THE CONATUS OF THE BODY IN SPINOZA'S PHYSICS

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Abstract. In Part 3 of his *Ethics*, Baruch Spinoza identifies the *conatus* of the mind as 'will' and of the mind and body together as 'appetite'/'desire,' but he does not identify the *conatus* of the body. This omission is curious, given that he describes 'motion-and-rest' and *conatus* in such ways that they appear to be one and the same thing. In this paper, however, I propose that motion-and-rest and *conatus* (in the attribute of extension) can be understood as two distinct aspects, relational and singular, of Spinoza's theory of the individuation of bodies. In Section 1, I explain Spinoza's account of the body. In Section 2, I reject the notion that the *conatus* of the body is a principle of rectilinear inertia. In Section 3, I indicate that besides *conatus*, Spinoza uses other terms throughout his texts to denote the concept of striving, each of which alludes to a relational and singular aspect of his theory of individuation. In Section 4, I show that for Spinoza, motion-and-rest refers to the relational ('preindividual') aspect of the body and that *conatus* (in the attribute of extension) refers to the singular (individuated) aspect of the body.

Keywords: Spinoza, physics, individuation, body, *conatus*, inertia, motion, rest.

Introduction

In Part 3 of his *Ethics*, Baruch Spinoza identifies the *conatus* [striving] of the mind as 'will' and of the mind and body together as 'appetite'/'desire,' but he does not identify the *conatus* of the body.[1] This omission is curious, because Spinoza identifies the body as "an unvarying relation of movement,"[2] and there is a clear similarity between his phrasing of his law of motion in Part 2, where he states that "a body in motion will continue to move until it is determined to rest by another body, and a body at rest continues to be at rest until it is determined to move by another body,"[3] and his phrasing of his doctrine of *conatus* in Part 3, where he states that if *conatus* "is not destroyed by an external cause, it will always continue to exist by that same power by which it now exists."[4] These details could lead one to assume that in the attribute of extension, so-called 'motion-and-rest' and *conatus* are two terms for one and the same thing. However, Spinoza does not explicitly connect these two concepts in the *Ethics*.

One might argue that Spinoza simply deferred to the work of contemporary physicists, and took it to be obvious that the *conatus* of the body is motion-and-rest (or the tendency of motion-and-rest to persist). However, he meticulously cross-references his arguments in the *Ethics* and the connection between motion-and-rest

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and *conatus* would be a rather blatant connection for him to overlook. And while Spinoza was not a physicist, it would be a mistake to underestimate his knowledge of physics.[5] One of the two works that Spinoza published during his lifetime, his *Principles of Cartesian Philosophy*, contains a detailed account of Cartesian physics. In addition to developing the scientific aptitudes required for lens-grinding, Spinoza carried out a number of scientific experiments of his own, for instance, on the compound nitre (potassium nitrate),[6] in optics[7] and in hydrostatics.[8] Furthermore, he maintains in an early letter to Willem van Blyenbergh that the *Ethics* "must be based on metaphysics and physics."[9] So, if Spinoza avoided addressing the relationship between motion-and-rest and *conatus* in the attribute of extension in the *Ethics*, it may be worth asking whether he had a good reason for doing so.

Moreover, Spinoza's physics remained an unfinished enterprise at the time of his death.[10] In a letter to Ehrenfried Walther von Tschirnhaus from January 1675, Spinoza appears to have expressed the intent to write a treatise on the subject. To Tschirnhaus's question, "When shall we have your . . . general treatise on physics?"[11] Spinoza responds that "concerning motion . . . , since my views on these are not yet written out in due order, I reserve them for another occasion."[12] Unfortunately, Spinoza never had the opportunity to compose such a treatise and he died just two years later. Thus, instead of a *Tractatus Physica*, we only have, what David Lachterman calls, the Physical Digression from Part 2 of the *Ethics* along with a select number of correspondences dedicated to the subject. Thus, one could argue that Spinoza may have had a new way of defining the relationship between motion-and-rest and *conatus* in the attribute of extension (and thereby, the *conatus* of the body), but was unable to develop his position due to his untimely death.

This problem has been discussed extensively in the secondary literature,[13] but in this paper, I propose that motion-and-rest and *conatus* can be understood as two distinct aspects, relational and singular, of Spinoza's theory of the individuation---i.e., the individual identity and persistence---of bodies. In Spinoza's system, finite individuals are not individuated in isolation from one another. Rather, they are 'co-individuated,' so to speak, meaning that a given finite individual and its environment (other individuals) are differentiated from one another simultaneously. Based on this model, I maintain that the individuation of the body requires a relational (or, to borrow Gilbert Simondon's term, 'preindividual') aspect, motion-and-rest, and a singular (individuated), aspect, *conatus* (again, in the attribute of extension). In Section 1, I explain Spinoza's account of the body. In Section 2, I reject the notion that the *conatus* of the body is a principle of rectilinear inertia, as in the work of René Descartes. In Section 3, I indicate that besides *conatus*, Spinoza uses other terms throughout his texts to denote the concept of striving, each of which alludes to a relational and singular aspect of his theory of individuation. In Section 4, I show that for Spinoza, motion-and-rest refers to the relational (preindividual) aspect of the body and that *conatus* refers to the singular (individuated) aspect of the body. In order to develop my argument, I draw from Spinoza's Physical Digression in Part 2 of the *Ethics*, as well as relevant passages in Spinoza's other texts and letters.

1. The Body as an Unvarying Relation of Motion

In Part 3 of the *Ethics*, Spinoza refers to *conatus* as "nothing but the actual essence of the thing itself."[14] Since will is the actual essence of the mind, and since appetite/desire is the actual essence of the mind and body together, I must begin by trying to discern what Spinoza may have meant by the actual essence of the 'body.' In the *Ethics*, he defines the body as "a mode that expresses in a definite and determinate way God's essence insofar as he is considered as an extended thing."[15] One cannot begin to properly understand this definition, without understanding his denial of the existence of a vacuum.[16] For Spinoza, the very concept of a vacuum is a contradiction. In a letter to Henry Oldenburg from 1663, he comments on Robert Boyle's ambivalence towards the theory, saying: "I do not know why he calls the impossibility of a vacuum a hypothesis, since it clearly follows from the fact that nothing has no properties."[17] He states in the *Short Treatise on God, Man and His Well-Being* that a vacuum is a basic contradiction in terms, because there cannot be "something positive and yet no body."[18] He presents this same refutation of the theory of a vacuum consistently throughout his oeuvre: there can be no place where bodies stop and space begins.[19] Through his denial of a vacuum, Spinoza is led to maintain that the physical universe is a single, absolutely infinite individual that consists of an infinite series of contiguous bodies. Spinoza demonstrates that bodies are: 1) infinitely divisible, 2) composed of greater and lesser infinites, and 3) parts of an indefinitely expansive individual. In the words of Nicolas Malebranche, "nothing but infinities are found everywhere."[20]

The first kinds of individuals that Spinoza introduces in his Physical Digression are the simplest bodies, or the elements of the physical world. One could take Spinoza's use of the superlative, 'simplest,' to mean that he holds to a brand of atomism, or a theory that elemental particles are indivisible, but also possess mass and volume. Spinoza, however, maintains that space is a plenum and in the context of 17th-century physics, denying a vacuum was essentially one and the same as denying atomism. For atoms to be distinct entities, they could not be separated by other bodies, but by space devoid of body alone.[21]

A concept of simplest bodies, thus, seems rather out of place in the context of Spinoza's system, as it establishes conditions in which no fundamental element is discernible, or at the very least, isolable. Bodies are, in principle, divisible *ad infinitum*.[22] Could simplest bodies, then, be akin to Cartesian corpuscles, elemental particles that possess mass and volume, but which are infinitely divisible?[23] Or are they more equivalent to Leibnizian monads?[24] Spinoza explicitly rejects the concept of vortices which describe the internal motion of Cartesian corpuscles.[25] The latter option must be ruled out in light of the fact that simplest bodies are not souls, as Leibnizian monads are.[26]

Although Jacob Adler and Lachterman maintain that the concept of simplest bodies functions as a placeholder for Spinoza,[27] it seems that this concept can be interpreted in one of two ways, namely, as 1) infinitesimals or vanishing quantities or 2) oscillations. The first interpretation has been defended by H.F. Hallet and Gilles Deleuze who argue that simplest bodies function as a limit concept.[28] If bodies are infinitely divisible, then simplest bodies must be those quantities of body that

approach nothingness in the process of continual division. This has invited comparisons to Gottfried Wilhelm Leibniz's infinitesimals or Sir Isaac Newton's vanishing quantities.[29] The comparison is not unbecoming given Spinoza's concept of quantities that cannot be accurately expressed by any number in Ep. 12, a concept which Leibniz himself expressed great admiration for.[30] Although the nature of such quantities are a matter of considerable dispute in the context of mathematics, in the context of Spinoza's physics, simplest bodies can be no more than useful abstractions for performing mathematical calculations as Leibniz and Newton treat them.[31] Otherwise, they would have to be individuals defined strictly by their external relationships, or as Alexandre Matheron and Lee Rice note, individuals with an outside, but no inside, which seems inconceivable.[32] Thus, simplest bodies would not be real entities in this reading, but relative from one perspective to another.

The interpretation of simplest bodies as oscillations can be found in the work of Martial Gueroult, who emphasizes Spinoza's definition of simplest bodies as those "which are distinguished from one another solely by motion-and-rest, quickness and slowness."[33] According to Gueroult, simplest bodies are indeed like Cartesian corpuscles. He maintains, however, that Spinoza's definition creates a problem. If simplest bodies are strictly defined by a pattern of motion, they can only manifest as a single pattern, otherwise, they would not be simple. A change in the pattern, of course, would result in a change of the identity of the simplest body. Any collision between a simplest body and another body, however, would result in a transfer of force that would interrupt this pattern of motion and, consequently, change the identity of the simplest body. Since simplest bodies are constantly in contact with other bodies, they would be in perpetual flux.[34] Thus, if they are defined by an internal pattern of motion, it cannot manifest as a vortex, as in Cartesian corpuscles, but only as periodic vibration or oscillation as in Christiaan Huygens's simple pendulums.[35]

This oscillation is defined by the following formula:

$t = 2\pi \sqrt{l/g}$,

where t stands for the duration of a single oscillation, l for the length of the pendulum, and g for the acceleration of gravity.[36]

In order to develop a pendulum for clocks that could reliably keep time, Huygens turned to the concept of the isochrone curve, or a curve that no matter where an object was dropped from, would reach the lowest point of the curve in the same amount of time. He discovered that such a curve was a cycloid, or the curve formed by tracing a circle as it rolls like a wheel along a straight line:

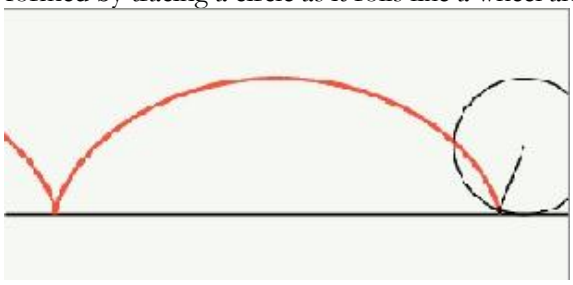

Fig. 1[37]

In the absence of intervening forces like friction, the period of motion of a pendulum along a cycloid ideally will remain the same in spite of losses in momentum after when the clock is first set.[38] For Gueroult, applying this formula of isochronic oscillation to the concept of simplest bodies allows each simplest body to maintain the same pattern of motion, even when encountered by other bodies.[39]

Treating simplest bodies as corpuscles, however, is problematic for Gueroult's interpretation given Spinoza's rather non-committal attitude towards Huygens's pendulums.[40] Moreover, if the logic of the simple pendulum holds, while it allows for a steady pattern of motion during collisions, this does not hold for division, as changes in length alter the period of motion. If bodies are, in fact, infinitely divisible and simplest bodies are indivisible, the latter would not be bodies. While Gueroult contends that simplest bodies are neither hard, nor soft, nor fluid, they could not possess mass or volume either.[41] This would mean that simplest bodies are, quite simply, nothing. Given the implausibility of the second reading, then, simplest bodies should not be understood as real at all, but as hypothetical entities, specifically as infinitesimal or vanishing quantities, according to the first reading.

The second kind of individuals that Spinoza introduces in the Physical Digression are composite bodies, which he defines as follows:

> [w]hen a number of bodies of the same or different magnitude form close contact with one another through the pressure of other bodies upon them, or if they are moving at the same or different rates of speed so as to preserve an unvarying relation of movement among themselves, these bodies are said to be united with one another and all together to form one body or individual thing, which is distinguished from other things through this union of bodies.[42]

Composite bodies are compounds, produced in the aggregation of either simplest or other composite bodies. They can be categorized according to three different states of matter: hard, soft and liquid. While Spinoza defines only these three in the *Ethics*, there is no reason to assume that he meant for this list to be exhaustive. In Ep. 6, for instance, Spinoza twice refers to vapours, indicating the possibility that he also considered there to be a gaseous state.[43] The concluding postulates of the Physical Digression suggest that Spinoza may have restricted himself to liquid, soft and hard bodies as these are the three types of composite bodies he saw as making up the human body.[44] Regardless, hard describes those "bodies whose parts maintain close contact along large areas of their surfaces," while bodies are soft "whose parts maintain contact along small surface areas" and, finally, those bodies are liquid "whose parts are in a state of motion among themselves."[45]

If bodies can be divided *ad infinitum*, they must be composed of an infinite number of parts. However, this introduces the inverse problem of division. Spinoza says that

> if an infinite length is measured in feet, it will have to consist of an infinite number of feet; and if it is measured in inches, it will consist

> of an infinite number of inches. So one infinite number will be twelve times greater than another infinite number.[46]

In other words, if one tries to compose an infinite quantity from parts, the scale of measurement applied to the different unit parts will result in greater and lesser infinite quantities. Construct one infinite quantity out of feet and another out of inches and the result will be one infinite being twelve times greater than the other, which is absurd.

In a famous letter to Lodewijk Meyer, now known as the "Letter on the Infinite" or the "Letter on Infinity," Spinoza addresses this problem by altogether re-defining how to understand composites in the first place. Take the following figure:

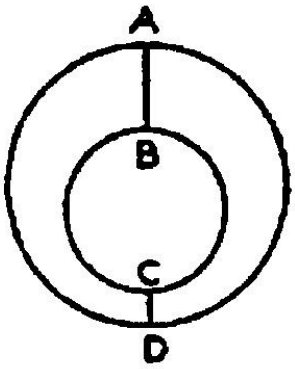

Fig. 2[47]

In his introduction of the figure, Spinoza is interested in "all the inequalities of the space lying between the two circles ABCD."[48] If one tried to reconstruct ABCD from parts, one would never succeed in re-constructing it, precisely in the way that Hercules could never reach the tortoise in Zeno's Paradox.[49] Reconstructing this figure by using a number of parts would always imply a discontinuity, no matter how miniscule. This implies the flaw in thinking that "a body is composed of surfaces, surfaces of lines, and lines of points."[50] The figure must envelope a continuous series of quantities that are inexpressible by any number.[51] To reconcile this tension, the determinate lengths of AB and CD must be understood in terms of their relationship to each other. If one treats the length of CD as a base unit of measure, as a unit of 1, then the length of AB is a multiple of CD. This pertains to composite bodies in general; while they are infinite in principle, they encounter limits in relation to other composite bodies.

The third and final kind of individual introduced in Spinoza's Physical Digression is the whole of nature, a concept that Spinoza also identifies in a letter to Georg Hermann Schuller as the *facies totius universi* [face of the universe].[52] With the exception of Spinoza's definition of this concept as "one individual whose parts---that is, all the constituent bodies---vary in infinite ways without any change in the

individual as a whole," there is little else that he says about it.[53] If there were limits to physical reality, it would be circumscribed by nothingness, which Spinoza argues is absurd. Thus, the premise that Spinoza uses to disprove a vacuum entails the indefinite expanse of the universe. Since, "nothing has no properties,"[54] the whole of nature must be indefinitely expansive. No individual, then, is separate from nature, and all bodies are parts of this single, integrated whole. The whole of nature, however, cannot be understood as a body insofar as bodies are definite and determinate, while the whole of nature is absolutely infinite. If simplest bodies are mere abstractions and the whole of nature cannot be understood as a body, then strictly speaking, the only bodies in Spinoza's physical system are composites.

Of what, however, are these bodies composed? In a letter to Oldenburg from 1662---which consists of a detailed commentary on Boyle's *Certain Physiological Essays*---Spinoza follows Boyle by distinguishing between those properties of a body that describe it "as it is in itself" and those properties of a body that describe it "as it is related to human senses."[55] In order to explain the latter, Spinoza uses the example of a bone, a body that to the human senses is undoubtedly solid. He states that while "bones may be unsuitable for forming chyle and similar fluids, perhaps they will be quite well adapted for forming some new kind of fluid."[56] In other words, while bone appears to be a solid to the human senses, to another organism or with respect to another object, bone could, for all purposes, be identified as a liquid. He provides two further examples, namely, of churning butter and the presence of vapour in air, stating that, in the churning of butter,

> particles of butter, when floating in milk, form part of the liquid; but when the milk is stirred and so acquires a new motion to which all the parts composing the milk cannot equally accommodate themselves, this in itself brings it about that some parts become heavier and force the lighter parts to the surface. But because these lighter parts are heavier than air so that they cannot compose a liquid with it, they are forced downwards by it; and because they are ill adapted for motion, they also cannot compose a liquid by themselves, but lie on one another and stick together. Vapours, too, when they are separated from the air, turn into water, which, in relation to air, may be termed solid.[57]

The example of churning butter shows that the alteration in the proportion of motion-and-rest of the milk leads some particles to "lie on one another and stick together,"[58] thereby leading them to take on a different state. Regarding vapour, Spinoza makes the more radical claim that the same vapour can be identified as solid, liquid and gas from different perspectives, without there being any change in the vapour itself. From these observations, he concludes that the primary qualities of bodies are "motion, rest and their laws,"[59] and the secondary qualities of bodies are "visible, invisible, hot, cold, and . . . fluid, solid, etc."[60] By treating the states of matter as secondary to motion-and-rest, Spinoza maintains that the former are entirely dependent upon the degree to

which surrounding bodies are in motion or at rest and that the primary quality is the motion-and-rest between the two bodies.

In the *Ethics*, Spinoza takes this a step further, by arguing that motion-and-rest serves as the form of bodies. As Spinoza states in the Physical Digression, the composition of bodies can perpetually change according to processes such as digesting and excreting, growing or shrinking, changing posture and changing location.[61] In Lemma 4 of the Physical Digression, Spinoza writes:

> [i]f from a body, or an individual thing composed of a number of bodies, certain bodies are separated, and at the same time a like number of other bodies of the same nature take their place, the individual thing will retain its nature as before, without any change in its form [*forma*].[62]

This shows that the identity of the body does not change along with changes in its composition. What is responsible for this? In his demonstration of Lemma 4, Spinoza cross-references Lemma 1 by stating that "[b]odies are not distinguished in respect of substance,"[63] but that "that which constitutes the form of the individual thing consists in a union of bodies."[64] Turning to Lemma 1 itself, in the place of a union of bodies, Spinoza writes that "[b]odies are distinguished from one another in respect of motion-and-rest, quickness and slowness, and not in respect of substance."[65] Thus, Spinoza identifies the body as an "unvarying relation of movement."[66]

2. Rejection of the Inertial Reading of *Conatus*

As indicated in the Introduction, Spinoza's phrasing of his law of motion in Part 2 of the *Ethics* and his phrasing of his doctrine of *conatus* in Part 3 are almost identical. According to some scholars, these similarities indicate that Spinoza borrows Descartes's position that *conatus* is a principle of rectilinear inertia; that is, *conatus* refers to the tendency of a body in motion to stay in motion and a body at rest to stay at rest.[67] This would be consistent with Spinoza's claim in the *Principles of Cartesian Philosophy* that in the attribute of extension, *conatus* refers to "*conatus* to motion,"[68] which is "not some thought, but [the fact] that a part of matter is so situated and stirred to motion that it would in fact be going in some directed if it were not impeded by any cause,"[69] and his claim in the *Appendix containing Metaphysical Thoughts*, where he states that, again, in the attribute of extension, motion and *conatus* are one and the same thing.[70] If this is true, then the *conatus* of the body would be the principle of inertia of the body.

Although many scholars hesitate to attribute positions from the *Principles of Cartesian Philosophy* or the *Appendix containing Metaphysical Thoughts* to Spinoza himself, many things that he says about motion-and-rest in the *Ethics* and in his letters are very similar to Descartes's laws of motion. According to Spinoza's law of motion in the Physical Digression, "a body in motion will continue to move until it is determined by another body, and a body at rest continues to be at rest until it is determined to move by another body,"[71] which has a great deal in common with Descartes's first law of motion, according to which "each and every thing, in so far as it can, always continues

in the same state; and thus what is once in motion always continues to move."[72] Like Descartes, Spinoza maintains that motion-and-rest are forces characterized by the principle of inertia;[73] they are not directed by a *τέλος* [*telos*; end], but rather continue indefinitely in the absence of any intervening cause.

Likewise, Spinoza goes on to say that

> when a moving body collides with a body at rest and is unable to cause it to move, it is reflected so as to continue its motion, and the angle between the line of motion of the reflection and the plane of the body at rest with which it has collided is equal to the angle between the line of incidence of motion and the said plane. So far we have been discussing the simplest bodies.[74]

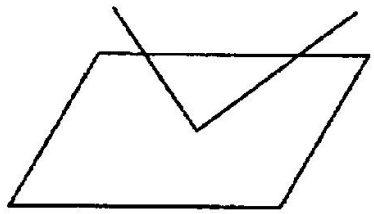

Fig. 3[75]

This passage refers to collision and further illustrates Spinoza's belief that bodies in motion tend in a rectilinear path, since the body in Fig. 3 proceeds in a different direction only because it collides with a plane. Thus, Spinoza would not have held to something like the Epicurean concept of the *clinamen* [swerve], or the position that particles can actually change direction at random while in motion.[76] Spinoza does qualify his point by claiming that Fig. 3 only pertains to simplest bodies. While he does not provide a reason as to why he introduces this qualification, it seems that Spinoza intends to provide an illustration of motion in an ideal sense. If this is accurate, then Spinoza upholds Descartes's second law of motion, according to which "all motion is in itself rectilinear; and hence any body moving in a circle always tends to move away from the centre of the circle which it describes."[77]

Furthermore, one should take Spinoza's remark in a letter to Oldenburg to imply his tacit consent to Descartes's third law of motion and seven laws of collision, with exception of the sixth. In Ep. 32, he states that he "did not assert that any of the rules were wrong except for the sixth."[78] This comment does not imply that Spinoza disagrees with Descartes's laws themselves, but that he disagrees with Descartes's calculation of the quantity of force transferred in such a collision. Based upon these similarities, it seems that Spinoza, like Descartes, defines motion in the ordinary sense as "the action by which a body travels from one place to another,"[79] but in the strict sense as

> the transfer of one piece of matter, or one body, from the vicinity of the other[s] which are in immediate contact with it, and which are regarded as being at rest, to the vicinity of other bodies,[80]

and that he defines rest as "[t]he opposite of motion."[81] Spinoza's claims in the *Principles of Cartesian Philosophy*, the *Appendix containing Metaphysical Thoughts*, the *Ethics* and his letters all seem to add up to the conclusion that Spinoza treats *conatus* as a principle of inertia in the attribute of extension, just like Descartes.

While many of Spinoza's claims about motion overlap with Descartes's, these should not be taken to reflect a similarity in their understanding of the relationship between motion-and-rest and *conatus*. Towards the end of his life, Spinoza wrote in a letter to Tschirnhaus from 5 May 1676 that "Descartes's principles of natural things are of no service, not to say quite wrong."[82] By this time, Spinoza had long broken with Descartes's understanding of extension and his understanding of motion-and-rest.[83] For Spinoza, motion-and-rest refers to the immediate infinite mode of extension[84] and the form of the body[85], neither of which are concepts in Descartes's system. Moreover, and most importantly, Spinoza treats *conatus* as a power by which an individual strives to preserve itself, as well as a power by which an individual strives to accumulate a greater degree of power.[86] For these reasons, one should treat the similarities between Spinoza's views on the relationship between motion-and-rest and *conatus* with Descartes's as coincidental.[87] Thus, the *conatus* of the body cannot be the principle of inertia of the body in Spinoza's system.

3. Other Formulations of Striving

This conflation of Spinoza's and Descartes's views on *conatus* overlooks the fact that throughout his oeuvre, Spinoza uses many other terms besides '*conatus*' to refer to the notion of the striving of finite individuals. Just as there are a number of similar notions that can be found over the course of the philosophical tradition---Aristotle's *ὁρμή* [horme; impulse], Stoic *pneuma* [breath], and the Scholastic *amor naturalis* [natural love], to name just a few---[88], Spinoza experiments with several different terms. An analysis of the many terms that Spinoza uses to apply to the same concept may shed some light in our effort to identify the *conatus* of the body in his system.

In Part 1 of the *Short Treatise*, Spinoza uses the terms general providence and special providence, which he defines as follows:

> *general* [*providence*] is that through which all things are produced and sustained insofar as they are parts of the whole of nature. [*S*]*pecial providence* is the striving of each thing separately to preserve its existence . . . considered not as a part of nature, but as a whole [by itself].[89]

He then provides an illustration of this distinction:

> All the limbs of man are provided for, and cared for, insofar as they are parts of man, this is *general providence*; while *special* [*providence*] is the striving of each separate limb (as a whole in itself, and not as a part of man) to preserve and maintain its own well-being.[90]

Clearly, the term special providence bears a notable resemblance to Spinoza's definition of *conatus* in the *Ethics*.[91] This distinction between general and special providence indicates that objects are conceived in two senses: both as produced and sustained according to the power of nature as a whole and according to their own power.

Later in the same text, Spinoza uses the term natural love [*natuurlijke liefde*], which he also defines as the force that "prompts everything to preserve its body."[92] Note that *natuurlijke liefde* is a Dutch translation of the Latin *amor naturalis*, a concept that figures prominently in the works of St. Thomas Aquinas and Leo Hebraeus.[93] It is unclear what exposure Spinoza would have had to Aquinas, but we do know that he owned a copy of Hebraeus's *Dialogues on Love* in Spanish.[94] In this text, love functions as the principle active agent of the cosmos around which everything is ordered.[95] It is the force that binds God to all things and all things to God, but which also takes on varying degrees of complexity, first as sensual love and then as spiritual love.[96] Given the teleological connotations of both providence and natural love, however, it is not surprising that Spinoza discarded these terms by the time that he wrote the *Ethics*.

In his *Metaphysical Thoughts*, Spinoza refers to the same concept, but now as life. In this text, he states that life can

> be attributed to corporeal things not united to minds and to minds separated from body. . . . Therefore by life we for our part understand the force through which things persevere in their own being. And because the force is different from the things themselves, we quite properly say that things themselves have life. But the force whereby God preserves in his own being is nothing but his essence, so that those speak best who call God 'life.'[97]

Again, Spinoza's language here is nearly identical to his definition of *conatus* in the *Ethics*. However, he clearly specifies that he only intends to use the term "in a philosophical sense"[98] and does not say that matter is alive, but rather that it contains "nothing but mechanical structures and their operations."[99] And while Spinoza does state in the *Ethics* that "men no more than . . . other individuals . . . are all animate, albeit in different degrees,"[100] animate here could mean anything from alive to dynamic, to intelligible, to sentient. Consequently, one should be careful to understand Spinoza's use of the term life as, in any sense, biological.[101]

It would be a mistake to treat the *conatus* of the body as one and the same as any of the aforementioned concepts. Note, however, that the aforementioned concepts all have something in common. General providence expresses how a finite individual is bound to the causal order of the cosmos and special providence expresses how a finite individual can act with some degree of autonomy in order to preserve

itself. Natural love expresses these two notions at once, as it refers both the finite individual's relationship to the divine as well as the finite individual's struggle to survive. Finally, life can refer to God itself, but it can also refer to the force that finite individuals possess to persist. In other words, through each term or pair of terms Spinoza tries to show that finite individuals have two aspects: one relational and one singular.

4. Relational and Singular Aspects of the Body

In a letter to Oldenburg, Spinoza indicates that he understands bodies according to relational and singular aspects as well. He writes that "all bodies are surrounded by others and are *reciprocally* determined to exist and to act in a definite and determinate way."[102] The term 'reciprocally' indicates that Spinoza does not just take bodies to be isolable chunks of matter, clustered side-by-side in space. Rather, each body acts upon and reacts to all other bodies, such that any given body is shaped by all other bodies across space and time.

Note that Spinoza also uses the term 'reciprocal' in the context of his discussion of motion-and-rest. In his *Principles of Cartesian Philosophy*, he writes that

> [t]he force by which bodies are to be moved is expended equally on the moved body and on the body at rest. The transfer is indeed reciprocal; if the boat is separated from the sand, the sand is also separated from the boat.[103]

In other words, the boat in the example does not simply move away from the stationary shore; the shore also moves away from the boat. From the time that the boat is docked at shore to the time that the crew aboard starts rowing, a change of force takes place between the boat and the shore that results in the separation of these two bodies. Spinoza provides a further set of examples of this reciprocal nature of motion and rest in a letter Oldenburg, where he writes that

> our breath, which in winter is obviously seen to be in motion, nevertheless cannot be seen so in summer, or in a heated room. Furthermore, if in summer the breeze suddenly cools, the vapours rising from water, since by reason of the change in the density of the air they cannot disperse through it as readily as they did before it cooled, gather again over the surface of the water in such quantity that they can easily be seen by us. . . . [I]n the case of a sundial . . . the shadow cast by the sun . . . is frequently too swift to be observed by us, as can be seen in the case of an ignited piece of tinder when it is moved in a circle at some speed; for then we imagine the ignited part to be at rest at all points of the circle which it describes in its motion.[104]

In other words, although our breath is ordinarily invisible to the human eye, the cold winter air condenses the moisture in our breath, such that it can be seen. Moreover,

although the rising vapor from the surface of a body of water is also invisible, during the warm summer months, the passing by of a cool breeze gives the appearance of steam dancing over the water's surface. Additionally, an ignited piece of tinder, when spun in a circle at a great enough speed appears to the human eye as a glowing ring of light.

Each of these examples illustrates Spinoza's commitment to the notion that there is no such thing as absolute motion or absolute rest.[105] Rather, he treats motion and rest as one and the same force, which is not so much 'motion-and-rest,'[106] but 'motion-or-rest.' He states this most explicitly in the *Short Treatise*, where he writes that "[m]otion alone does not exist, but only motion and rest together."[107] In other words, if one was to treat motion as a force and rest as the absence of force, the observer-dependent nature of motion and rest would imply that a body has force from one perspective and lacks force from another. Instead, motion and rest have to be treated as one and the same. There is further evidence of this position in the *Ethics*, where Spinoza writes that "[a] body in motion or at rest must have been determined to motion or rest by another body, which likewise has been determined to motion or rest by another body, and that body by another, and so *ad infinitum*."[108] Of course, one could take Spinoza to mean here that the motion or rest of a given body is caused by, say, a collision between the given body and other bodies in motion or at rest. But, because of Spinoza's commitment to the reciprocal nature of motion and rest, he means that whether a body can be said to be in motion or to be at rest depends upon whether one observes the given body from a point of view in relative motion or from a point of view at relative rest. Thus, I maintain that motion and rest are not two individual forces, i.e., the force of motion and the force of rest, but a single, relational force. Motion-and-rest comes to be identified either as motion or as rest once one enters into a particular vantage point.

Since bodies are 'unvarying relations of movement,' bodies are distinguished from one another in the same way that 'motion' and 'rest' are distinguished from one another via the relational force of motion-and-rest. In other words, motion-and-rest does not produce one body at a time, but rather, modulates a relation in extension through which a body and its respective environment (other bodies) are individuated at the same time.[109] As Étienne Balibar indicates, this shows that Spinoza's theory of individuality is a precursor to 20th-century French philosopher Simondon's theory of 'transindividuality.' According to this theory, a principle of individuation cannot itself be an individual, as this simply begs the question of what it means to be an individual. Rather, a principle of individuation must be 'preindividual,' meaning that it cannot individuate one body at a time, but rather differentiates multiple bodies from one another simultaneously.[110] For Balibar, Spinoza (along with Leibniz), holds to this very similar model, because he discovered that it is impossible strictly speaking to have a strong notion of singularity without at the same time having a notion of the interaction and interdependence of individuals. Right from the beginning, the leibnizian and spinozistic theories imply that singularities are interconnected, building up a 'network' or a 'system.' We may conclude that in these doctrines the real 'object of thought' are not so much, in reality, the classical extra (the Whole and the Element, or the Part), but rather the reciprocal viewpoints of unity and multiplicity, and the

relative character of such notions as 'whole' and 'parts.'[111] In Spinoza's philosophy, motion-and-rest plays the role of the relational (preindividual) aspect that individuates bodies.[112]

This leaves *conatus* to play the role of the singular (individuated) aspect of the body. Since *conatus* expresses the way in which an individual strives to persevere in its existence, the *conatus* of the body cannot refer to the relational aspect of bodies. For Spinoza, if the force of an individual was to simultaneously be defined according to what it is and what it is not, it would result in a contradiction in the individual that would effectively destroy it. Thus, "[s]o long as we are attending only to the thing itself . . . , we can find nothing in it which can destroy it."[113] Since "the definition of anything affirms, and does not negate, the thing's essence,"[114] *conatus* must be "nothing but the actual essence of the thing itself."[115] This indicates that motion-and-rest and the *conatus* of the body are not one and the same thing. Rather, just as 'motion' or 'rest' are conceived as secondary manifestations of motion-and-rest, *conatus* of body must refer to the singular (individuated) aspect, of the primary relational (preindividual) aspect of motion-and-rest. This can be illustrated by repurposing one of Spinoza's analogies from the *Short Treatise*, which he uses to illustrate how things necessarily follow from the nature of a thing. He writes that

> for instance, it belongs to the essence of a mountain that it should have a valley, or the essence of a mountain is that it has a valley; this is truly eternal and immutable, and must always be included in the concept of a mountain, even if it never existed, or did not exist now.[116]

If one was to apply this analogy to the relation between motion-and-rest and the *conatus* of the body, motion-and-rest would be the valleys that are driven into the 'surface' of extension, while the *conatus* of bodies would be the mountains that necessarily rise from its surface.

Conclusion

Spinoza alludes to, but never identifies the *conatus* of the body. In this chapter, I showed that individuation in Spinoza's system involves a relational (preindividual) aspect and a singular (individuated) aspect of the individual itself. Since motion-and-rest expresses the relational aspect of bodies, *conatus* in the attribute of extension refers to the singular aspect of the body. What significance this distinction has on Spinoza's ethical and practical philosophy must be set aside as a matter for future investigation.

References

[1] Spinoza, B., *Ethics*, in *Spinoza: Complete Works*, ed. M. Morgan and trans. S. Shirley (Indianapolis/Cambridge: Hackett Publishing Company, Inc., 2002), 284 (E3p9s).
[2] *Ibid.*, 253 (E2p13lem3ax2def).
[3] *Ibid.*, 253 (E2p13lem3c).
[4] *Ibid.*, 283 – 284 (E3p8d).

[5] Rivaud, A., "La Physique de Spinoza," *Chronicon Spinozanum* 4 (1924 – 1926): 24 – 25.
[6] Spinoza, B., *The Letters*, in *Spinoza: Complete Works*, ed. M. Morgan and trans. S. Shirley (Indianapolis/Cambridge: Hackett Publishing Company, Inc., 2002), 768 – 776 (Ep. 6).
[7] *Ibid.*, 857 – 860 (Ep. 36), 863 – 864 (Ep. 39), 864 – 866 (Ep. 40), 884 – 885 (Ep. 46).
[8] *Ibid.*, 867 – 868 (Ep. 41). Cf. Rivaud, "La Physique de Spinoza," 24.
[9] Spinoza, *The Letters*, 839 (Ep. 27). It is unclear exactly what Spinoza meant by the term 'physics.' Indeed, the very use of the term should be approached with some care in the context of 17th century thought insofar as, as Andrew Cunningham points out, "most people in the past . . . . might have described their enterprise as 'anatomy,' 'chemistry,' or whatever---as a branch or subdiscipline of philosophy or natural philosophy." Perhaps Spinoza uses the term in a more general sense than the study of bodies in motion. According to François Zourabichvilli, Spinoza intended the physics of the body to be the basis of some kind of physics of the mind. According to more conventional readings, such as that of Jeffrey Bernstein, Spinoza's physics should indeed be limited to the study of bodies in motion. He states that Spinoza espouses a physics if we "take [our] understanding . . . from Aristotle," namely that, "physics is the inquiry which is concerned with things insofar as they exhibit (i.e., contain a principle of) motion." Cunningham, A., "Getting the Game Right: The Identity and Invention of Science," *Studies in History and Philosophy of Science* 19 (1988): 379; Zourabichvilli, F., *Spinoza: Une physique de la pensée* (Paris: Presses Universitaires de France, 2002); Bernstein, J., "The Ethics of Spinoza's Physics," *North American Spinoza Society Monograph* 10 (2002): 5n8. Cf. Gaukroger, S., "Spinoza's Physics (Lemmata Following 2p13)," in *Spinoza's* Ethics*: A Collective Commentary*, ed. M. Hampe, et al. (Leidein: Brill, 2011), 119 (hereafter, "Spinoza's Physics").
[10] Lachterman, D., "The Physics of Spinoza's *Ethics*," in *Spinoza: New Perspectives*, ed. R. Shahan and J. Biro (Norman: University of Oklahoma Press, 1978), 75.
[11] Tschirnhaus, E., *The Letters*, in *Spinoza: Complete Works*, ed. M. Morgan and trans. S. Shirley (Indianapolis/Cambridge: Hackett Publishing Company, Inc., 2002), 911 (Ep. 59).
[12] Spinoza, *The Letters*, 911 (Ep. 59), 913 (Ep. 60).
[13] According to Stephen Gaukroger, "Spinoza introduces the idea of *conatus*, by which a body strives to retain its identity, to account in a different way for the individuation of bodies. To what extent this notion can be accommodated to the mechanist principles set out in [E2p13] is, however, an open question." Martial Gueroult suggests that in spite of the fact that *conatus* belies Spinoza's account of the physical world, it is a metaphysical principle and, therefore, unnecessary for explaining mechanics. He states: "it does not seem that one needs to involve the metaphysical notion of *conatus* here. Indeed, based in terms of phoronomy and the common notions that order it, Spinoza distinguishes bodies by nothing other than motion and rest, speed and slowness." Lachterman recognizes that "Spinoza avoids using the term '*conatus*' in the '*Physical Digression*' although he makes a tantalizing allusion to one congeneric notion, i.e. *conservatio*, in the fourth postulate concerning the human body. The relevant clues lie elsewhere, in the notions of law and of a body's nature. In the present context, I can pursue these clues only a short distance." According to Eric Schliesser, "Cartesian 'inertial' *motion* is a *consequence* of the state-preserving power inherent in each thing, while Spinoza offers no such consequence relation his lemma. . . . Motion is strikingly absent in motivating or explaining the *conatus* doctrine." Gaukroger, "Spinoza's Physics," 119 – 128; Gueroult, M., *Spinoza, T. 2 – L'Âme (*Ethique, II*)* (Hildesheim: Georg Olms Verlag, 1974), 154, 187 – 189 [my translation] (hereafter, *Spinoza, T. 2*); Lachterman, "The Physics of Spinoza's *Ethics*," 90; Schliesser, E., "Angels and Philosophers: With a New Interpretation of Spinoza's Common Notions," *Proceedings of the Aristotelian Society* 111 (2011): 513, 513n42.

[14] Spinoza, *Ethics*, 283 (E3p7).
[15] *Ibid.*, (2002), 244 (E2def1).
[16] *Ibid.*, (2002), 252 (E2p13lem1d).
[17] Spinoza, *The Letters*, 794 (Ep. 13).
[18] Spinoza, B., *Short Treatise on God, Man and His Well-Being*, in *Spinoza: Complete Works*, ed. M. Morgan and trans. S. Shirley (Indianapolis/Cambridge: Hackett Publishing Company, Inc., 2002), 44 (KV 1 § 2n12) (hereafter, *Short Treatise*).
[19] Cf. Spinoza, *Ethics*, 226 (E1p15s); Spinoza, *The Letters*, 774 (Ep. 6).
[20] Malebranche, N., *The Search after Truth*, ed. and trans. T. Lennon and P. Olscamp (Cambridge: Cambridge University Press, 2006), 27.
[21] Nevertheless, Robert Roecklin maintains that Spinoza does, in fact, uphold atomism while denying a vacuum. "Spinoza does deny a vacuum, but his simplest bodies are nonetheless atoms that move and rest alternately." Roecklein, R., "On Spinoza's 'Substance' or 'Nature,'" in *Politicized Physics in Seventeenth-Century Philosophy: Essays on Bacon, Descartes, Hobbes, and Spinoza* (Lanham: Lexington Books, 2014), 228n62.
[22] "[I]t is by reason and calculation that we divide bodies to infinity, and consequently also the forces required to move them. We can never confirm this by experiments." Spinoza, *The Letters*, 773 (Ep. 4).
[23] Siwek, P., *L'Âme et le corps d'après Spinoza: La Psychophysique Spinoziste* (Paris: Librairie Félix Alcan, 1930), 40.
[24] Hicks, G., "The 'Modes' of Spinoza and the 'Monads' of Leibniz," *Proceedings of the Aristotelian Society* 18 (1917 – 1918): 329 – 362.
[25] Spinoza, *The Letters*, 844 (Ep. 30).
[26] "If we wish to designate by soul everything which has perceptions and appetites in the general sense which I have just explained, all simple substances or created monads could be called souls." Leibniz, G., "The Monadology," in *Philosophical Papers and Letters, 2nd Ed.*, ed. and trans. L. Loemker (Dordrecht/Boston: D. Reidel Publishing Company, 1976), 644.
[27] Lachterman, "The Physics of Spinoza's *Ethics*," 84. Cf. Adler, J., "Spinoza's Physical Philosophy," in *Spinoza's Critical Assessments, Vol. 2 – The* Ethics, ed. G. Lloyd (London/New York: Routledge, 2001), 171.
[28] Hallett, H., *Æternitatis: A Spinozistic Study* (Oxford: Clarendon Press, 1930), 140; Deleuze, G., "The Actual Infinite-Eternal, The Logic of Relations," trans. S. Duffy (lecture presented at Université Paris VIII, Paris, France, 10 March 1981) http://www.webdeleuze.com/php/texte.php?cle=42&groupe=Spinoza&langue=2.
[29] Leibniz, G., "Letter to Varignon, with a Note on the 'Justification of the Infinitesimal Calculus by That of Ordinary Algebra,'" in *Philosophical Papers and Letters, 2nd Ed.*, ed. and trans. L. Loemker (Dordrecht/Boston: D. Reidel Publishing Company, 1976), 542 – 546 (herafter, "Letter to Varignon"); Newton, I., *The Principia: Mathematical Principles of Natural Philosophy*, translated by I. Cohen, et al. (Berkeley/Los Angeles/London: University of California Press, 1999), 446 (hereafter, *The Principia*).
[30] In his own copy of Ep. 12, Leibniz makes the following comment regarding Spinoza's presentation of this concept: "This, of which most mathematicians . . . are ignorant, is remarkably observed, and very carefully inculcated by our author." Leibniz, G., *Die Philosophischen Schriften von G.W. Leibniz, vol. I*, ed. Carl Gerhardt (Berlin: Wedmannsche Bunchhandlung, 1875 – 1890), 137n21. Cf. Deleuze, G., *Expressionism in Philosophy: Spinoza*, trans. M. Joughin (New York: Zone Books, 1990), 380 – 381n8.
[31] "Even though these are called imaginary, they continue to be useful and even necessary in expressing real magnitudes analytically." Leibniz, "Letter to Varignon," 543. "Those ultimate ratios with which quantities vanish are not actually ratios of ultimate quantities,

but limits which the ratios of quantities decreasing without limit are continually approaching, and which they can approach so closely that their difference is less than any given quantity, but which they can never exceed and can never reach before the quantities are decreased indefinitely." Newton, *The Principia*, 442 – 443.

[32] Rice, L., "Spinoza on Individuation," *The Monist* 55 (1971): 648. Cf. Matheron, A., *Individu et communauté chez Spinoza* (Paris: Les Éditions de Minuit, 1969), 27.

[33] Spinoza, *Ethics*, 253 (E2p13lem3ax2).

[34] Gueroult, *Spinoza, T. 2*, 158 – 159.

[35] *Ibid.*, 159, 161.

[36] *Ibid.*, 159.

[37] "Cycloid," *Python for Bioinformatics*, last modified January 2012, http://telliott99.blogspot.be/2012/01/cycloid.html.

[38] Huygens, C., *Horologium Oscillatorium*, trans. I. Bruce, last modified August 2013, http://www.17centurymaths.com/contents/huygenscontents.html.

[39] Gueroult, *Spinoza, T. 2*, 160.

[40] "You want to know what our people here think of Huygens' pendulums. As yet I cannot give you any definite information on this subject, but this much I know, that the craftsmen who was the sole right to manufacture them has stopped work altogether because he cannot sell them." Spinoza, *The Letters*, 845 (Ep. 30A). Cf. Chareix, F., "Le bal des pendules: Spinoza et Leibniz face à la mécanique théorique de Huygens," in *Spinoza/Leibniz: Rencontres, controversies, receptions*, ed. R. Andrault, et al. (Paris: Presses de l'université Paris-Sorbonne, 2014), 263 – 264.

[41] Gueroult, *Spinoza, T. 2*, 161.

[42] Spinoza, *Ethics*, 253 (E2p13lem3ax2def).

[43] Spinoza, *The Letters*, 774 (Ep. 6).

[44] Spinoza, *Ethics*, 255 (E2p13post2).

[45] *Ibid.*, 252 (E2p13ax3).

[46] *Ibid.*, 225 (E1p15s).

[47] Spinoza, *The Letters*, 790 (Ep. 12).

[48] *Ibid.*, 790 (Ep. 12).

[49] The following is Aristotle's account of Zeno's Achilles and the tortoise paradox: "[T]he so-called 'Achilles' argument . . . . declares that even the swiftest runner will never overtake the slowest, because the pursuer must first reach the point from which the pursued has set out . . . so that the slower runner will always be some distance ahead. The argument is essentially the same as the one that depends on repeated bisection." Aristotle, *The Presocratics*, ed. and trans. P. Wheelwright (Upper Saddle River: Prentice-Hall Inc., 1997), 110.

[50] Spinoza, *Ethics*, 226 (E1p15).

[51] Gueroult, M., "Spinoza's Letter on the Infinite (Letter XII, to Louis Meyer)," in *Spinoza: A Collection of Critical Essays*, ed. M. Grene and trans. K. McLaughlin (Garden City: Anchor Books, 1973), 185.

[52] Spinoza, *The Letters*, 919 (Ep. 64).

[53] Spinoza, *Ethics*, 255 (E2p13lem7s). In the letter to Schuller, Spinoza defines the *facies totius universi* as "although varying in infinite ways, yet remains always the same." Spinoza, *The Letters*, 919 (Ep. 64).

[54] *Ibid.*, 149 (Ep. 13). His phrasing in the *Short Treatise* is slightly different, but speaks to the same point: "Nothing can have no attributes." Spinoza, *Short Treatise*, 40 (KV 1 § 2n6).

[55] Spinoza, *The Letters*, 773 (Ep. 6).

[56] *Ibid.*, 773 (Ep. 6).

[57] *Ibid.*, 774 (Ep. 6).
[58] *Ibid.*, 774 (Ep. 6).
[59] *Ibid.*, 773 (Ep. 6).
[60] *Ibid.*, 773 (Ep. 6).
[61] Bennett, J., *A Study of Spinoza's* Ethics (Indianapolis: Hackett Publishing Company, 1984), 107.
[62] Spinoza, *Ethics*, 254 (E2p13lem4).
[63] *Ibid.*, 254 (E2p13lem4d).
[64] *Ibid.*, 254 (E2p13lem4d).
[65] *Ibid.*, 252 (E2p13lem1).
[66] *Ibid.*, 253 (E2p13lem3ax2def).
[67] Carriero, J., "Spinoza on Final Causality," in *Oxford Studies in Early Modern Philosophy*, ed. D. Garber and S. Nadler (Oxford: Clarendon Press, 2005), 134; Rice, L., "Spinoza, Bennett, and Teleology," *The Southern Journal of Philosophy* 23 (1985): 248 – 249. Cf. Viljanen, V., *Spinoza's Geometry of Power* (Cambridge: Cambridge University Press, 2011), 106.
[68] Spinoza, B., *Principles of Cartesian Philosophy*, in *Spinoza: Complete Works*, ed. M. Morgan and trans. S. Shirley (Indianapolis/Cambridge: Hackett Publishing Company, Inc., 2002), 176 (PPC2def3).
[69] *Ibid.*, 176 (PPC3def3).
[70] "Motion has force to persevere in its own state. This force is surely nothing else than motion itself. . . . Now . . ., let us grant that this *conatus* to motion is something other than the very laws and nature of motion. Because, then, you suppose this *conatus* to be a metaphysical good, this *conatus* will also necessarily have a *conatus* to persevere in its own being, and this again another *conatus*, and so *ad infinitum*. I cannot imagine anything more absurd than this." Spinoza, B., *Appendix containing Metaphysical Thoughts*, in *Spinoza: Complete Works*, ed. M. Morgan and trans. S. Shirley (Indianapolis/Cambridge: Hackett Publishing Company, Inc., 2002), 188 (CM 1.6) (hereafter, *Metaphysical Thoughts*).
[71]Spinoza, *Ethics*, 253 (E2p13lem3c).
[72] Descartes, R., *Principles of Philosophy*, in *The Philosophical Writings of Descartes, Vol. 1*, ed. and trans. J. Cottingham, et al. (Cambridge: Cambridge University Press, 1985), 240.
[73] Spinoza never uses the term 'inertia,' but this term has been adopted in the secondary literature given the nearly identical phrasing of E2p13lem3c and Newton's first law of motion, also known as his law of inertia. Newton, *The Principia*, 416; Garber, D., "Descartes and Spinoza on Persistence and *Conatus*," *Studia Spinozana* 10 (1994): 43 – 68.
[74] Spinoza, *Ethics*, 253 (E2p13lem3ax2).
[75] *Ibid.*, 253 (E2p13lem3ax2).
[76] "When . . . atoms are travelling straight down through empty space by their own weight, at quite indeterminate times and places they swerve ever so little from their course, just so much that you can call it a change of direction. If it were not for this swerve, everything would fall downwards like rain-drops through the abyss of space. No collision would take place and no impact of atom on atom would be created. Thus nature would never have created anything." Lucretius, *On the Nature of the Universe*, trans. R. Latham (London: Penguin Books, 1988), 66.
[77] Descartes, *Principles of Philosophy*, 241.
[78] Spinoza, *The Letters*, 850 (Ep. 32). Spinoza also rejects Descartes's sixth law of collision in a prior correspondence with Oldenburg: "I think that regarding the sixth rule of Motion in Descartes, . . . [he is] quite in error." Descartes's sixth law of collision reads as follows: "If a body C was at rest and exactly equal in size to a body B which moves towards it, then it must in part be pushed by B and in part cause B to rebound; so that if B approaches C

with four degrees of velocity, it must transfer one degree to it and return in the direction from which it had come through the other three degrees." *Ibid.*, 845 (Ep. 30A); Shirley, S., trans., *Ethics*, in *Spinoza: Complete Works* (Indianapolis/Cambridge: Hackett Publishing Company, Inc., 2002), 850n109.
[79] Descartes, *Principles of Philosophy*, 233.
[80] *Ibid.*, 233.
[81] *Ibid.*, 244.
[82] Spinoza, *The Letters*, 956 (Ep. 81).
[83] "[F]rom extension as conceived by Descartes, to wit, an inert mass, it is not only difficult, . . . but quite impossible to demonstrate the existence of bodies." *Ibid.*, 956 (Ep. 81).
[84] Spinoza, *Short Treatise*, 59 (KV 1 § 9); Spinoza, *The Letters*, 919 (Ep. 64).
[85] Spinoza, *Ethics*, 252 (E2p13lem3d).
[86] Viljanen, *Spinoza's Geometry of Power*, 109; Adler, "Spinoza's Physical Philosophy," 180.
[87] Garber, "Descartes and Spinoza on Persistence and *Conatus*," 44.
[88] Shirley, trans., *Ethics*, 283n1. Cf. Long, A., "Stoicism in the Philosophical Tradition: Spinoza, Lipsius, Butler," in *The Cambridge Companion to the Stoics*, ed. B. Inwood (Cambridge: Cambridge University Press, 2003), 365 – 392.
[89] Spinoza, *Short Treatise*, 53 (KV 1 § 5).
[90] *Ibid.*, 53 (KV 1 § 5).
[91] In the Dutch manuscripts of the *Short Treatise*, the translation of striving is *poging* [effort]. Given that the Dutch manuscripts are believed to be translations of a no longer extant Latin manuscript, however, it is unknown how Spinoza's original text actually reads. A more recent translation by Jan Knol substitutes *poging* with *streven* [endeavor], a term he sees as more likely to capture the original Latin. Whatever the original term may be, it suggests a likely equivalence between special providence and *conatus*. Spinoza, B., *Korte verhandeling over God, de mens en zijn geluk*, trans. J. Knol (Amsterdam: Wereldbibliotheek, 2011), 64n205.
[92] Spinoza, *Short Treatise*, 104 (KV App 2).
[93] Wolfson, H., *The Philosophy of Spinoza: Unfolding the Latent Processes of His Reasoning, Vol. 2* (Cambridge: Cambridge University Press, 1962), 197, 201.
[94] Van Sluis, J. and T. Musschenga, ed., *De boeken van Spinoza* (The Hague: Bibliotheek der Rijksuniversiteit Groningen and Haags Gemeentearchief, 2009), 37.
[95] Sirat, C., *A History of Jewish Philosophy in the Middle Ages* (Cambridge: Cambridge University Press, 1985), 409.
[96] Abrabanel, J., *The Philosophy of Love*, trans. F. Friedberg-Seeley and J. Barnes (London: Soncino, 1937), 394 – 396. Cf. Sirat, *A History of Jewish Philosophy in the Middle of Ages*, 409.
[97] Spinoza, *Metaphysical Thoughts*, 197 (CM 2.6).
[98] *Ibid.*, 197 (CM 2.6).
[99] *Ibid.*, 197 (CM 2.6).
[100] Spinoza, *Ethics*, 251 (E2p13s).
[101] For readings that characterize Spinoza's system as animistic, see Zac, S., *L'Idée de vie dans la philosophie de Spinoza* (Paris: Presses Universitaires de France, 1963) and Bouveresse, R., *Spinoza et Leibniz: L'Idée d'animisme universel* (Paris: Librairie Philosophique J. Vrin, 1992).
[102] Spinoza, *The Letters*, 849 (Ep. 32) [my emphasis].
[103] Spinoza, *Principles of Cartesian Philosophy*, 148 (PPCdef8.4).
[104] Spinoza, *The Letters*, 775 (Ep. 6).
[105] In the Physical Digression, Spinoza writes that "all bodies agree in that they involve the concept of one and the same attribute, and in that they can move now more slowly, now more quickly, and absolutely, that now they move, now they are at rest." Spinoza's use of

the term 'absolutely' should not be mistaken for Newtonian absolute motion and absolute rest. Spinoza, *Ethics*, 459 (E2p13lem2d).

[106] I borrow this construction from Samuel Shirley. Spinoza, *Ethics*, 251 – 255 (E2p13), 281 (E3p2s), 342 (E4p39); Spinoza, B., *Theological-Political Treatise*, in *Spinoza: Complete Works*, ed. M. Morgan and trans. S. Shirley (Indianapolis/Cambridge: Hackett Publishing Company, 2002), 460 (TP 7).

[107] Spinoza, *Short Treatise*, 44 (KV 1 § 2n12).

[108] Spinoza, *Ethics*, 252 (E2p13lem3).

[109] Balibar, É., "Spinoza: From Individuality to Transindividuality," *Mededelingen vanwege het Spinozahuis* 71 (1993): 9, 15 (hereafter, "From Individuality to Transindividuality").

[110] *Ibid.*, 10 – 11. Cf. Simondon, G., *L'individuation à la lumière des notions de forme et d'information* (Grenoble: Editions Jérôme Million, 2005); Simondon, G., "The Position of the Problem of Ontogenesis," trans. G. Flanders, *Parrhesia* 7 (2009): 4 – 16.

[111] Balibar, "From Individuality to Transindividuality," 9 – 10n9.

[112] "The individual would then be grasped as a relative reality, a certain phase of being that presupposes a preindividual reality, and that, even after individuation, does not exist on its own, because individuation does not exhaust with one stroke the potentials of preindividual reality. Moreover, that which the individuation makes appear is not only the individual, but also the pair individual-environment." Simondon, "The Position of the Problem of Ontogenesis," 5.

[113] Spinoza, *Ethics*, 282 (E3p4d).

[114] *Ibid.*, 282 (E3p4d).

[115] *Ibid.*, 283 (E3p7).

[116] Spinoza, *Short Treatise*, 37 (KV 1 § 1n1).