general raise a crucial philosophical objection, due to their dependence on the problematic concept of spacetime. But an adequate alternative to these theories needs to

⁷⁶ Maritain, *Philosophy of Nature*, 32.

⁷⁷ *Ibid.*, 122-23.

⁷⁸ Maritain, *Science and Wisdom*, 66.

include more than a metaphysical account undifferentiated from the philosophy of nature. The philosophy of nature proposed by Maritain and Simon provides a way for Anglo-analytic philosophers to recover the link to real being that the philosophy of nature offers. Such an analysis is implicit in the research of the physical scientist, and is denied by the Anglo-analytic metaphysician at the cost of unraveling all real beings into beings of reason in his account of reality.