

Spinoza on the “Principles of Natural Things”

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Abstract

This essay considers Spinoza’s responses to two questions: what is responsible for the variety in the physical world and by what mechanism do finite bodies causally interact? I begin by elucidating Spinoza’s solution to the problem of variety by considering his comments on Cartesian physics in an epistolary exchange with Tschirnhaus late in Spinoza’s life. I go on to reconstruct Spinoza’s unique account of causation among finite bodies by considering Leibniz’s attack on the Spinozist explanation of variety. It turns out that Spinoza’s explanations of the variety of bodies, on the one hand, and of causation among finite bodies, on the other, generate a tension in his system that can only be resolved by taking Spinoza to employ two notions of “existence.” I conclude by offering evidence that this is in fact what Spinoza does.

§1 Introduction

Two questions were central to attempts to ground an account of the nature and behavior of bodies in the 17th century: what makes bodies distinct from one another and by what mechanism do they causally interact? In this essay, I consider Spinoza’s responses to these two questions in light of his critique of Cartesian physics, on the one hand, and Leibniz’s attack on Spinoza’s account of finite things, on the other. This highlights a tension in Spinoza’s theory of finite bodies that can only be resolved, I argue, by positing that bodies exist in a radically different way from the way that they are experienced by finite beings like us. I conclude by offering evidence that this is, in fact, Spinoza’s view.

§§2-4 analyze Spinoza’s cryptic comments to Tschirnhaus concerning Cartesian physics in a series of letters exchanged at the end of Spinoza’s life. §2 introduces the conversation, and in §3 I show that the dominant family of interpretations of these letters, which claims that Spinoza is concerned in one way or another with the origin of motion in matter, is incorrect. §4 develops an alternative interpretation of the comments along two lines. In §4.1, I argue that Spinoza’s comment that Extension must express “eternal and infinite essence” can be traced through the *Ethics*, where it suggests that bodies must be individuated

prior to their instantiation in space and time. In §4.2 I offer reasons to believe that Spinoza also rejected Descartes' understanding of the nature of Extension itself.

§5 considers Leibniz's surprising response to Spinoza's account of variety in *Specimen Dynamicum* and *De Ipsa Natura*. I elucidate what I think is the essential difference between Spinoza and Leibniz regarding the relationship between our two opening questions: that of the origin of the variety of bodies and that of their causal powers. While Spinoza and Leibniz agree that the identity of a body and its effects are inextricably related, Leibniz does not allow that modes have essences while Spinoza does. In fact, as I'll show, while for Leibniz a thing only has causal power if it is a substance, according to Spinoza, causation between finite bodies can only obtain because they are precisely *not* substances. This doctrine depends on Spinoza's unique and decidedly un-Leibnizian account of parts and wholes.

§6 highlights a deep tension raised by the juxtaposition of lines of argument developed in §4 and §5. I argue that it can only be resolved by positing that Spinoza understood "existence" in two different ways, and show that in fact Spinoza accepts this account.

§2 The Exchange with Tschirnhaus

Seven months before his death, in nearly his last recorded words, Spinoza writes to his friend Ehrenfried Walter von Tschirnhaus that "Descartes' principles of natural things are of no service, not to say quite wrong."¹ Fourteen years earlier, in a letter to Oldenburg discussing Robert Boyle's experiments with nitre, Spinoza wrote that, in contrast to Boyle, Descartes had "abundantly proven" that the tangible qualities of bodies depend only on their mechanical states.² What made Spinoza come so vehemently to reject Cartesian physics?

Spinoza's comments come at the end of an exchange with Tschirnhaus about some fundamental points of metaphysical physics, comprising Letters 80 through 83, sent between May and July of 1676. There are several other places where Spinoza discusses physics and its foundations - most notably in his correspondence with Oldenburg in Letters 30-33³ and in Letters 6⁴ and 13⁵ to Oldenburg concerning Boyle's experiments - but those address Descartes' rules of impact and proper scientific method, respectively, and do not bear on the question of the nature of matter and bodies.⁶ Spinoza's words in his letters to Tschirnhaus, then, represent his only definitive statement on the most fundamental nature of the physical world, or, as he puts there, on the "principles of natural things." Tschirnhaus begins the

dialogue by observing that

I find it very difficult to understand how the existence of bodies having motion and figure can be demonstrated *a priori*, since there is nothing of this kind to be found in Extension, taken in the absolute sense.⁷

Tschirnhaus, like Descartes, understands “extension” as three-dimensional extension in space, or the “extension of the geometers.” Merely by contemplating *that*, Tschirnhaus says, we can deduce neither that there is a multiplicity of bodies, nor that they have any of the properties they do. In response, Spinoza makes two claims:

(I) “...from Extension, as conceived by Descartes, to wit, an inert mass, it is not only difficult, as you say, but quite impossible to demonstrate the existence of bodies,”⁸ and

(II) “With regard to your question as to whether the variety of things can be demonstrated *a priori* solely from the conception of Extension, I think I have already made it quite clear that this is impossible. That is why Descartes is wrong in defining matter through Extension; it must necessarily be explicated through an attribute which expresses eternal and infinite essence.”⁹

According to Spinoza, Extension *is* one of the “infinite attributes, each of which expresses eternal and infinite essence.”¹⁰ So Spinoza must take his account of bodies to succeed where Descartes’ fails either because (1) Descartes does not appreciate this relationship between extension and eternal and infinite essence, or (2) Descartes’ understanding of extension itself - as three-dimensional extension in space - is inadequate.

There are, as far as I know, no accounts of Spinoza’s comments that suggest that Spinoza is proposing a redefinition of “Extension”, and all of the accounts of Spinoza’s motivations behind claiming (1) argue that his concern with the relationship between Extension and eternal and infinite essence is ultimately a concern with how matter comes to be in motion. I will argue that Spinoza means both in §4, but first, I’ll show that (1) does not represent a concern with how matter comes to be in motion.

§3 Motion in Extension

According to Descartes, there is no distinction between space and matter, or between a body and the volume of space that it occupies,¹¹ and all the variety in nature is generated by the relative motion of these parts of space.¹² Motion engenders variety in nature in two ways. First, motion is responsible for qualitative variety, since properties like red and fragrant are in fact the impact of particles of a certain shape and speed on the sensitive parts of our own bodies. Second, motion is responsible for quantitative variety, because parts are only distinguishable to the extent that they are in relative motion. But it is important to note that neither way of introducing variety changes the fact that the essences of any two bodies are always identical, since the essence of any body is extension.

Motion, in turn, is granted to matter by God, and God preserves it in the same quantity as a consequence of his immutability.¹³ Spinoza can't accept this account, of course, since his God does not transcend the physical universe. So it is natural that Tschirnhaus, assuming that Spinoza accepts Descartes' explanation of variety, wonders how Spinoza can explain it without recourse to God as a mover. Most contemporary commentators share Tschirnhaus's sense that Spinoza is responding to his question about the variety of bodies by offering an alternative explanation of how matter comes to be in motion. For example, a clear statement of this view is offered by Alexandre Matheron in an article discussing these letters; he writes there that

...that which individualizes a body, according to the definition of the individual which follows IIp13 of the *Ethics*, can only be a certain combination of motion and rest. Without motion the physical universe would be an undifferentiated block, without rest it would be a pure fluidity with no internal articulation... And as this goes for all bodies without exception, one can say that motion and rest, taken together, are strictly equivalent to the property which God has, considered under the attribute of extension, of necessarily having to produce in itself all conceivable bodies.

And

The great error of Descartes is to have considered extension as being, all else being equal, at rest.¹⁴

W.N.A. Klever, in Klever (1988), articulates the common view that that fundamental distinction between Spinoza's account of bodies and Descartes' is that Spinoza takes motion to be an immanent or even essential property of matter:

SPINOZA ON THE PRINCIPLES OF NATURAL THINGS

Spinoza's world is motion, and motion once more...movement is not a simple accident of matter but its essence.¹⁵ For Spinoza, Klever argues, the basic entities of physics are "*moles in motu*" instead of "*moles quiescens*."

However, as I'll argue in the next several paragraphs, Spinoza's concern in these letters is not with how matter comes to be in motion. There are two kinds of evidence for this. First, this interpretation of Spinoza's meaning does not make sense of the exchange with Tschirnhaus. Second, there is plenty of evidence elsewhere that Spinoza believes that bodies are individuated prior to motion, and so motion is not necessary for the existence of distinct bodies.

First, consider the progression of the discussion in the letters. To quote Letter 81 at greater length, Spinoza indicts Descartes' principles of bodies on the grounds that

...from Extension as conceived by Descartes, to wit, an inert mass, it is...quite impossible to demonstrate the existence of bodies. For matter at rest, as far as in it lies, will continue to be at rest, and will not be set in motion except by a more powerful external cause.¹⁶

Tschirnhaus points out in his response that Descartes makes no attempt to demonstrate the variety of bodies from Extension alone, but in fact agrees that matter requires a more powerful external cause to set it in motion, and identifies that cause as God. But it is very unlikely that Spinoza, in the previous letter, has mischaracterized Descartes' view in the way that Tschirnhaus thinks, since thirteen years earlier Spinoza himself wrote a careful and detailed reconstruction of Descartes' physics in his *Principles of Cartesian Philosophy*. What Spinoza writes in Letter 81 is that it is impossible to demonstrate the existence of bodies from Extension as conceived by Descartes, not from Extension *alone* as conceived by Descartes. That suggests that Spinoza does not think that Extension as Descartes understands it can yield the variety of bodies *no matter what* is done to it or added to it.

Whether or not this is true, however, Tschirnhaus very explicitly clarifies in his response that Descartes does not try to deduce matter from Extension alone. Spinoza replies:

With regard to your question as to whether the variety of things can be demonstrated *a priori* solely from the conception of Extension, I think I have already made it quite clear that this is impossible. That is why Descartes is wrong in defining matter through Extension; it must necessarily be explicated

through an attribute which expresses eternal and infinite essence.

The “that is why” cannot refer to a claim that Descartes tries to deduce the variety of things from Extension alone - even if Spinoza made this mistake in Letter 81 (which I believe is unlikely), it seems impossible that he should make it again in Letter 83, after Tschirnhaus has carefully clarified matters. What is more, Spinoza writes that Descartes is wrong to define matter through Extension, confirming the interpretation above of Letter 81: Spinoza’s complaint against Descartes is that matter, if it is defined as mere Extension, is not the kind of thing that can yield a variety of bodies, motion superadded or not. If Spinoza means to say that Descartes simply does not correctly account for the presence of motion in matter, his move from “[that] the variety of things can be demonstrated *a priori* solely from the conception of Extension...is impossible” to “Descartes is wrong in defining matter through Extension” is a non sequitur. Spinoza’s insistence on this point makes it difficult to see why he would think that merely positing matter to be in motion would be a satisfactory solution. Spinoza does not, in these letters, complain about the fact that Descartes’ transcendent God superadds motion to matter. Rather, he stresses in both letters that Descartes is wrong from the start about the very nature of matter.

Moreover, if Spinoza were to identify Descartes’ error as his requirement that God be a transient and sustaining cause of motion rather than its immanent cause, his conclusion that “Descartes’ principles of natural things are of no service, not to say quite wrong” would be very puzzling. It is true that Spinoza believes that the Cartesian view is predicated on a number of absurdities - it requires the existence of multiple substances; it separates God’s will and acts from God’s essence; it requires God’s constant intervention in nature - and so he cannot accept Descartes’ account of the origin of motion. But Spinoza recognizes the difference between the usefulness of an approach to the study of nature and the adequacy of its outcome; for example, to Oldenburg, he writes that Boyle’s empirical studies of fluids are “very useful” even though they do not address the question of the essence of bodies. In contrast, Spinoza’s language in Letter 81 strongly suggests that Descartes’ misunderstanding of the basis of physics leads to mistakes in the physics itself - mistakes which, he writes in Letter 83, he hopes to have time to set right. If Spinoza merely disputed Descartes’ account of how motion in general originates in matter, there would be little reason so broadly to censure Descartes’ physics; the differences in their respective metaphysics should not ramify so far as to render Descartes’ rules of motion “useless.”

I've tried to show that the interpretation that sees the origin of motion in matter as Spinoza's main concern in his letters to Tschirnhaus renders Spinoza's comments there incoherent. But what is more, this interpretation is premised on the assumption that Spinoza accepts that bodies are distinguished from one another through motion or that their identity requires that matter be in motion.¹⁷ This seems to be suggested by Lemma 1 of what is sometimes known as the "physical interlude" of the *Ethics*. Its first two axioms read:

Axiom 1: All bodies either move or are at rest.

Axiom 2: Each body moves now more slowly, now more quickly.¹⁸

Lemma 1 which follows, with its proof, reads:

Bodies are distinguished from one another by reason of motion and rest, speed and slowness, and not by reason of substance.

Dem.: I suppose that the first part of this is known through itself. But that bodies are not distinguished by reason of substance is evident both from Ip5 and from Ip8. But it is more clearly evident from those things which are said in Ip15s.¹⁹

Lemma 1 is taken to be proof that Spinoza thinks that the only way that one body and another can be said to be different is if they are in motion relative to one another.²⁰ However, this interpretation depends upon reading "*ratione...distinguuntur*" as indicative that relative motion is *constitutive* of the distinction between bodies. But it may be taken merely to establish that any body admits of being in motion or at rest and admits of having a certain speed, without establishing that its state of motion is *constitutive of* the distinction between it and other bodies. While the contrast with "*ratione substantiae*" provides evidence for the constitutive reading, suggesting that distinction by motion and rest is replacing real distinction, the proof of the fact that bodies are distinguished in respect of motion and rest is very different from the proof that finite things are not distinguished substantially. That proof takes up much of Part I of the *Ethics*, while the former is non-existent. If this is supposed to be "known through itself," it surely cannot be tantamount to the contentious claim that motion is responsible for any distinction among bodies.

In fact, throughout the interlude, Spinoza is assuming and not proving that a body is an individual. For example, in the Corollary to Lemma 3, Spinoza claims that a body is in absolute motion or rest when it is isolated from any other body. Such a body in isolation must retain its state of motion, because

when I suppose that body A, say, is at rest, and do not attend to any other body in motion, I can say nothing about body A except that it is at rest. If afterwards

it happens that body A moves, that of course could not have come about from the fact that it was at rest. For from that nothing else could follow but that body A would be at rest.²¹

This is hardly, as Spinoza claims, self-evident, but is rather an application of Propositions 4 and 5 of Part III. If a body in motion were to come to rest alone, it would have had to contain “natural contraries” within itself. This is impossible only for something that is a well-defined individual, since E IIIp5 asserts that contradictory qualities cannot exist *in the same subject*. There is no reason to read this as suggesting that Spinoza thought that relative motion is, as Jonathan Bennett puts it, at the “ground floor” metaphysical level, or that he expects it alone to account for “all qualitative variety” in nature.²²

Perhaps more explicit evidence that bodies are individuated prior to their state of motion comes in Spinoza’s reconstruction of Cartesian physics, the second part of the *Principles of Cartesian Philosophy*. There, Spinoza entertains the Zeno-like “sophism” that a body does not move because “it either moves in a place in which it is or in one in which it is not. But not in a place in which it is, for if it is somewhere, then it must be at rest. And not in a place in which it is not. Therefore, the body does not move.” He responds by drawing a distinction: “if by *has been* we understand *has rested*, then we deny that it has been anywhere while it was moving; but if by *has been* he means *has existed*, we say that, while it was moving, it must have existed.” This argument relies on the intuition that the body exists as an individual independent of its place or change of place – on the persistence of an individual through time and motion. It is, incidentally, an account of persistence that is not open to Descartes and so borders on the traitorous in a treatise on his physics.

Finally, the *Principles of Cartesian Philosophy* required Spinoza carefully to study features of Descartes’ physics like his identification of space with matter and his claim that relative motion is responsible for the variety in matter. Given that this is so, the absence in the *Ethics* of both a definition of matter and such a distinction is conspicuous. Indeed, while Descartes explicitly notes that motion is the only real quality of matter, the preface to Part II of the *Ethics* identifies the modes of Extension as “form, motion, *etc.*” (my emphasis). And even before the *Ethics*, when Spinoza writes that there is only one immediate infinite mode of matter - Motion - a mysterious note is appended:

What is said here of Motion in matter is not said seriously. For the Author still intends to discover its cause, as he has already done, to some extent, *a posteriori*. But it can stand as it is here, because nothing is built on it, or

depends on it.²³

These passages, taken together with the absence of any endorsement in Spinoza's mature work of the claim that motion is the source of all the variety in matter - and of the central principles of Cartesian physics in general - provide strong evidence that Spinoza was at least very uncomfortable with Descartes' claim that motion generates the variety in matter.

I've tried to show that there is little reason to think that Spinoza identifies the source of Descartes' inability to explain variety with his account of the origin of motion in matter. Further evidence for this will emerge once we start investigating the account of variety that Spinoza *does* propose. So let's take a look at that.

§4 Spinoza's Critique of Descartes

Besides some enigmatic remarks about Descartes, Spinoza offers only an obscure dictum as a clue to his own explanation of the variety of physical things: "Descartes is wrong in defining matter through Extension; it must necessarily be explicated through an attribute which expresses eternal and infinite essence."²⁴ This section elucidates Spinoza's comments in light of my claim that his response to Descartes involves both of the following positions: (1) that Descartes does not appreciate this relationship between extension and eternal and infinite essence, and (2) that Descartes' understanding of extension itself - as three-dimensional extension in space - is inadequate to ground a physics. §4.1 argues that Spinoza holds (1) and offers an alternative to the dominant interpretation of his reasons that was discussed and rejected above. §4.2 argues that Spinoza takes Descartes' understanding of extension itself to be wrong.

§4.1 "Eternal and Infinite Essence"

Extension²⁵ is one of the attributes, which, according to *Ethics* Id6, "expresses an eternal and infinite essence" of God. E Ip29 establishes an identity between "attributes of substance [that] express an eternal and infinite essence" and "God, insofar as he is considered a free cause." E IIp45, in turn, relates God as a free cause or as "eternal and infinite essence" to particular things:

Each idea of each body, or of each singular thing which actually exists, necessarily involves an eternal and infinite essence of God.²⁶

It's clear from this passage as well as from the wording of E Id6 and the appeal to

E Id6 in the proof of E IIp45 that each idea of each body that exists must involve the attribute of Extension, insofar as it is expressive of the eternal and infinite essence of God. The proof of E IIp45 is as follows:

Dem: The idea of a singular thing which actually exists necessarily involves both the essence of the thing and its existence (by IIp8c). But singular things (by Ip15) cannot be conceived without God – on the contrary, because (by IIp6) they have God for a cause insofar as he is considered under the attribute of which the things are modes, their ideas must involve the concept of their attribute (by Ip4), i.e. (by Id6), must involve an eternal and infinite essence of God, q.e.d.²⁷

Note that IIp45 only concerns singular things which actually exist; this is confirmed by the demonstration, since only the idea of an existent thing involves both the essence and the existence of that thing. But why does E IIp45 and its demonstration apply only to singular things that actually exist? The demonstration cites E IIp8c, which distinguishes between singular things that do not exist but are “comprehended in God’s attributes” and those which “also...are said to have duration”, the ideas of which “also involve existence through which they are said to have duration.” If Extension is the eternal and infinite essence of God that is expressed by singular things, and the essences of even non-existent singular things are comprehended in the attribute of Extension, there seems to be no reason that IIp45 shouldn’t apply to finite things whether or not they actually exist.²⁸ The remaining citations - E IIp6, E Ip4, and E Id6 - do not, as far as I can tell, make any distinction between the conception of existent and non-existent singular things that would answer this question. But the scholium turns its focus to existence:

Schol.: By existence here I do not understand duration, i.e., existence insofar as it is conceived abstractly, and as a certain species of quantity. For I am speaking of the very nature of existence, which is attributed to singular things because infinitely many things follow from the eternal necessity of God’s nature in infinitely many modes (see Ip16). I am speaking, I say, of the very existence of singular things insofar as they are in God. For even if each one is determined by another singular thing to exist in a certain way, still the force by which each one perseveres in existing follows from the eternal necessity of God’s nature. Concerning this, see Ip24c.

This scholium cites Ip16 in support of its claim that “infinitely many things follow from the eternity of God’s nature in infinitely many modes,” and Spinoza clarifies that he is speaking of singular things. Spinoza uses “singular things” almost

exclusively when he is discussing finite things like bodies; in fact, he defines singular things at the beginning of Part II of the *Ethics* as “things that are finite and have a determinate existence.” This suggests that E Ip16 is meant to show that finite things follow from the eternal necessity of God’s nature. E Ip16 proves that an infinity of modes, not just of body but of all attributes, follow necessarily from God’s essence as God’s *propria*²⁹: “From the necessity of the divine nature there must follow infinitely many things in infinitely many modes (*modus*), i.e., everything which can fall under an infinite intellect.” Spinoza’s response to Tschirnhaus in Letter 83 mirrors the language of E Ip16, which goes on to explain that since the divine nature has infinite attributes, “each of which also expresses an essence infinite in its own kind, from its necessity there must follow infinitely many things in infinitely many modes.” In his response, Tschirnhaus even cites E Ip16 (rightly!) as “almost the most important proposition” of the *Ethics*. It seems very clear, then, that Spinoza has E Ip16 in mind when he wrote to Tschirnhaus that finite modes arise from Extension only if they “express eternal and infinite essence” or God as a free cause.

I have tried to establish that the modes that follow from God as stipulated in E Ip16 include finite modes, and I want to highlight this because it is denied by Yitzhak Melamed in a fascinating chapter on the infinite modes in his forthcoming book on Spinoza’s metaphysics. Professor Melamed claims that only the infinite modes, and not finite modes, follow from God’s essence per E Ip16; were finite modes to follow, it would violate the restriction on the finite following from the infinite that Spinoza endorses at E Ip22.³⁰ I have tried to show in this section that the textual evidence suggests that the essences of finite modes are caused directly by God’s essence, and I will explain why that does not violate the restriction on the finite’s following from the infinite in §6.

To conclude this section, I’d like to point out a neglected thread in the conversation with Tschirnhaus that supports my explanation of how Spinoza thinks that the variety in nature is generated. The second time that Tschirnhaus presses Spinoza on the problem of the variety of things, he writes: “[i]n mathematics I have always observed that from any thing considered in itself...we are able to deduce at least one property; but if we wish to deduce more properties, we have to relate the thing defined to other things.”³¹ Much has been made of Descartes’ “circularity” problem: he defines a distinct individual as whatever is in motion with respect to its surroundings, and in turn defines motion as the removal of a thing from its surroundings. But the problem that Tschirnhaus is identifying is deeper than this

one. Even if Descartes assumes numerical distinction between bodies, he is still committed to the claim that their essences are identical; the essence of any finite thing, like a human being, animal or plant, is the same as any other thing, since the essence of any body is extension. If the effects of a thing follow at least in part from their essences, it is hard to see how there can, in turn, be a diversity of effects or properties. Since there is no variety of essences, there can truly be no variety in nature, and the variety of essences can be accounted for only if finite things are modes of God, or follow from an eternal and infinite essence.

§4.2 The Attribute of Extension

Aside from the relationship that Descartes posits between substance and Extension, Spinoza objects to Descartes' understanding of Extension itself. As §3 showed, this does not mean that Extension itself involves motion, or that motion is part of the essence of matter. In Letter 81, Spinoza rejects Descartes' conception of Extension as "an inert mass" (*molem quiescentem*), and those who take him to be concerned about the origin of motion in matter are encouraged by what they see here as an emphasis on "inert." In the next few paragraphs, I'll try to show that Spinoza's emphasis is rather on Descartes' identification of Extension and mass.

I cannot offer a full defense of this position here, which would involve articulating the inadequacies that Spinoza saw in the notion of three-dimensional extension to a well-grounded physics. But I would like to highlight some textual evidence that Spinoza does not believe that physical substance, or even physical modes, are properly understood to be extended in space. In other words, Spinoza's understanding of the attribute of Extension is not as spatial extension.

In Letter 73 to Oldenburg, Spinoza writes that "reasonable and intelligent Christians" who read the *Tractatus Theological-Politicus* and believe that its conclusions "rest on the identification of God with Nature (by the latter of which they understand a kind of mass or corporeal matter)" are "quite mistaken." But Spinoza states clearly at *Ethics* IIp2 that "Extension is an attribute of God, or God is an extended thing." So God must be an "extended thing" but not "a kind of mass or corporeal matter." Similarly, Spinoza writes in the Scholium to E Ip15, signaling his agreement, that

everyone who has to any extent contemplated the divine nature denies that God is corporeal. They prove this best from the fact that by body we understand any quantity, with length, breadth, and depth, limited by some

SPINOZA ON THE PRINCIPLES OF NATURAL THINGS

certain figure. Nothing more absurd than this can be said of God, viz. of a being absolutely infinite.

This passage indicates three features of body that may not be applied to God: it is a quantity, it has length, breadth and depth, and it is finite, or limited by figure. The fact that God cannot be finite is taken for granted in the remainder of the passage. As for quantity, Spinoza goes on to argue that we cannot understand substance using this particular notion of quantity. But Spinoza also includes “length, breadth, and depth” among those qualities that are absurd to attribute to God, a fact that is almost universally ignored.³²

Besides comments like these, consider what is absent from the *Ethics*. Just as Spinoza does not claim that relative motion individuates bodies in the *Ethics*, space plays no role in that work. Identifying “Extension” as spatial extension is certainly open to Spinoza, who discusses space and its relation to matter at length in the *Principles of Cartesian Philosophy*. The fact that he says nothing about it in the *Ethics* or in these letters is, in light of this, significant.

Finally, there are two well-known passages in which Spinoza discusses the relationship between divisibility, on the one hand, and Extended substance, on the other: the “Letter on the Infinite” to Lodewijk Meyer and the scholium to Ip15 of the *Ethics*.³³ Both consider one of the principal objections to the claim that God is extended: that extension entails divisibility, and substance cannot be divided. In order to address it, Spinoza draws a distinction between two kinds of quantity. Insofar as quantity is conceived as divisible, it is conceived inadequately by the imagination, or as abstracted from substance, but quantity understood by the intellect as it applies to substance is indivisible.

There are, broadly speaking, three ways of understanding Spinoza’s claim that God is Extended but not divisible. One is to take “Extended” to have its usual meaning, and to claim that God is spatial; Jonathan Bennett is the best-known proponent of this view. Another is to deny that God is spatial but to admit that bodies are, and to explain the transition from Extended substance to Extended finite modes in terms of emanation or the infinite modes. A final way is take God and things to be Extended in the same way, but deny that Extension is spatial. I’ll briefly discuss here why I think that third way is the best one.

I’ll start with the second family of approaches, which take it that when Spinoza calls God or substance an “Extended thing”, he does not intend for it to be taken in the way that it is when he says that a finite body is an Extended thing. Melamed (2012) sees the immediate infinite mode of Extension doing the job of

transforming indivisible, eternal *natura naturans* into the divisible, sempiternal *natura naturata*. This distinction in turn maps on to the distinction between substance and modes. But while this accounts for the importance of the infinite modes in Spinoza's system,³⁴ I think that there are good reasons to wonder about it. First, the association of divisibility with the imagination suggests that even Extended modes are not properly understood with this conception of quantity. Second, Spinoza identifies the immediate infinite mode of Extension as motion and rest at E Ip32c2 (C 435/G II 73). It is difficult to see how the introduction of motion and rest into Extension, whatever Extension is, can be responsible for such a profound change in its very nature, transforming it from eternal to sempiternal, indivisible to divisible, and so on.

Schmaltz (1999) argues that in order to avoid the problem of divisibility, Spinoza holds that God contains Extension eminently but not formally.³⁵ This highlights what I take to be a very important problem for any account which posits an explanatory chasm between Extended substance and Extended modes. In the scholium to Ip15, Spinoza writes approvingly of those who deny that God is a body like finite bodies, but argues that they go too far:

...they clearly show that they entirely remove corporeal, or extended, substance itself from the divine nature. And they maintain that it has been created by God. But by what divine power could it be created? They are completely ignorant of that.

Spinoza's claim that God is Extended, or physical, is supposed to be explanatory in a way that is undermined by simply claiming that the essence of the physical is contained in God as a perfection. Spinoza calls God, or substance, an "Extended thing" just as he calls my body or a plant's body an Extended thing, and it is consistent with his overall ontological and explanatory parsimony that he means "Extension" in the same way in both of these cases.

Finally, Jonathan Bennett takes Spinoza to be admitting that God is spatial but that space is not really divisible, based on the claim that "if space does have parts, they must be regions of space; but regions don't relate to space in any way that would jeopardise the latter's status as a substance."³⁶ But I think that there is plenty of evidence that Spinoza believes that space is divisible potentially if not actually, and that potential divisibility is enough to threaten a thing's status as a substance. In the Letter on the Infinite, Spinoza compares measure, extension (or a certain notion of quantity), and infinity, on the one hand, with time, duration, and eternity, on the other hand. Measure and time are both "aids of the imagination";

measure applies to extension or quantity and time applies to abstract duration. In the *Cogitata Metaphysica*, Spinoza explains that “duration is not attributed to God” because since “duration is conceived as being greater or lesser, or as composed of parts, it follows clearly that...by attributing duration to him, we divide into parts what is infinite by its own nature and can never be conceived except as infinite.”³⁷

Spinoza does not say here that by attributing time to God, we divide God into parts, but that merely by attributing duration to God we are admitting the *possibility* of dividing God into temporal parts. In this passage and similar ones there is a strict analogy between time and duration, on the one hand, and measure and extension or quantity, on the other, which suggests that merely by attributing quantity to God, we admit the possibility of dividing God into spatial parts. Although Spinoza does not say the very same thing about space explicitly, he applies a similar analysis to spatial extend a few pages later, in the section “Of God’s Immensity.” He criticizes those who, when speaking of God’s immensity, “seem to ascribe quantity to him...they seem to ascribe Immensity to God insofar as they regard him as having a certain quantity; for they seek to argue for God’s Immensity from the properties of extension which is most absurd.” God is everywhere, Spinoza goes on to argue, because nothing can exist without God. But this does not mean that God is in every place. In fact, he says here, to understand how God is in every thing is “beyond man’s grasp.” Space, like duration, is divisible potentially even if not actually. In short, Spinoza does not think that we can conceive of Extended substance, or God, as “indivisible, infinite and unique” and still as spatial; three-dimensional extension cannot “express eternal and infinite essence.”³⁸

I think that the only way left to avoid ascribing the imperfections of spatial extension to God while still respecting the sense in which substance is really physical, or understood under the attribute of Extension, is to deny that Spinoza identifies extension and Extension. I can’t defend this here, but it is supported by Spinoza’s account of the imagination, which furnishes us with inadequate ideas of bodies. It is the imagination that takes matter to be extended in three dimensions, and *that* provides us with no reason to think that is how it should properly be understood. Ultimately, I take this to apply to finite things as well, since Spinoza denies that we understand finite modes if we understand them through the imagination and not “as they flow from God.”³⁹ And we should keep in mind Spinoza’s warning that to understand them in the latter way is “very difficult.”⁴⁰

§5 Spinoza and Leibniz on Horizontal Causation

Spinoza's exchange with Tschirnhaus has been the subject of several studies that note the close relationship between Leibniz and Tschirnhaus at the time that it took place. Ursula Goldenbaum in Goldenbaum (1994) points out that by the time that Tschirnhaus wrote the second letter to Spinoza, he and Leibniz had discussed a draft of Spinoza's *Ethics* at length. Kulstad (1999) takes the relationship as evidence that Tschirnhaus's questions were strongly influenced by Leibniz's own concerns with explaining variety and his dissatisfaction with Cartesian physics, and goes on to offer an interpretation, in light of the letters, of Leibniz's *De Summa Rerum*. I am concerned less here by any influence that Leibniz may have had over Tschirnhaus than the opportunity that contrasting Spinoza with Leibniz's comments on individuation and dynamics provides to elucidate Spinoza's approaches to those questions. I said in the introduction that this paper would discuss two central problems of seventeenth-century metaphysical physics and Spinoza's response to them, but the previous three sections have only addressed Spinoza's answer to the first: why is there a variety of bodies in the world? They did not offer an account of Spinoza's answer to the question of how finite bodies causally influence one another.

At least by the period between 1695 and 1705, during which Leibniz wrote *Specimen Dynamicum* and *De Ipsa Natura*, Leibniz claims that these two questions are identical: to exist as an individual with a definite nature or essence, Leibniz argues, a substance must act. *Specimen Dynamicum* is meant to found a "new science of dynamics" on the basis of Leibniz's claim that "corporeal things contain something other than extension, indeed something prior to extension, namely the force of nature implanted in all things by the Creator...this force... constitutes the inmost nature of bodies. For to act is the mark of a substance."⁴¹ Among the reasons that Leibniz accepts this principle is that he is concerned with the refutation of occasionalism, which was widely adopted as an explanation of the apparent causal power of Cartesian bodies. It is no problem for occasionalism that a created thing should exist despite producing no effects, but in *De Ipsa Natura*, Leibniz argues that this is incoherent. That essay poses two questions: first, "what makes up the nature which we normally attribute to things" and second, "Is there any *energeia* in created things?"⁴² Leibniz concludes that "once we understand that [things'] internal nature is no different from the force of acting and being acted on, this question reduces to the first. For there cannot be action without a force for acting, and, conversely, a power which can never be exercised

is empty.” He goes on to associate occasionalism, which separates these two questions, with Spinozism:

This...shows that the doctrine of occasional causes which some defend can lead to dangerous consequences...Far from increasing the glory of God by removing the idol of nature, this doctrine seems, with Spinoza, to make God into the very nature itself of things, and to reduce created things to mere modifications of a single divine substance. For that which does not act, which has no active force, which is robbed of any distinguishing characteristic, and finally of all reason and ground of permanence, can in no way be a substance.⁴³

Much of *De Ipsa Natura*, however, seems consistent with the spirit of Spinozism. Consider, for example, a previous criticism of Spinoza in the same essay:

[T]he very substance of things consists in a force for acting and being acted upon. It follows from this that no enduring thing can be produced if the divine power cannot impress on it some force which lasts through time. If that were so, then no created substance, no soul, would remain the same thing, and nothing would be conserved by God. Everything would reduce to just transitory, evanescent modifications or phantasms, so to speak, of one permanent divine substance. Or what comes to the same thing, nature itself, or the substance of all things, would be God - a doctrine of very ill repute which an irreligious, though admittedly clever, author has recently introduced to the world (or at least revived).⁴⁴

Leibniz’s concern with the the explanation of “things that last through time” reflects Spinoza’s own comments about the substance of things in response to the Zeno-like paradox discussed in §4.⁴⁵ More importantly, Spinoza accepts a principle at Ip36 of the *Ethics* that foreshadows Leibniz’s claim that the question of a thing’s identity reduces to the question of its effects: “Nothing exists from whose nature some effect does not follow.” So what is Leibniz’s big complaint?

Leibniz and Spinoza agree that a thing only exists if it produces an effect, but Leibniz, for his part, does not admit that modes are things. There is no argument to this effect in *De Ipsa Natura*, only abuse of modes as “transitory or evanescent states.” According to Spinoza, however, modes both exist and act. In fact, as I’ll argue in the next several paragraphs, Spinoza does not merely think that modes can act, but that only modes, and *not* substances, can be involved in the kind of causation that exists among finite bodies. This kind of causation, with which Leibniz is concerned in *De Ipsa Natura*, I’ll call “horizontal” causation to signify that it holds of causation between entities of the same kind.⁴⁶ Horizontal causation

can only obtain among modes because according to Spinoza, this sort of causation is tantamount to a limitation to which substances cannot be subject. Spinoza's solution to the problem of how finite bodies causally interact is that they are not genuine individuals but rather parts of a single whole (and is in a sense, then, rather a *dissolution* of the problem of causation among finite bodies).

In a letter to Oldenburg in 1665, Spinoza responds to a question that Oldenburg has posed, concerning "how each part of Nature accords with its whole, and the manner of its coherence with other parts."⁴⁷ Spinoza responds that "this is beyond my knowledge. To know this it would be necessary to know the whole of Nature and all its parts."⁴⁸ He invites Oldenburg to join him in a reverie featuring a worm living in the bloodstream; such a worm would

regard each individual particle of the blood as a whole, not a part, and it could have no idea as to how all the parts are controlled by the overall nature of the blood and compelled to mutual adaptation as the overall nature of the blood requires, so as to agree with one another in a definite way. For if we imagine that there are no causes external to the blood which would communicate new motions to the blood, or any space external to the blood, nor any other bodies to which the parts of the blood could transfer their motion, it is beyond doubt that the blood would remain indefinitely in its present state and that its particles would undergo no changes other than those which can be conceived as resulting from the existing relation between the motion of the blood and of the lymph, chyle, etc. Thus the blood would always have to be regarded as a whole, not a part. But since there are many other causes which do in a definite way modify the laws of the nature of the blood and are reciprocally modified by the blood, it follows that there occur in the blood other motions and other changes, resulting not solely from the reciprocal relation of its particles but from the relation between the motion of the blood on the one hand and external causes on the other. From this perspective the blood is accounted as a part, not as a whole.

Discussions of the worm fancy take Spinoza to be arguing that whether something is a whole itself or a part of a greater whole is a mere matter of perspective; for example, in the most sustained treatment of the letter, William Sacksteder writes that "Spinoza's definitions of part, whole and attendant phrases are...made relative to the position of the knower, to the locus of the mind which surveys the world and its place in it."⁴⁹ When Spinoza writes that the blood is a whole considered from a certain perspective, he means that the blood is a whole if *we posit certain*

SPINOZA ON THE PRINCIPLES OF NATURAL THINGS

facts about it. The blood is a whole from that perspective because it is a whole if those facts are true. In particular, the passage above establishes that the blood is a whole if it “would remain indefinitely in its present state and [if] its particles would undergo no changes other than those which can be conceived as resulting from the existing relation between the motion of the blood and of the lymph, chyle, etc.” Of course, this is not true of blood, nor is it true of any other finite thing; it is only true of the whole of nature. So the blood is *not* a whole, no matter the scale of the creature assessing it.

What is the sense of “whole” that is under consideration here? Something is a whole not merely if it is complex, but if it is self-sustaining or independent - something is a whole if it will “always remain in the same state, and...undergo no modifications, save those which may be conceived as arising from the relations of [its parts].” That is to say, something is a whole to the extent that it is free of causal influence from the outside. Moreover, Spinoza stresses that when we conceive of something as a whole we are thereby conceiving it as *not a part*. So we may conclude that according to Spinoza a thing is a whole to the extent that it is independent of external influence and a part to the extent that it is involved with external causes.

Now, why should it be true that being part of a greater whole jeopardizes a thing’s “wholeness”? It’s not obvious why a cell is any less a whole than a liver, a liver any less a whole because it is part of a human body, or a human body less an whole because it is part of nature. Spinoza’s reason for thinking this can be extrapolated from the criterion of composition for finite bodies that he offers following IIp13 of the *Ethics*: things are a part of a greater whole or individual insofar as they retain a certain “*ratio* of motion and rest.”⁵⁰ But it’s not usually appreciated that Spinoza fashions this *ratio* as a dynamic, not a kinematic one - the parts of an individual must “communicate their motions to each other in a certain fixed manner.”⁵¹ If these relationships were purely kinematic ones - that is to say, if they were merely functions of the relative speeds of the parts - there would indeed be no reason to think that the liver’s individuality is compromise by its role in the body. Nature might be a completely self-contained individual, made of parts that, despite their being parts of some greater whole, are themselves completely self-contained individuals.

For Spinoza, then, being involved in a relationship of causation with the same kind of thing requires that a thing be limited. This is not surprising: much of Part I hinges on Spinoza’s argument that there can only be one substance, on pain of limiting substance. No substance can be involved in horizontal causation.

Leibniz, of course, agrees with Spinoza that substances cannot affect one another; as Leibniz puts it, “as a matter of strict metaphysics one created substance can’t affect another by sending something across to it.”⁵² But for his part, Leibniz reduces causation between two created individuals to a harmony among their intrinsic properties - there are no real relations, just the “internal strivings of simple substances.”⁵³ So, both accepting the premise that genuine individuals cannot be engaged in horizontal causation, Leibniz rejects the understanding of causation that it entails (that something passes from one individual to another) while Spinoza denies that existent bodies, or real finite things insofar as they are actually instantiated in space and time, are genuine individuals. In this sense, Spinoza’s solution to the problem of horizontal causation among bodies – and as a result, his entire physics – relies on substance monism.

§6 Conclusion: Two Senses of “Existence”

In §§2-4, I argued that Spinoza believes that bodies are individuated prior to their instantiation in space and time, and, as a consequence, prior to motion. Since this explanation of the variety in nature requires that finite things like bodies be instantiations of their essences in God, it would seem to suggest that bodies are individuals in a robust sense. However, in §5, I argued that Spinoza’s account of the causal interaction of finite bodies relies on their being parts of a greater whole - the whole of nature - which in turn requires that they are not true individuals and that their identities are quite flexible. So there seems to be a tension or even a contradiction engendered by Spinoza’s account of variety and his account of inter-body causation. To answer this, I’d like to return to the Scholium to IIP45 quoted earlier:

Schol.: By existence here I do not understand duration, i.e., existence insofar as it is conceived abstractly, and as a certain species of quantity. For I am speaking of the very nature of existence, which is attributed to singular things because infinitely many things follow from the eternal necessity of God’s nature in infinitely many modes (see Ip16). I am speaking, I say, of the very existence of singular things insofar as they are in God. For even if each one is determined by another singular thing to exist in a certain way, still the force by which each one perseveres in existing follows from the eternal necessity of God’s nature. Concerning this, see Ip24c.

We established in Section 4 that Spinoza believes that the essences of finite things

are generated from God's eternal and infinite essence. But in *what way* do they follow?

It is clear that Spinoza is making a distinction, in IIp45s, between different kinds of existences. But it is difficult to tell from the scholium alone whether Spinoza is simply distinguishing between the existence of essences or whether he is making a three-way distinction between essences, existence understood as flowing from God or the "very nature of existence", and existence understood as instantiation in space and time. It has been pointed out recently in several studies that Spinoza makes a distinction between at least two ways that an individual can exist: they can exist as essences comprehended in God's attributes, as Spinoza makes clear in E IIp8c, or as actually existent modes.⁵⁴ But Spinoza makes another distinction, this time between two kinds of actuality, at E Vp29s:

We conceive things as actual in two ways: either insofar as we conceive them to exist in relation to a certain time and place, or insofar as we conceive them to be contained in God and to follow from the necessity of the divine nature. But the things we conceive in the second way as true, or real, we conceive under a species of eternity, and *to that extent they involve the eternal and infinite essence of God.*⁵⁵

It might look like the distinction that Spinoza is making E IIp45s and E Vp29s is between the existence of essences as comprehended in God's attributes and the instantiation of those essences in space and time. However, I will argue in the last several paragraphs that Spinoza is in fact making a threefold distinction. First, the essences of finite things are comprehended in God's attributes. Second, a thing is said to exist *simpliciter* when its essence is instantiated. Third, things are said to exist in space and time when instantiated essences limit one another. I'll call existence in the second case "existence₁" and in the third case "existence₂."

"Existence₁" is the existence of a singular thing as it "flows from God". There is no problem here of God's causing anything finite, since Spinoza makes clear that when a singular thing is considered in itself, and its essence is granted existence₁, it cannot self-limit. In this sense, then, the existence granted to the essence is infinite.

"Existence₂" is the level of existence at which finitude emerges. Finitude does not arise because infinite substance is modified by an infinite mode that admits of division; rather, it arises from the mutual limitation of the powers of modes of the same attribute to exist. In other words, God's essence posits but does not limit the existence of these things. This reading of how finite modes are generated from

substance also makes sense, in its way, of Spinoza's famous claim that finitude is nothing but a negation.

Why does God make essences that, when instantiated, limit each other? Why doesn't God just create an infinity of infinite things? There is an *a priori* explanation: Extension itself, because it expresses an essence of God, must produce an infinite number of things. But since no two things of the same nature, and so no two Extended things, can exist without limiting each other, it can only produce things that limit one another: modes, and not substances. In this way, finite things do not follow from "the absolute nature of any of God's attributes", which is prohibited by E Ip21.

It is also confirmed *a posteriori* at the beginning of E Part IV. Part I and Part IV show that it is a central Spinozistic principle that essences cannot self-limit, so they must be instantiated in a world where there is mutual limitation. At the beginning of Part IV, Spinoza argues that a man must be part of nature, because otherwise, he would have infinite power:

...if it were possible for a man to undergo no changes except those which could be understood through the man's nature alone, so that he would necessarily always exist...it would follow that the man would be infinite.⁵⁶

And this, of course, is false. Earlier, we saw Spinoza claim that the blood, for example, is only an individual insofar as it is considered to be impervious to external causation. Indeed, Spinoza clarifies at IVp29d: "The power of each singular thing, and consequently (by IIp10c), man's power, by which he exists and produces an effect, is not determined except by another singular thing."⁵⁷ A finite thing is defined by its essence, but it must be limited by another thing, since the essence of a thing can only posit it and not involve its limitation:

And no thing has anything in itself by which it can be destroyed, or which takes its existence away (by p4). On the contrary, it is opposed to everything which can take its existence away (by p5).⁵⁸

This is related to the *conatus* doctrine of E IIIp6 (C 498/G I 132) that "Each thing, as far as it is in itself, strives to persevere in its being." The demonstration there also appeals to the fact that singular things or modes of an attribute express God's power, and that no thing has in it any power by which it can be destroyed. This striving involves "no finite time, but an indefinite time." In the Letter on the Infinite, Spinoza distinguishes between modes "as they flow from God" - or, as Ip16 describes them - and not as they are understood in space and time. The tension can be resolved, then, by observing that the worm in the blood sees provisional

SPINOZA ON THE PRINCIPLES OF NATURAL THINGS

individuals that arise from mutual limitation of instantiated essences, while the individuals that Spinoza is discussing in the letters exchanged with Tschirnhaus are the individual modes “as they flow from God.”

The lesson to be learned is that to understand the things in nature through their essences would be to understand them in a radically different way than we imagine them in space and time, suggesting that Spinoza is somewhat less of a scientific naturalist than he has been thought to be in recent years.⁵⁹ We cannot understand the essences of bodies by considering them as we experience them, and that understanding them through the intellect, as we saw in §4.2, is very difficult. This is not surprising when we consider that questions about physics and its relation to metaphysics are, as far as I can see, the only problems about which Spinoza can be seen to express real perplexity in his letters; in the exchange with Tschirnhaus, he writes, as he has before, that he has not had the opportunity to put his thoughts in order on the topic.

This raises a final question, which I am not prepared fully to answer here: how “real” are the limited modes that exist in space and time? On the account of finite things outlined above, it is clear that finite modes are absolutely real - that God’s creatures are not the ephemera that Leibniz accuses them of being. There are an infinite number of modes of, say, Extension, whose essences and power to exist flow from God, but must necessarily limit one another when they are instantiated since they are all conceived under the same attribute. However, it is difficult to divine the relationship between the apparent, shifting world of finite quasi-things, which are generated, changed and destroyed and whose identities are provisional and temporary, and the world, from which these things are generated, of eternal essences. In Part V, Propositions 21 and 23, of the *Ethics*, Spinoza suggests that things are only experienced in space and time by other things in space and time, since we only experience worldly things while we are instantiated. They are not experienced by God, or the intellect, in this way. There might seem to be a tension here, since in order for us to experience worldly things we must actually be instantiated. But I hope to have offered resources for resolving this tension with the dual account of existence. To be instantiated means to be granted existence₁, while existence₂ may, being only experienced by other instantiated things, not be real. Many questions still remain. But if this is right, then bodies are not properly understood when they are conceived in space and time, and the apparent bodies of the world of our senses would seem to have very little in common with the actual modes of Extension as they flow from God.

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Notes

¹ Letter 81 to Tschirnhaus, 5 May 1676 (S 352/G II 256). I use the following abbreviations for Spinoza: E = *Ethics*, where p = proposition, d = demonstration, def = definitions, c = corollary, a = axiom, app = appendix, l = lemma; KV = *Short Treatise on God, Man, and his Well-Being*; TIE = *Treatise on the Emendation of the Intellect*; TTP = *Theologico-Political Treatise*; PP = *Principles of Cartesian Philosophy*; CM = *Metaphysical Thoughts*. All references to translations of Spinoza's works except the letters are to Curley's translation (C): E. Curley, ed. and trans. (1985). *The Collected Works of Spinoza*. Princeton University Press. In references to the letters I have used Shirley's translation (S): S. Shirley, ed. and trans. (1995). *Spinoza: The Letters*. Indianapolis and Cambridge: Hackett Publishing Company, Inc. Latin and Dutch references are to Gebhardt's edition (G): C. Gebhardt, ed. (1925). *Opera*, in two volumes. Heidelberg: Carl Winter. References to Descartes' *Principles of Philosophy* are to (CSM): J. Cottingham, R. Stoothoff and D. Murdoch. (1991). *The Philosophical Writings of Descartes*,

Volume I. Cambridge: Cambridge University Press and to (AT): C. Adam and P. Tannery. (1964). *Oeuvres de Descartes* (11 vols.). Paris: CNRS and J. Vrin. References to Leibniz are according to the conventions of the *Leibniz Review*. I am very grateful to Yitzhak Melamed, Baron Reed and Eric Schliesser for their insightful comments and invaluable discussion, and to an anonymous referee for helpful suggestions.

² Letter 6 to Oldenburg, 1662 (S 76/G II 14).

³ S 185-200/G II 125-137

⁴ S 71-84/G II 25

⁵ S 110-116/G II 46-54

⁶ I intentionally omit the axioms, lemmas and postulates following E IIp13 - a section of the *Ethics* that is sometimes called “the physical interlude” and is usually thought to be Spinoza’s most committed statement on physics. I do not have the space here to argue that this section should in no way be taken to comprise Spinoza’s physics but is rather a way for Spinoza to establish a cross-attribute account of individuality. In any case, it is easy to see that the physical interlude, although it mentions Extension and motion and rest, does not define those terms, nor are they defined anywhere else in the *Ethics*, so we are left with the letters.

⁷ Letter 80 to Tschirnhaus, 2 May 1676 (S 351/G II 254-5).

⁸ Letter 81 to Tschirnhaus, 5 May 1676 (S 352/G II 255).

⁹ Letter 83 to Tschirnhaus, 15 July 1676 (S 355/G II 258).

¹⁰ E Ip11 (C 417/G I 46).

¹¹ “I conceive of [a body’s] extension, or the property it has to occupy space not as an accident, but as its true form and its essence”(Principles II 64 (CSM 247/AT VIIIA 78)). In *Rules* 14, Descartes compares the proposition “bodies are extended” to “people with wealth are wealthy.”

¹² “...all variation in matter, that is, all the diversity of its forms depends on motion...and all the properties we clearly perceive in it reduce to this one thing, that it is divisible and mobile with respect to its parts, and this is capable of all those properties [*affectiones*] which we perceive can follow from the motion of its parts”(Principles II 23 (CSM 232/AT VIIIA 52)). “Body” is defined at *Principles* II 25 (CSM 233/AT VIIIA 54): “By ‘one body’ or ‘one piece of matter I mean whatever is transferred at a given time.”

¹³ “God’s perfection involves not only his being immutable in himself, but also his operating in a manner that is always utterly constant and immutable...Thus, God imparted various motions to the parts of matter when he first created them, and

he now preserves all this matter in the same way...God likewise always preserves the same quantity of motion in matter” (*Principles* II 36 (CSM 240/AT 61-62)). According to Descartes, the details of the process by which God grants motion to matter are beyond our knowledge.

¹⁴ My translation of Matheron (1991), pp. 97 and 107. Matheron’s discussion is very illuminating in a number of respects; in particular, he shows how E Ip16 can be justified in terms of certain implicit principles that can be reconstructed from Part I of the *Ethics*. However, in addition to his identifying motion and rest as the source of the variety in matter, I take issue with several of his points. First, Matheron develops an account there of how Spinoza might deduce the laws of physics *a priori* from his ontological principles. I do not find any indication that Spinoza has a view of this kind; in fact, Spinoza does not mention the laws of nature in the *Ethics* or the Tschirnhaus letters. I believe that Matheron’s identification of the common notions with the laws of nature, though common, is misleading. Second, Matheron maintains that all of the phenomena of nature can be understood in terms of geometrical extension and motion; I offer several considerations that weigh against this in §4.2.

¹⁵ Klever (1988). See also, for example, Huenemann (2004), p. 32 (“...it seems something beyond mere inert, quantitative extension must be attributed to matter if matter is to be anything other than a static, homogeneous soup. This something is, as we have seen, infinite motion and rest...”), Lachterman (1971), Adler (1996), and Rice, Adler and Barbone’s introduction to Shirley (1995), page 352.

¹⁶ Letter 81 to Tschirnhaus, 5 May 1676 (S 352/G II 255).

¹⁷ This is widely assumed, but can be found explicitly in, for example, Adler (1996), Lachterman (1977) and Gaukroger (2006).

¹⁸ E Ila1 and Ila2 following Iip13 (C 458/G I 88).

¹⁹ “*Corpora ratione motus, & quietus, celeritatis, & tarditatis, & non ratione substantiae ab invicem distinguuntur.*” E III1 and III1d following Iip13 (C 458-9/G I 88).

²⁰ Gaukroger (2006), Gabbey (1996), Klever (1988).

²¹ E III3c (C 459/G I 88).

²² Bennett (1984), pp. 124-5.

²³ KV I IX (C 91/G II 297).

²⁴ Letter 83 to Tschirnhaus (S 355/G II 258).

²⁵ I’ll write “Extension” when I refer to Spinoza’s use of it to describe the relevant attribute and “extension” when I mean three-dimensional extension.

²⁶ E IIp45 (C 481/G I 114).

²⁷ E IIp45d (C 482/G I 114).

²⁸ Of course, for a finite mode to be “comprehended in” an attribute is not the same as for it to express God’s essence through the attribute - as Sam Newlands points out in a recent essay (Newlands 2012), the variety of dependence relationships Spinoza discusses is mind-boggling. Nonetheless I take them to amount to the same thing here.

²⁹ *Propria*, as opposed to properties (*proprietas*), are specifically properties that flow from an essence, without which the thing cannot be conceived. They are to be contrasted with accidents, which a thing can lose or gain without endangering its identity. A passage a little later on in Part I confirms that Spinoza intends it in this way: “if things had been produced by God otherwise than they now are, God’s intellect and his will, i.e. (as is conceded), his essence, would have to be different. And this is absurd”(E Ip33 (C 436/G I 65)).

³⁰ Melamed (2012).

³¹ Letter 82 (S 353/G II 256).

³² An exception is Tad Schmaltz in Schmaltz (1999); see below. I agree on many of the details of his reasons why God cannot be extended; however I also think that the same reasons apply to the fact that modes themselves cannot be extended in space. Moreover, Schmaltz takes the fact that God is not extended in space to mean that God is not like actual material things and that instead, contains eminently what matter contains actually. I do think that substance, or God, is material - just that “material” does not mean “extended” for Spinoza.

³³ (C 421/G I 57) and (C 422-423/G I 58), respectively.

³⁴ Melamed (2012) points out that the concept of an infinite mode is “probably the only Spinozist concept that has no equivalent among his predecessors or contemporaries” (Melamed 2012, p. 1).

³⁵ Schmaltz (2012), p. 188.

³⁶ Bennett (1984), p. 86.

³⁷ CM Part 2 Chapter I (C 316/G II 478).

³⁸ One important reason to include a brief discussion of this point here is that it is denied by Matheron in Matheron (1991), p. 94: “We know...that there is infinitely more in an existing body than a simple combination of motion and rest...even though we also know that geometrical physics (if it were fully developed) would permit us to comprehend completely everything that happens” (my translation). I do not believe that Spinoza thought that geometrical physics would permit

us to comprehend everything that happens; we are very far, for Spinoza, from understanding “what a body can do.”

³⁹ Letter 12 to Meyer, 20 April 1663 (S 103/G II 41).

⁴⁰ Ibid.

⁴¹ *Specimen Dynamicum* §2 (WFP 154).

⁴² *De Ipsa Natura* §2 (WFP 210).

⁴³ *De Ipsa Natura* §15 (WFP 221).

⁴⁴ *De Ipsa Natura* §8 (WFP 214).

⁴⁵ Leibniz makes further comments in this vein in *Specimen Dynamicum* §§10-14 (WFP 148-9).

⁴⁶ Spinoza usually calls this “transient causation” but this emphasizes the fact that the effect does not inhere in the cause. There are those who believe that Spinoza thinks that horizontal causation involves inherence and so by using the phrase “horizontal causation” I avoid this debate while emphasizing the fact that causation between bodies is causation between the same kinds of things (i.e. finite modes).

⁴⁷ Letter 31 from Oldenburg, 12 October 1665 (S 189/G II 126).

⁴⁸ Letter 32 to Oldenburg, 20 November 1665 (S 193-4/G II 128-129).

⁴⁹ Sacksteder (1978), p. 145.

⁵⁰ E IIdf following IIp13 (C 460/G I 88).

⁵¹ Ibid.

⁵² *Specimen Dynamicum* § 21 (WFP 245). Although it is worth noting that he does not say that no substance *simpliciter* can affect another by sending something across to it, which is Spinoza’s position.

⁵³ *Specimen Dynamicum* §22 (WFP 246).

⁵⁴ See, for example, Schliesser (2012) and Ward (2011). My account of the nature of finite things shares much, otherwise, in common with Professor Schliesser’s account. There, his formulation of a related problem about the intrinsic and extrinsic properties of bodies is extremely helpful and interesting.

⁵⁵ E Vp29s (C 609/G I 298).

⁵⁶ E IVp4d (C 548-9/G I 193).

⁵⁷ E IVp29d (C 560/G I 207).

⁵⁸ E IIIp6d (C 499/G I 132).

⁵⁹ For more on this, see Schliesser (2012).