History of Philosophy Quarterly
Volume 29, Number 1, January 2012

NEWTON'S ANTI-CARTESIAN CONSIDERATIONS REGARDING SPACE

Noa Shein

Introduction[1]

In *De Gravitatione*,[2] Isaac Newton makes it quite clear what he thinks space is not. In particular, he raises objections to René Descartes's construal of space as extended substance. However, central features of his positive view remain unclear. Consider, for example, the following key passage:

> Perhaps now it may be expected that I should define extension as substance, or accident, or else nothing at all. But by no means, for it has its own manner of existing which is proper to it and which fits neither substances nor accidents. It is not a substance: on the one hand, because it is not absolute in itself, but is as it were an emanative effect of God and an affection of every kind of being; on the other hand, because it is not among the proper affections that denote substance, namely actions, such as thought in the mind and motions in the body. (Newton 2004, 21)[3]

Newton here seems to be breaking with the traditional ontological dichotomy between substance and accident.[4] He offers "emanative effect of God and an affection of every kind of being" as something between substance and accident—although closer to substance—and takes space to belong to this ontological category. How are we, though, to understand this emanative effect and affection of beings?

One key step toward answering this question is to consider the following: Is the relation of God and creatures to space univocal? It is this last question that I will focus on. Recent influential articles have advanced the position that the relation is, in fact, univocal, and that the relation between space and God does not, in principle, have precedence over the relation of space to any other kind of being.[5] Howard Stein expresses this by saying that space "results from" the existence of anything and,

since it results from *any* existing thing, it results from the first existing being—namely, God—as well. In this paper, I will argue to the contrary and claim that space is primarily related to God and only derivatively to everything else.[6]

To do so, I will look closely at some of Newton's objections and reactions to Descartes. In addition to the overt objections to Descartes, I suggest that other central Newtonian ideas can be better understood when considered as reactions to Descartes. This, in turn, will allow us to gain better insight into Newton's metaphysical and epistemological commitments and thereby attain a fuller understanding of his positive view regarding the nature of space.

I will begin by laying out these commitments and their relation to Descartes. There are three points that are of particular interest for our purposes. First, it seems that, as Newton reads Descartes, one can have a clear and distinct idea of extension prior to having a clear and distinct idea of God. Newton will object by saying that things that depend on others must be conceived through what they depend on. Second, Newton objects to Descartes's construal of the essence of extension as consisting merely of breadth, length, and depth—in other words, to its seeming inertness—and will claim that all substances act. Finally, Newton will attack some aspects of Descartes's construal of the interaction between mind and body and hold that all action must be local. As we shall see, these lines of objection reveal commitments regarding the conceivability of creatures, the necessary activity of substances (and extended substances in particular), and, finally, space as a condition of possibility for any action (be it bodily or mental). The important implication of these last two points is that God's activity—that is, creation—is local as well.

In the second part of the article, I return to consider Newton's claim that space is an emanative effect of God and an affection of every kind of being in light of the commitments laid out in the first part. I conclude by raising objections to the Stein-Janiak type of interpretation of the characterization of space as resulting from any existing thing.[7]

What Cannot Be Thought Independently Cannot Exist Independently

In *De Gravitatione,* Newton objects, among other things, to Descartes's conception of proper motion, the real distinction between mind and body, and the identification of body with space. He raises the following objection to the identification of body with extension:

> If we say with Descartes that extension is body, do we not manifestly offer a path to atheism, both because extension is not created but has

> existed eternally and because we have an idea of it without any relation to God and so in some circumstances it would be possible for us to conceive of extension while supposing God not to exist? (Newton 2004, 31)

Newton then claims that, if body is identified with space, that is, if we accept Cartesian extension, this would lead to atheism for two reasons, which I will treat separately. The first reason he offers is "because extension is not created but has existed eternally." Why does Newton claim that taking extension to be *uncreated* leads to atheism? Newton cannot be claiming that *space*, as uncreated, might lead to atheism, since uncreated space is fundamental to his own positive view, which he clearly thinks is an alternative that leads *away* from atheism. What is at work in the background here is Newton's disapproval of the identification of space with body. If space is uncreated—as Newton supposes it is—and space is identical to body—as it is for the Cartesians—one can conclude that body is uncreated. Taking *body* to be uncreated might indeed lead to atheism, since it could lead to full-blown materialism, in which case God's role would be superfluous at best.

Let us now consider the second part of Newton's objection: "and because we have an idea of it without any relation to God and so in some circumstances it would be possible for us to conceive of extension while supposing God not to exist" (Newton 2004, 31). We know that Newton read Descartes's *Meditations* and saw Pierre Gassendi's objections to them.[8] To understand why Newton thinks this can lead to atheism, it is important to revisit the *Meditations*. The relevant issue here is the wax example in the Second Meditation. In what follows, I offer a reading of the *Meditations* as I believe Newton understood them in light of his objections to Descartes. Naturally, this reading may not be the most charitable one, but it does pick up on a sensitive issue for Descartes (one that Baruch Spinoza also objected to). One of the things the meditator is supposed to recognize from inspecting the wax is that she comes to know it, *qua* body, via the intellect alone and not via the senses. Furthermore, although the meditator cannot fully appreciate this at this point in the *Meditations*, in retrospect, she comes to recognize that the inspection of the wax actually culminated in a clear and distinct perception of the innate idea of extension.

For our purposes, what is crucial is that this clear and distinct perception of extension comes *before* the Third Meditation, that is, before the proofs for God's existence. So it seems possible to read the *Meditations* as allowing us to have a clear and distinct perception of extension while feigning God's inexistence. This is precisely what Newton fears could potentially lead to atheism. If we can *think* of extension without God, then we might be tempted to think that extension can *exist* without God.

To clarify this, let us turn our attention to a point Newton makes later in *De Gravitatione*:

> Indeed, however we cast about we find almost no other reason for atheism than this notion of bodies having, as it were, a complete, absolute, and independent reality in themselves, such as almost all of us, through negligence, are accustomed to have in our minds from childhood (unless I am mistaken), so that it is only verbally that we call bodies created and dependent. And I believe that this prejudice explains why the same word, substance, is applied univocally in the school to God and his creatures, and what philosophers, in forming the idea of body, cling to and ramble on about, *when they try to form an independent idea of a thing dependent upon God. For certainly whatever cannot exist independently of God cannot be truly understood independently of the idea of God*. God does not sustain his creatures any less than they sustain their accidents, so that created substance, whether you consider its degree of dependence or degree of reality, is of an intermediate nature between God and accident. *And hence the idea of it no less involves the concept of God, than the idea of accident involves the concept of created substance*. (Newton 2004, 32–33; italics added)

Although this segment does not target Descartes specifically or solely, we can nonetheless understand how Newton can see this as directed at Descartes's conception of extension as a created substance.

There are two aspects of Newton's objection, one ontological and the other epistemological. The objection on ontological grounds is that bodies, being created substances, are in fact treated by Descartes as uncreated, that is, as independent. It is clear, given Newton's focus on the independence of substance that he has in mind here a definition of substance akin to the one Descartes provides in *Principles* I, 53: "By *substance* we can understand nothing other than a thing which exists in such a way as to depend on no other thing for its existence" (CSM I, 210; AT VIII, 25).[9] Since bodies are treated as independent, Newton believes the term "substance" is in fact being applied univocally to both God and bodies, which is illegitimate. It is clear that Descartes is not literally guilty of this since he makes it clear in the definition of "created substance" that the term "substance" is not being applied univocally.

On epistemological grounds, however, Newton might believe that Descartes is *de facto* vulnerable to this charge. At play here is Newton's commitment to the claim that, if things can be thought of independently, they can exist independently (as well as the converse that what cannot exist independently cannot be understood separately): "For certainly whatever cannot exist independently of God cannot be truly understood independently of the idea of God." Combining these considerations with

what we reviewed regarding the clear and distinct perception of extension arrived at in the Second Meditation, we can say the following: Since it seems that, according to Descartes, we can have a clear and distinct perception of body prior to having a clear and distinct conception of God, Descartes is, in fact, committed to the claim that bodies—like the wax—can exist independently of God. Newton expresses this in the passage above as follows: "And I believe that this prejudice [of treating bodies as independent] is . . . what philosophers, in forming the idea of body, cling to and ramble on about, when they try to form an independent idea of a thing dependent upon God."

In his article "Newton's Metaphysics," Stein presents his view that Newton is committed to the general claim that space in some sense "results from" the existence of *anything* and consequently of God. As evidence, he refers to the same text we saw above: "we have an idea of it without any relation to God and so in some circumstances it would be possible for us to conceive of extension while supposing God not to exist" (Newton 2004, 31).[10] More specifically, he believes that this text makes it clear that the counterfactual statement of the sort "if God did not exist but some other being exists, space exists" is intelligible for Newton. I will address the specific problems with this view later on, but for now it is important to recognize why this text should be read in a different light. For Stein, this text makes it clear that Newton believes we can think about space while supposing that God does not exist. Furthermore, he takes this statement to be decisive on this issue. However, not only is that not the case, but it can and should be read, as we saw, as affirming the very opposite point. Newton thinks that, if we follow the Cartesian path by supposing that the idea of space can be independent of the idea of God, we arrive at atheism. If we were to read the passage as Stein suggests, namely, that we can think about space while entertaining the idea that God does not exist, it is not clear how that would lead us *away* from atheism. On the contrary, Newton believes that what leads us *to* atheism is, precisely, supposing that we can conceive of space independently of God.

Newton draws conclusions vis-à-vis his own positive view from this argument both regarding the nature of created beings—that is, bodies—and with respect to the ontological status of space and time. The conclusion regarding bodies is clear: they must be thought through God, to use a Spinozistic term, because they depend on God. The ontological claim is that created beings are of an intermediate ontological status between God and accidents.

Newton also argues on conceptual grounds that space and time cannot be accidents of created substances. The continuation of the passage just quoted makes this explicit:

> Thus the prejudice just mentioned must be laid aside, and substantial reality is to be ascribed to these kinds of attributes, which are real and intelligible things in themselves and do not need to be inherent in a subject, rather than to the subject which we cannot conceive as dependent, much less form any idea of it. And this we can manage without difficulty if (besides the idea of body expounded above) we reflect that we can conceive of space existing without any subject when we think of vacuum. And hence some substantial reality fits this. (Newton 2004, 32–33)

Newton's position here also relies on his commitment to the idea that what can be thought of independently can exist independently as well. Since we can think of space independently of any bodies, for example, as we do when we think of vacuum, it can exist independently of bodies. Newton believes that this shows that space is not an accident, for if it were, it would depend on a subject—a body—and would have to be conceived through it, so to speak.

All Substances Act

Newton's objections to the Cartesians can also be seen as motivating his stance that all substances be able to act.[11] As we shall see, this applies both to God and creatures. When Newton gives a negative characterization of the ontological status of space, he says that it is not substance, as we saw, nor is it an affection either: "because it is not among the proper affections that denote substance, *namely actions such as thoughts in the mind and motion in body . . .*" (Newton 2004, 21; italics added). We can see here that Newton takes "action" as the paradigmatic example of the proper affection of substance, along with the kinds of things that count as actions. Furthermore, Newton does not believe he is saying anything new here, only making explicit what philosophers already think:

> For although philosophers do not define substance as an entity that can act upon things, yet everyone tacitly understands this of substances, as follows from the fact that they would readily allow extension to be substance in the manner of body if only it were capable of motion and of sharing the actions of body. And on the contrary, they would hardly allow that body is substance if it could not move, nor excite any sensation or perception in any mind whatsoever. (Newton 2004, 21–22)

It is puzzling at first that Newton chooses to make his point regarding the active nature of substance by using extended substance as his prime example. Newton's view would be seen much more easily as applying to thinking substance, since thinking is active. It is also clear why this can be attributed to the infinite substance, since the infinite substance is in no way passive.[12] However, the case is not as obvious for extended substance, and the important example here, although overlooked, is

once again Descartes. It is curious that Newton attributes this view to philosophers and, thus, would intend for it to hold for Descartes as well, since for Descartes, the essence of extended substance is simply to be extended in length, breadth, and depth (*Principles* II, 4, CSM I 224; AT VIII 42). This is a notoriously sensitive issue for Descartes, since it seems, at least, that God is needed to set extension in motion—that is, Descartes can be read as requiring activity to be *added* to extension.[13] It seems unlikely that Newton was unaware of Descartes's position on this matter, especially since *De Gravitatione* is intended in part as a case against the Cartesian understanding of motion. Newton, therefore, can be seen to be claiming here that, even for Descartes, extended substance ultimately must be endowed with motion and therefore with activity. If the kind of substance that might seem most problematic—that is, material substance—can be shown to be active, then, Newton can draw the grand conclusion that all substances are, in fact, active.

All Action Is Local

Although Newton does not believe we can ever know the essence of material substance (Newton 2004, 33), he does say several things about the conditions of the interaction among substances or rather the conditions for substances acting on one another. For our purposes, what is important is Newton's claim that all action is local, or conversely, that there is no action at a distance. The reason for holding this claim is on conceptual grounds. I will show that he holds this view regarding all the possible classes of interaction among beings. First, I will show that this is the case for interaction among bodies, then for actions between mind and bodies, and finally between God and created substances.

1. Activity among Bodies. The question regarding how bodies can or cannot act upon one another comes to the forefront for Newton when he ascribes gravity to bodies. Newton's claim that bodies attract one another made him subject to the objection that he reintroduced an occult quality since gravity implies action at a distance. This can be seen, for example, in G. W. Leibniz's fifth letter in his correspondence with Samuel Clarke[14]:

> I objected, that an attraction properly so called, or in the scholastic sense, would be an operation at a distance, without any means intervening. The author answers here, that an attraction without any means intervening, would be indeed a contradiction. Very well! But then what does he mean, when he will have the sun to attract the globe of the earth through an empty space? (Clarke, Leibniz, et al., 1970, 94)

Sensitive to this type of objection, Newton articulates some conditions regarding the possibility of action among bodies. Although Newton

claims we cannot know whether gravity is essential to bodies, or the mechanism by which it acts, it is clear that a mechanism is required and that it cannot be action at a distance. In his correspondence with Richard Bentley, he says,

> That gravity should be innate, inherent, and essential to matter, so that one body may act upon another through a vacuum without the mediation of anything else, by and through which their action and force be conveyed from one to another, is to me so great an absurdity, that I believe no man who has in philosophical matters a competent faculty of thinking can ever fall into it. Gravity must be caused by an agent acting constantly according to certain laws, but whether this agent be material or immaterial, I have left to the consideration of my readers. (Newton 2004, 102–3)

The rejection of action at a distance is on conceptual grounds—action at a distance is repugnant to reason. If there can be no action at a distance, that is, action with no mediation among two bodies, action among bodies must be local. Another way of putting it is to say that a substance can only act where it is. Janiak proposes to resolve the apparent tension between treating gravity as a real force and the denial of action at a distance by claiming that local action need not be understood as mechanical in the Leibnizian sense. That is, for Leibniz, local action must be understood via impact: "A body is never moved naturally, except by another body which touches it and pushes it; after it continues until it is prevented by another body which touches it. Any other kind of operation on bodies is either miraculous or imaginary" (Clarke, Leibniz, et al. 1970, 66). According to Janiak, Newton is agnostic as to how precisely bodies interact locally, and he proposes that Newton can hold that it cannot be denied, on empirical grounds, that they interpenetrate at the microscopic level while interacting via impact at the macroscopic level.[15] Therefore, since gravity need not be explained via laws of impact, Newton can hold both that gravity is a real force and that all action is local.[16] Although there is great tension, or at least an apparent tension, between Newton's commitment to the ascription of gravity to bodies and his denial of action at a distance, we need not delve further into this issue. For our purposes, it is only important to note that Newton seems committed to the maxim that all action is local in the case of bodies in addition to or in spite of their having gravitational force.

2. Activity of Minds and Bodies. Not only does Newton claim that bodies act locally, but he believes that minds do so as well. Newton, along with many others, finds Descartes's real distinction between mind and body problematic: "Nor is the distinction between mind and body in his philosophy intelligible, unless at the same time we say that mind has

no extension at all, and so is not substantially present in any extension, that is, exists nowhere; which seems the same as if we were to say that it does not exist, or at least renders its union with body thoroughly unintelligible and impossible" (Newton 2004, 31). Furthermore, Newton takes it as axiomatic that our minds move our bodies: "[E]ach man is conscious that he can move his body at will, and believes further that other men enjoy the same power of similarly moving their bodies through thought alone" (Newton 2004, 15). The only way minds can move bodies, then, is by being in the same place as their respective bodies. The reason Newton insists that minds have "to be present in extension" in order to move them is precisely because all action must be local. Here again we see that Newton's insistence on local action is based on conceptual grounds. Action that is not local is unintelligible.

Newton understands Descartes as being committed to the real distinction between minds and bodies and, at the same time, to their union and interaction.[17] He, therefore, can be seen here to be raising a concern that is analogous to the one that Leibniz raises against gravity. Just as it was repugnant to reason to conceive of bodies interacting with no mediation, or at a distance, it is equally repugnant, according to Newton, to conceive of the mind and the body interacting at a distance, that is, not locally. Newton's commitment to the unintelligibility of action at a distance can be seen as a partial motivation for his holding the view that minds must be spatially located. Therefore, if the mind cannot be located in space, Newton claims, it is literally unintelligible to conceive of it as causing motion in the body. Here again, as in the case of the interaction among bodies, even though Newton is committed to local action of the mind on the body, he does not pretend to propose an account of the mechanism by which this action is performed.

While Leibniz agrees with Newton regarding the unintelligibility of action at a distance, he resists Newton's conclusion that minds must be spatially located. Leibniz can maintain his denial of action at a distance but, at the same time, deny the localization of minds in this respect because of his denial of the real interaction between minds and body. Leibniz, as is well known, accounts for the apparent interaction between minds and bodies by alluding to the preestablished harmony between them.[18] He does not, as far as I can tell, raise the following consideration that is a somewhat unorthodox implication of Newton's position, although he may have had it in the back of his mind. Newton's claim that minds move the bodies to which they are united entails allowing two substances to be present in the same place.[19] Two bodies, of course, cannot be in the same place because they are impenetrable (Newton 2004, 28), but a mind and a body must be in the same place in order for

the former to be the cause of motion in the latter. Furthermore, as we shall see in a moment, God's omnipresence entails that he is also, albeit not entirely, in the same place as a mind and a body. Thus, Newton gives up the maxim that no two things can be in the same place at the same time. God, a mind and the body to which it is united, are all, even if not entirely, in the same place.

A final element in the mind-body interaction that will be relevant to God's relation to space is the following: Newton believes that the mind's power to move the body is a limited version of God's power to create bodies. This can be seen in the continuation of the text quoted above:

> Since each man is conscious that he can move his body at will and believes further that other men enjoy the same power of similarly moving their bodies by thought alone, the free power of moving bodies at will can by no means be denied to God, whose faculty of thought is infinitely greater and more swift. And for the same reason it must be agreed that God, by the sole action of thinking and willing, can prevent a body from penetrating any space defined by certain limits. (Newton 2004, 27)

It seems, then, that whatever allows minds to move bodies allows God to create bodies, but to a much greater extent, of course. Regarding what we can know of God, Newton says in the General Scholium to the *Principia*: "For all discourse about God is derived through a certain similitude from things human, which while not perfect is nevertheless a similitude of some kind" (Newton 2004, 92). The crucial point, however, is that one of the conditions of the possibility for a mind to cause movement in a body is that it be in the same place as that body—regardless of the fact that we do not know by which mechanism it does this. This is true of God as well. A condition of the possibility of God's creating a body is that God be, even if not entirely, in the same place as the created body. In other words, action is local even for God, as we shall presently see.

3. God and Creatures. We can see that Newton believes that the infinite substance must act locally as well, by considering the conditions of the possibility of God's omniscience and omnipotence. Newton believes that animals perceive because the mind is present in the same place where the senses are and, thus, animals perceive what affects the senses: "Is not the sensory of animals that place to which the sensitive substance is present, and into which the sensible species of things are carried through the nerves and the brain, that there they may be perceived by their immediate presence to the substance?" (Newton 2004, 130).

The case is similar with God: "[God] sees the things themselves intimately, and thoroughly perceives them, and comprehends them wholly *by*

their immediate presence to himself" (Newton 2004, 130; italics added). Newton makes it clear that he does not think that the senses themselves perceive but rather that they serve as a conduit to the mind from what is external to the body to the mind. The mind perceives immediately what is given in the senses. In other words, the human mind immediately perceives the input from the senses, while what is external to us it perceives mediated through the senses. He makes this point clear in the Query 30 to the *Opticks* while denying a pantheistic interpretation of his view:

> [God is no more the soul of things] than the soul of man is the soul of the species of things carried through the organs of sense into the place of its sensation, where it perceives them by means of *its immediate presence*, without the intervention of any third thing. The organs of sense are not for enabling the soul to perceive the species of things in its sensorium but for conveying them thither. (Newton 2004, 138; italics added)

God does not need sense organs to perceive the world since sense organs serve to funnel to the sensorium the impression of what is external to the body. However, God perceives with no mediation, according to Newton, because he is literally everywhere: "God has no need of such organs, he being everywhere present to the things themselves" (Newton 2004, 138–39).

Finite minds require sensory organs in order to perceive because no two bodies can be in the same place; thus, finite minds are restricted to the place where the bodies to which they are united are located. No such restriction applies to God. Nonetheless, perception is local. God can only perceive where he is. God's being substantially present everywhere is a condition of the possibility of his omniscience.

In a parallel way, God's omnipotence is possible only by virtue of his omnipresence.[20] God's omnipotence is expressed most forcefully by his creative power. When he creates bodies, he endows a region of space with sensible qualities and impenetrability (Newton 2004, 27–28), and in order to do so, he must be present in that place. In the same way that God can only perceive where he is located, he can only create where he is present. His presence is to be understood literally, as he makes clear in the General Scholium in the *Principia*: "He is omnipresent not only *virtually* but also *substantially*; for action requires substance" (Newton 2004, 91). This is in contrast to Descartes who, of course, would not deny that God is omnipresent but would clearly object to saying that God is literally or substantially in extension.[21]

Emanative Effect of God and an Affection of Every Kind of Being

We are now in a position to reconsider Newton's characterization of space as an emanative effect of God and an affection of any kind of being. As we have seen, since God is a substance and therefore acts and since there can be no action at a distance, God must act locally. Since action in general requires space, God's activity, in particular, requires space. Therefore, for this reason, space itself cannot be created. For Newton, to conceive of space as created is a contradiction, since space is a condition of the possibility for creation: "If ever space had not existed, God at that time would have been nowhere; and hence he either created space later (where he was not present himself), or else, which is no less repugnant to reason, he created his own ubiquity" (Newton 2004, 26).[22] Here, we can see Newton's insistence that God cannot create where he is not present—an instance of Newton's more general claim that action is local. It is in this sense that space is a necessary consequence. Stein states as well that space is a necessary consequence, but this is only a characterization rather than an analysis of why this is so (Stein 2002, 269). The crucial link that has been overlooked is Newton's commitment to the notions that, on the one hand, substances act, and, on the other, that all action must be local. A fuller account, then, would be the following: to be is to act, and to act is to act locally, that is, in space and time.

We are now in a position to treat the following passage from *De Gravitatione* and put it in context with what I have suggested thus far: "God is everywhere, created minds are somewhere, and body is in the space that it occupies; and what is neither everywhere nor anywhere does not exist. Hence it follows that space is an emanative effect of the primarily existing being, because when any being is posited, space is posited" (I use here McGuire's translation [1995, 3]). Newton here seems to be giving a catalogue of the kinds of substances that exist: God, minds and bodies. It is clear that he is only discussing substances and not everything that exists because of his omission of time. Time, of course, also exists for Newton, but it is not a substance. Therefore, if he were cataloguing *everything* that exists, time would also be part of the list. All substances are related to space in one way or another: God is ubiquitous, bodies are in their place, and minds are somewhere (in virtue of which they can act on bodies). The reason they all are related to space is that they act. After establishing that all substances are related to space, Newton infers that space is an emanative effect of the primarily existing being. Space is an emanative effect *because* it cannot be created—space is a condition of the possibility of creation.

According to Janiak, the first being to exist, any being, emanates space: "Instead, Newton's view is general: since space is an affection of every entity, it follows that space emanates from whatever entity is the *first to exist*" (Janiak 2008, 146; italics added). This, in part, is intended to be a gloss on Newton's statement: "Et hinc sequitur quod spatium sit entis primariò existentis effectus emanativus, quia posito quolibet ente ponitur spatium," which Janiak translates as follows: "And hence it follows that space is an emanative effect of the first existing being, for if any being whatsoever is posited, space is posited" (Newton 2004, 25). The important thing to notice is that Janiak translates *primario* in temporal terms as "first." This reading, however, seems problematic since, in a sense, it makes space dependent on time. Newton, however, treats time and space in terms of the cause of their existence—an emanative effect—and he considers them as parallel with no precedence of one over the other. Since space and time coemanate from the first being, understanding *primario* as "first" in temporal terms is misleading. A better translation is that of McGuire who translates it as "primarily" (McGuire 1995, 3). Newton's concern here is not temporal primacy but ontological primacy. Therefore, when Newton claims that space is an affection of the *entis primario existentis*, he clearly means to say it is an emanative effect of God—the primarily existing being—and not an emanative affection of whatever happens to exist first.

Let us turn our attention to the second part of the quoted text: "for if any being whatsoever is posited, space is posited." This conditional is presented to explain why space is an emanative effect of the primarily existing being. The first part of the passage, as we saw, makes it clear which beings are candidates for being posited: God, minds, and bodies. That is, the candidates must be either an infinite substance or a finite substance. Let us consider the infinite substance first: if God, an infinite substance, is posited, space is posited. The reason for this is not stated in this passage, but in light of what we have seen above, we can understand it: God is a creator: that is, he acts, and action is only intelligible as occurring in space. Therefore, if God—the creator—is posited, space is posited.

We can now consider what happens when we posit a finite being to exist. Recall Newton's objection to the Cartesians: bodies cannot be conceived without conceiving what they depend on—namely, the infinite substance: "For certainly whatever cannot exist independently from God cannot be truly understood independently of the idea of God" (Newton 2004, 32). Therefore, assuming Newton maintains this commitment throughout the *De Gravitatione* and there is no indication to the contrary, we can say that, in the passage under consideration, in order to posit a finite substance, we must at the same time conceive it to be dependent

on God. Therefore, positing a finite substance necessitates positing an infinite substance, which, in turn, implies positing space. One important thing to notice here is that positing an infinite substance and a created one are not the same. Positing a created substance, which is dependent by nature, requires us to posit an infinite one. We can, of course, confusedly entertain the idea, or imagine, the finite thing without God, but this would be mistaken and is clearly not what Newton has in mind.

One might say that Newton is pointing out here something about space and beings in general, a la Stein and Janiak, and even though finite substances do depend on God, their relation to space is immediate.[23] This, however, seems to conflict with Newton's metaphysical commitment that substances act[24] or, as we saw above, that activity is a proper affection of substance (Newton 2004, 21). The reason for this is the following: not only does the existence of finite substances derive from God's existence, but, we must admit, ultimately their activity also derives from it in one way or another. Even granting that the existence of a finite substance and its activity are two different things, which depend on God in different ways perhaps, the activity is still dependent on and derivative of God's activity, namely, God's creative power. Therefore, a finite being does not have space as an *immediate* emanative effect but has it only as it is *mediated* through God. Space, then, is primarily an emanative effect and affection of God and only derivatively of minds and bodies.

Objections to the Stein/Janiak Counterfactual

Both Stein and Janiak believe that Newton's commitment to space being an affection of being—any being—is completely general and applies univocally to God and other beings. One way to express this is by the counterfactual of the sort we saw above: "If God did not exist, but a frog existed, space would exist." In order to consider the counterfactual as a viable account of Newton's view, it must be something that can be articulated given Newton's other commitments. Let us then try to spell out this counterfactual. The counterfactual requires us to be able to think of a frog, say, while feigning God's inexistence. More specifically, if we suppose the existence of a finite being and *no* infinite being, space would exist since, according to Stein and Janiak, it is said to be an affection of *any* being. However, for Newton, any finite being is created. As he makes clear, created things depend on God's will: "That for the existence of these beings [bodies or something like them] . . . extension and an act of the divine will are enough" (Newton 2004, 29). As we saw before, in light of Newton's objection to the Cartesians, since finite beings, and bodies in particular, are dependent on God, they must be thought of *through* God. Therefore, according to Newton, we cannot truly understand a finite being without thinking at the same

time about God. On conceptual grounds, then, the counterfactual would be literally unintelligible for Newton. Furthermore, the positing of the counterfactual would make him vulnerable to the objection he himself raised against the Cartesians and, therefore, is not a viable characterization of Newton's position.

Keeping in mind Newton's objections to the Cartesians, one can see why the relation of God and creatures to space cannot be univocal. God's relation to space is immediate. God's activity, which is essential to him, must be local and, therefore, takes place in uncreated space—although it emanates from him. Created substances, on the other hand, depend on God both for their existence and activity in some way or other. Therefore, space, as an affection of created substances, is necessarily derivative of space as an emanative effect and affection of God. Recognizing this last point opens the path for further investigation into Newton's seemingly enigmatic characterization of space as an emanative effect of God and affection of every being.

The Hebrew University of Jerusalem

NOTES

1. I would like to thank Alan Nelson, Andrew Janiak, Eric Schliesser, Mary Domski, and Geoffrey Gorham for their helpful comments on earlier drafts of this paper. I would also like to thank participants of the Scottish Seminar in Early Modern Philosophy (2010), as well as participants of the National Endowment for the Humanities Summer Seminar, directed by Daniel Garber and Roger Ariew (2010) for their insightful observations. Finally, I would like to thank the Edelstein Center at the Hebrew University for supporting me through a postdoctoral fellowship while working on this article.

2. What has been come to be known as *De Gravitatione* is an incomplete draft, first published in 1962, which begins with the sentence (and, hence, the title), "De Gravitatione et aequipondio fluidorum et solidorum in fluidis scientiam duplici methodo tradere convenit"—"It is fitting to treat the science of the weight and of the equilibrium of fluids and of solids in fluids by a two fold method." For issues regarding the precise dating of this work see, Howard Stein, "Newton's Metaphysics," in *The Cambridge Companion to Newton*, edited by I. B. Cohen and G. E. Smith, 302n39 (Cambridge: Cambridge University Press, 2002); and J. E. McGuire, "The Fate of the Date: The Theology of Newton's Principia Revisited," in *Rethinking the Scientific Revolution*, edited by M. J. Osler, 271–96 (Cambridge: Cambridge University Press, 2000).

3. All quotes, unless otherwise stated, are from Newton's works are taken from Isaac Newton, *Philosophical Writings*, translated and edited by Andrew Janiak (New York: Cambridge University Press, 2004), and page numbers refer to the pagination in this book.

4. McGuire suggests that perhaps Newton was indebted to Pierre Gassendi on the issue of holding space to be neither a substance nor an accident. J. E. McGuire, *Tradition and Innovation: Newton's Metaphysics of Nature* (Dordrecht; Boston: Kluwer Academic Publishers, 1995), 1.

5. Cf. Stein 2002, 268; and Andrew Janiak, *Newton as Philosopher* (Cambridge: Cambridge University Press, 2008), 145.

6. McGuire and Slowik also argue for the primacy of the relation of space to God over that of creatures. They do so for reasons complementary to my own and stress the primacy of space as an affection of God. J. E. McGuire and Edward Slowik, "Newton's Ontology of Omnipresence and Infinite Space," *Oxford Studies in Early Modern Philosophy*, edited by Daniel Garber and Steven Nadler (forthcoming).

7. There are, of course, many ways in which Howard Stein and Andrew Janiak differ in their interpretations. For example, Stein holds that Newton is what he calls a "philosophical empiricist ("Newton's Metaphysics," 261). Janiak, on the other hand, holds that Newton arrives at certain conclusions that he cannot, in principle, reach empirically ("Substance and Action in Descartes and Newton," *The Monist* 93, no. 4 [2010]: 657–77). They are, however, in agreement about the univocal relation of creatures and God to space.

8. McGuire, *Tradition and Innovation*, 151–52 ; and Janiak, trans., *Philosophical Writings*, 21n.7.

9. All Descartes references, unless otherwise noted, are from Descartes, *The Philosophical Writings of Descartes*, translated by John Cottingham, Robert Stoothoff, and Dugald Murdoch (CSM), 3 vols. (Cambridge: Cambridge University Press, 1984). I have also noted the pagination from the standard edition of Descartes's writings edited by Charles Adam and Paul Tannery (AT). To do so, I have used the common abbreviations: e.g., "CSM I, 210; AT VIII, 25" indicates the first volume of *The Philosophical Writings of Descartes*, 210, and page 25 in volume VIII of the Adam and Tannery edition.

10. Stein, "Newton's Metaphysics," 271.

11. Schliesser has argued for the position that Newton should be taken to admit only one substance, since there is only one thing that satisfies both the conditions of depending on nothing else and is a cause of action. Eric Schliesser, "Newton's Substance Monism, Distant Action, and the Nature of Newton's Empiricism: Discussion of H. Kochiras," *Studies in History and Philosophy of Science Part A* 42, no. 1 (2011): 160–66. Nonetheless, Newton does make a distinction between God and creatures and seems to treat creatures as substance-like, even if one were to grant that they are not strictly substances. Although creatures depend on God for their existence, Newton thinks that they can be the cause of action—and, in this important sense, they are substance-like. For a

discussion of the different sense in which Newton uses the term *substance*, see Janiak *Newton as Philosopher*, 140–41. For my purposes, all that is important to recognize here is the ability of God, minds, and bodies to cause action, as I shall presently show. For this reason, I allow myself to use the terms "created being" and "finite substance" interchangeably.

12. Cf., e.g. Newton, *Philosophical Writings*, 3.

13. On this issue, see Daniel Garber, *Descartes' Metaphysical Physics* (Chicago: University of Chicago Press, 1992), chapter 7.

14. Cf. also 3, Samuel Clarke, G. W. Leibniz, and Isaac Newton, *The Leibniz-Clarke Correspondence, Together with Extracts from Newton's Principia and Opticks*, edited by H. G. Alexander (Manchester, UK: Manchester University Press, 1970), 66.

15. Andrew Janiak, "Newton and the Reality of Force," *Journal of the History of Philosophy* 45, no. 1 (2007): 127–147, at 142–3.

16. Hylarie Kochiras, on the other hand, argues that Newton cannot consistently hold that all we know of substance is through experience, the denial of action at a distance and the real efficacious nature of gravity. Kochiras, "Gravity and Newton's Substance Counting Problem," *Studies in History and Philosophy of Science Part A* 40, no. 3 (2009): 277.

17. It is an open question, of course, how exactly to construe the union of mind and body and their interaction. See, e.g., Garber, *Descartes' Metaphysical Physics*, 73–75; Paul Hoffman, "The Unity of Descartes's Man," *The Philosophical Review* 95, no. 3 (1986): 339–70; Daisie Radner, "Descartes' Notion of the Union of Mind and Body," *Journal of the History of Philosophy* 9, no. 2 (1971): 159–70; Marleen Rozemond, "Descartes on Mind-Body Interaction: What's the Problem?, *Journal of the History of Philosophy* 37, no. 3 (1999): 435–67; T. M. Schmaltz, "Descartes and Malebranche on Mind and Mind-Body Union," *The Philosophical Review* 101, no. 2 (1992): 281–325; T. Vinci, "Mind-Body Causation, Mind-Body Union and the Special Mode of Thinking in Descartes," *British Journal for the History of Philosophy* 16, no. 3 (2008): 461–88; D. Kaufman, "Descartes on Composites, Incomplete Substances, and Kinds of Unity," *Archiv für Geschichte der Philosophie* 90, no. 1 (2008): 39–73; John Cottingham, "The Mind-Body Relation," in *The Blackwell Guide to Descartes' Meditations*, edited by S. Gaukroger, 179–92 (Malden, MA: Blackwell Publishing, 2006).

18. Cf., e.g., Leibniz's correspondence with Clarke, *The Leibniz-Clarke Correspondence*, 41, and *Monadology*, §81. G. W. Leibniz, *Philosophical Essays*, translated by R. Ariew and D. Garber (Indianapolis: Hackett Publishing Co., 1989), 223.

19. Cf. Kochiras, "Gravity and Newton's Substance Counting Problem," 267–69. Newton, however, is not alone in holding such a position. One important example in this regard is John Locke, who claims that, although no two substances of the *same* kind can be in the same place, substances of *different* kinds may be present in the same place. See *Essay Concerning Human Un-*

derstanding, edited by Peter Nidditch (Oxford: Oxford University Press, 1975), book II, chap. 27. I thank Jeffrey Tlumak for reminding me of this point.

20. On the historic situation of Newton's view in the nullibism and holenmerism controversy, see the very thorough article by McGuire and Slowik, "Newton's Ontology of Omnipresence and Infinite Space" (forthcoming).

21. For an interesting analysis of the exchange between Descartes and Henry More, on this point, see Janiak, "Substance and Action in Descartes and Newton."

22. Schliesser has argued for thinking of space as a condition of possibility, but his emphasis is on its being a condition of possibility of entities rather than one of action. Schliesser, "Newtonian Emanation, Spinozism, Measurement, and the Baconian Origins of the Laws of Nature," PhilSci Archive: http://philsci-archive.pitt.edu/4343/, accessed August 5, 2011.

23. In the following section, I treat Stein and Janiak's suggestion more closely.

24. Janiak has argued that Newton holds this view ("Substance and Action in Descartes and Newton").