

By y^e divine arm: God and substance in *De gravitatione*

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Abstract: This article interprets Newton's *De gravitatione* as presenting a reductive account of substance, on which divine and created substances are identified with their characteristic attributes, which are present in space. God is identical to the divine power to create, and mind to its characteristic power. Even bodies lack parts outside parts, for they are not constructed from regions of actual space, as some commentators suppose, but rather consist in powers alone, maintained in certain configurations by the divine will. This interpretation thus specifies Newton's meaning when he writes that bodies subsist 'through God alone'; yet bodies do qualify as substances, and divine providence does not extend so far as occasionalism.

Introduction

Substance is the focus of considerable concern during the early modern period, and it numbers among the problems that Newton addresses in his unpublished manuscript, *De gravitatione et aequipondio fluidorum*. As his most philosophical text, the manuscript has received a good deal of scrutiny.¹ Yet significant questions persist, including questions about substance. As for the general concept of substance, certain remarks might lead one to wonder whether Newton means to eliminate it entirely. The question arises in particular for the divine substance, as certain passages seem to reduce God to his attributes. Newton's views of the created substances also remain controversial. As for the mind, certain remarks have led some commentators to the bold conclusion that Newton abandons substance dualism. Howard Stein (2002), supposing that *De gravitatione* employs what I. B. Cohen has called the 'Newtonian Style', reaches the methodological conclusion that, interesting himself only in empirically

tractable research questions, Newton sets aside the question about a substantial mind–body distinction.² Liam Dempsey (2006), meanwhile, reaches the ontological conclusion that Newton is moving toward substance monism. As for body, Newton’s hypothesis about how God might have created matter has been interpreted in ways that have a troubling implication. If Newton imagines bodies to be constructed from regions of actual space, as some commentators have argued, that could imply that certain regions of space, once transformed into bodies, would be torn out of space upon becoming mobile. Not only would that conflict with Newton’s assertion that the parts of space are immobile and indivisible, it would raise the difficult question of what would remain once a part of space had been torn away.³

My purpose here is to explicate the concepts of substance that Newton develops in *De gravitatione*, along with their implications for the nature of God and of divine providence. On the interpretation that I develop, Newton most definitely retains the concept of substance, though his account is reductive, in that he takes all substances, divine and created, to consist in their characteristic attributes. Bodies are not constructed from regions of actual space, but rather consist in powers alone, maintained in certain configurations by God. Minds similarly consist in their characteristic powers or attributes, though we lack specific knowledge of those powers. And Newton vigorously defends a substantial distinction between minds and bodies; he neither eschews the question nor moves toward monism. The divine substance consists in omnipotence or creative power. Divine providence includes the unifying task that is accomplished for Aristotelian bodies by prime matter or substrate, yet it does not reach so far as occasionalism. An implication of my interpretation of *De gravitatione* is that space alone is extended in the sense of having parts outside parts, that is, quantitative parts, which in principle could be mapped onto other quantitative parts. Not even material bodies have parts outside parts, for though all substances are extended, their extension consists in the presence of their constituent powers in space, and thus is parasitic upon the extension of space.

Newton uses his account of body as a touchstone for his discussion of mind and of substance generally. The next section of this article therefore begins with that account, developing the interpretation of body noted above. The third section addresses his ideas about the mind–body distinction, as elaborated during his attack upon Descartes. The fourth section rejects eliminativism in favour of a reductive account of substance, and considers such an account for minds and God. A final section reviews conclusions.

The account of body

Newton develops his account of material body in what Howard Stein has called the ‘creation’ story or hypothesis. This account has also been called the

'determined quantities of extension hypothesis' (Slowik 2009), since Newton marks the account as speculative and develops it by associating various conditions with 'determined quantities of extension'.⁴ I shall follow Stein's terminology, however, for reasons concerning Newton's account of minds, as explained later.⁵ Understanding the account of body depends upon properly understanding these determined quantities of extension and their relation to space (extension) itself. It is therefore important briefly to review *De gravitatione's* claims about space.

Features of space

For Newton, space is an existence condition for any substance and 'an affection of every kind of being'.⁶ This latter description refers to the manner of existing in nature, a manner of existing quite different from that of an abstract entity or a number, as J. E. McGuire has explained.⁷ As space is an affection of every kind of being, so is it a condition for their existence. As Newton asserts in a well-known remark, one repudiating the concept of spirits as transcendent, 'No being exists or can exist which is not related to space in some way. God is everywhere, created minds are somewhere, and body is in the space that it occupies; and whatever is neither everywhere nor anywhere does not exist.'⁸

Since space is an existence condition of substances, it is not surprising that Newton takes it to have its own manner of existing. It is neither substance, he emphasizes, nor accident.⁹ That it is not an accident inhering in a subject means, in part, that as an affection of every kind of being, it cannot be localized to or associated with any one created being. Accordingly, it is independent of bodies; if all bodies were annihilated, it would continue to exist unchanged.¹⁰ Space more nearly resembles a substance than an accident, Newton indicates, and as we shall see later, he ascribes a degree of 'substantial reality' to it. Indeed, he cites it as the one thing that can in some circumstances be conceived apart from God – a feature he will use to attack Descartes's account of matter as atheistic.¹¹ Yet though it has some substantial reality, space is not a substance. For one thing, it is 'not absolute in itself, but is as it were an emanative effect of God'.¹² Its not being absolute could not alone explain its failure to qualify as a substance; for created substances too are not absolute in themselves, being dependent upon God. Yet created substances have a different relation to God, precisely in virtue of having been created. There is also another important difference. Substances act, whereas space produces no effects.¹³

Though neither substance nor attribute, space is not nothing, Newton emphasizes, for it has properties. The properties he describes indicate a Euclidean space, three-dimensional, homogeneous, and infinite. Space is also eternal and immutable, and though parts may be distinguished within it, those parts are motionless and indivisible.¹⁴ It is these features – the immobility and indivisibility of space's distinguishable parts – that are especially significant for Newton's account of body.

The creation hypothesis and the definition of body

Newton develops his creation hypothesis in two stages, first ignoring mobility but subsequently introducing it. He begins from the realization that we can temporarily make regions of space impervious to other bodies by moving our own bodies into them, observing that this might somehow simulate the divine power of creation. By his will alone, God 'can prevent a body from penetrating any space defined by certain limits'.¹⁵ Such an entity would either be a body, or would be indistinguishable from bodies by us.¹⁶ For if God made some region above the earth impervious to bodies and all 'impinging things', it would be like a mountain; it would reflect all impinging things, including light and air, and it therefore would be visible and coloured, and would resonate if struck.¹⁷

These entities would be very similar to corporeal particles, Newton notes, except for this important feature: as he has imagined them thus far, they are motionless. For an entity to be a body, or at least to resemble bodies in all humanly perceptible ways, it must be mobile. He therefore now adds that the hypothesized entities be capable of being moved from place to place, and in a law-governed way, a feature that is relatively new to conceptions of body.¹⁸ Additionally, the entities can stimulate perceptions in minds and be operated upon by minds.¹⁹ The hypothesized entities are now just like bodies, being perceptible, and having shape, tangibility, mobility, and the ability both to reflect and be reflected. They therefore could be 'part of the structure of things', just like 'any other corpuscle'.²⁰ This enables Newton to provide a definition of body (insofar as we can know them).

We can define bodies as *determined quantities of extension which omnipresent God endows with certain conditions*. These conditions are:

(1) that they be mobile, and therefore I did not say that they are numerical parts of space which are absolutely immobile, but only definite quantities which may be transferred from space to space; (2) that two of this kind cannot coincide anywhere, that is, that they may be impenetrable, and hence that oppositions obstruct their mutual motions and they are reflected in accord with certain laws; (3) that they can excite various perceptions of the senses and the imagination in created minds, and conversely be moved by them, which is not surprising since the description of their origin is founded on this.²¹

One of the interesting things about this definition is that Newton sees it as serving theological goals, as will become evident from his commentary, and yet it is firmly rooted in experience. The fundamental features of our experiences of bodies appear in the definition: their mobility; the mutual impenetrability that results in law-governed reflections of other bodies, light, and air; and the sensations they produce in us, such as those of colour. Newton's remark at the end of the passage highlights the fact that experiences, specifically perceptions, make

his description of the bodies' origin possible; if bodies lacked the power to produce sensations, we could never have any ideas of them.²² It is notable that Newton specifies condition (3), the power to produce sensations, as distinct from condition (2), impenetrability. One reason for distinguishing them is that in the hypothesis's context – the first creation of matter – impenetrability could not be sufficient to produce sensations in minds. For if any minds existed when God first created matter, no human bodies would exist to touch that matter, and so the mutual impenetrability of bodies could not then produce sensations in minds. Yet there is another explanation for the inclusion of condition (3) as independent of condition (2): even in the context of actual experiences, Newton does not seem to consider sensations as explicable solely in terms of impenetrability. He rather seems to share a belief common in the early modern period – that while the contact of light particles with the eye and food particles with the tongue seem to play some necessary role, they are not sufficient for the production of sensation, and so some role must be attributed to God.²³

The definition's third condition is thus the basis for Newton's claim that Descartes's account of matter leads to atheism, while his own confirms God's existence. As indicated above, he takes space to be the one thing sometimes conceivable apart from God, since it produces no sensations or other effects, and so by identifying matter with extension (space), Descartes allows that matter is conceivable apart from God.²⁴ For as Newton indicates elsewhere, '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.'²⁵ On his own account, bodies are not conceivable apart from God, because their capacity to produce sensation cannot be so conceived, and that inconceivability is expressed directly by his definition's third condition.

*Interpreting Newton's account: determined quantities of extension
and the role of divine action*

Yet what exactly are the 'determined quantities of extension' endowed with the three conditions that Newton asserts? The question is essential to an understanding of his account of body, but it also has implications for the nature and extent of divine providence, as we will see. It is often supposed that in his creation hypothesis, Newton takes God to create bodies from parts of absolute space itself. For example, Christopher Conn speaks of a body in *De gravitatione* as 'nothing more than a divinely-modified region of space'.²⁶ Geoffrey Gorham also takes Newton's determined quantities of extension to be parts of absolute space itself, contrasting the 'favored regions of space', which God endows with powers, against the 'normal' regions (though on his soft occasionalist interpretation, the favoured regions of space are given only powers of producing sensations).²⁷ If Newton were seeking some sort of substrate in which properties could inhere, space might initially seem suitable, since as noted earlier, he considers it to be

more like a substance than an accident. Nevertheless, there are powerful reasons to deny that he supposes God to create bodies by modifying parts of absolute space itself.²⁸

The starting point of the creation hypothesis, though hardly decisive, is potentially significant. That starting point is the observation that we can make spaces impenetrable by moving our bodies into them – an action that does not, notably, alter the nature of space itself. Also significant, I think, is the ‘metaphysical truth’ that God ‘has created bodies in empty space out of nothing’;²⁹ to square his account with that truth, as he means to do, Newton cannot say that God creates bodies out of space, since space is not nothing. A consideration that should be decisive, however, is the nature of space as he describes it, together with the implications of supposing that actual parts of space figure in his creation story and definition. He describes space as being eternal, immutable, immobile, unable to produce effects, and as having parts that are distinguishable but indivisible. To suppose that certain parts of space could be divinely modified, rendered able to produce sensations, solidified and set into motion, is to suppose a full contradiction of Newton’s claims. It is to suppose that space is not eternal, because some parts of it may be turned into bodies; that space is not immutable, because some parts could be made impenetrable and able to produce sensations; and that its parts are not immobile and indivisible, because some parts, once made impenetrable, could be torn away from their neighbours and set into motion. And if some parts could be torn away, what exactly would ensue – would space be left with gaps, or would additional space appear to fill the gaps?

These are the sorts of conceptual problems that Newton points to when clarifying the first condition of his definition. Mobility is the first stated condition with which determined quantities of extension are endowed, and since space is immobile, he immediately clarifies that he is not speaking about the parts of space itself, but rather about their quantities: ‘therefore I did not say that they are numerical parts of space which are absolutely immobile, but only definite quantities which may be transferred from space to space.’³⁰ Significantly, a quantity of some part of space is not identical to the part of space itself – after all, some numerically distinct parts of space have the same volume. Thus as Newton’s own clarification indicates (a clarification we should keep firmly in mind when he seems to stray from it by employing more abbreviated locutions³¹), it is a mistake to reify his determined quantities of extension, by mistaking them for parts of space itself.³²

Since Newton associates only quantities with the qualities or powers identified by his three conditions, and not parts of absolute space itself, bodies are constructed from powers alone. Insofar as it is useful to speak in terms of subject and the properties predicated of it, the quantity of any given region of space in which the powers are present may serve as a logical (grammatical) subject, but the utility of such locutions should not lead us to suppose that bodies consist in

anything beyond powers. There is nothing like a substrate. Rather, bodies consist in sets of powers, distributed at multiple points of one region of space if the body is resting, or at points of successive regions if the body is moving. This interpretation does require that Newton's first condition, mobility, be considered differently from the other two, in that mobility must apply to something. I therefore suggest that Newton takes bodies (insofar as we can know them) to consist in mobile sets of spatially configured powers for mutual impenetrability and production of sensation. These mobile sets of powers must somehow be unified, so as to maintain their characteristic configurations as they either rest or move through space, and I propose that he assigns the task of unifying them to God. The powers are unified and maintained as enduring configurations by God – by y^e divine arm, to borrow a phrase that Newton uses elsewhere.³³ The divine will accomplishes the task that he takes to be performed in the Aristotelian account by prime matter or substrate.

This interpretation fits well with his emphasis upon perceived qualities as the basis of a substance. In one of the explanatory points following his definition of body, he explains that the entities he has described are no less real than bodies and may be called substances, since 'whatever reality we believe to be present in bodies is conferred on account of their phenomena and sensible qualities.'³⁴ And a remark elsewhere in the manuscript, which I discuss in more detail in a subsequent section, points to attributes as the basis of 'substantial reality'. An interesting implication of my interpretation is that the extension of bodies is parasitic upon the extension of space. Since bodies are extended in virtue of the presence of their constituent qualities or powers in space – a view whose conceptual predecessor is a concept of immaterial spirits as spatially located powers, as noted later³⁵ – only space is extended in the sense of having parts outside parts, a complete reversal of the Aristotelian view that all extension is corporeal, an attribute of matter.

An objection and response

Still, more needs to be said, because some of Newton's remarks may seem to conflict with the interpretation I have given. In an explanatory remark claiming an advantage for his own account over that of the Aristotelians, he writes, 'Extension takes the place of the substantial subject in which the form of the body is conserved by the divine will.'³⁶ This remark, which refers to extension itself, might make one wonder whether Newton does after all mean that God creates bodies by modifying regions of actual space.

I already noted a powerful reason to reject the view that this objection recommends, namely, that it conflicts with Newton's own concept of space and his own clarification that his definition refers to definite quantities, not to numerical parts of space. It should also be acknowledged that the mere mention of extension (space) cannot by itself imply anything, since the mobility condition ensures that

absolute space must play some role in Newton's account and hence in any interpretation. Still, the remark figuring in the objection must be explained. To investigate Newton's meaning, then, I quote the remark in full, along with a second explanatory remark following his definition, which will help illuminate the one particularly at issue.

That for the existence of these beings it is not necessary that we suppose some unintelligible substance to exist in which as subject there may be an inherent substantial form; extension and an act of divine will are enough. Extension takes the place of the substantial subject in which the form of the body is conserved by the divine will; and that product of the divine will is the form or formal reason of the body denoting every dimension in which the body is to be produced.

Between extension and its impressed form there is almost the same analogy that the Aristotelians posit between prime matter and substantial forms, namely when they say that the same matter is capable of assuming all forms, and borrows the denomination of numerical body from its form. For so I posit that any form may be transferred through any space, and everywhere denote the same body.³⁷

In both of these passages, Newton compares his account to the Aristotelian one, but the first passage repudiates the Aristotelian framework while the second points to a structural similarity between that account and his own.³⁸ We will need to understand that structural similarity as well as the criticism in order to understand the remark figuring in the objection. Newton's criticism of the Aristotelian account, as elaborated elsewhere in the manuscript, is clear enough: its notions of prime matter or substrate (substantial subject, here) and of a substantial form inhering in that prime matter are unintelligible.³⁹ This charge motivates the advantage he claims for his own account: since extension 'takes the place of the substantial subject', he avoids the unintelligible notion of prime matter.

Turning to the structural similarity, Newton takes extension (space) in his own account to be analogous to prime matter in the Aristotelian account; and he takes form in his account (which he also refers to as the product of the divine will) to be analogous to their substantial form. Before proceeding, we must ask what he could mean by 'form' in connection with his own account. I think he means 'form' to refer to the extent and shape of the configured set of powers. For in a limited class of cases, the Aristotelians take form to be little more than shape, and that is a use of the term that Newton can accept, even as he rejects the notion of substantial form more generally. Thus, when he writes that the form of the body is conserved by the divine will, he means that the spatial configuration of the set of powers is maintained by God's action, as I argued earlier.⁴⁰

Proceeding, then, we next need to understand the relation Newton sees between prime matter and substantial form in the Aristotelian account, since that will

enable us to understand the relation he asserts between extension and form in his own account.⁴¹ He represents the Aristotelians as saying the following. Since prime matter can be associated with any form, its association with any body, via a particular form, is merely contingent; and so it is the substantial form that individuates the body.⁴² That is to say, although prime matter facilitates a body's existence (since both prime matter and substantial form are needed for the body to exist), it never truly belongs to the body because its association with that body is contingent; and therefore, to refer to the body is actually to refer to its form.

Newton sees the same sort of relation in his own account, writing that 'any form may be transferred through any space, and everywhere denote the same body.' Space facilitates a body's existence, in that the body's powers must be distributed in space – for as noted earlier, no being can exist without being somehow related to space. Yet any given region of space may be associated with any body, since any body may occupy or pass through it; and since that region's association with the body (set of powers) is contingent, it cannot be said to belong to the body. This is Newton's point when he writes that the form denotes the same body, even as it is transferred through different spaces. Thus the interpretation that I have given can make sense of the passages discussed. (And it makes better sense of them than does the interpretation claiming bodies to be divinely modified parts of actual space. That interpretation cannot account for the contingent, transitory relation the passages assert to hold between a part of space and the form, for if a part of space were modified so as to become a body, its relation to the form would not be contingent or transitory.)

The account of body and the extent of God's providence

In another of the explanatory remarks following the definition of body, Newton states that the entities he has described subsist 'through God alone'.⁴³ The interpretation I have given provides a specific way of understanding this: the entities subsist through God alone in that the sets of powers are unified and maintained in their configurations by divine action. Since this action is direct, God's providence is much greater than if he merely concurred with the bodies' continued existence. Still, Newton also leaves ample room for secondary causation, for as indicated earlier, he sees the account of body and thus God's direct action as limited to corpuscles. This suggests a view similar to that found in a much later text, Query 31 of the *Opticks*. Query 31 sidesteps the problem of cohesion at the sub-corpuscular level by suggesting that corpuscles are created by God, but it speculatively attributes the cohesion of aggregate bodies to interparticulate forces, and thus to secondary causes.⁴⁴ Here too, by restricting his account of bodies to corpuscles, Newton leaves the cohesion of aggregate bodies to secondary causes.

The role that Newton assigns to God in *De gravitatione* therefore falls considerably short of occasionalism. This is consistent with the expectations that

he evinces in other texts. In a letter of 1680, Newton writes: 'Where natural causes are at hand God uses them as instruments in his works'.⁴⁵ Furthermore, as I have argued elsewhere, Newton never endorses the hypothesis that God causes gravitational effects directly, and his continuous search for an explanation expresses his expectation of secondary causes.⁴⁶

I therefore disagree with the interpretation defended recently by Gorham, who attributes occasionalism to Newton, albeit a soft sort.⁴⁷ The occasionalism is soft in that God does not cause perceptions in minds directly, instead endowing varying regions of space with the power to do so, in a continuous creation of matter.⁴⁸ Yet it is still a kind of occasionalism, because Gorham argues that the first and second conditions of Newton's definition of body are superfluous, doing 'no independent work of their own',⁴⁹ and that bodies consist in only the powers to produce sensations. Regions of space are the 'spatial occasions' for the sensations, and God creates matter continuously by creating the powers to produce sensations in varying regions of space.⁵⁰ Gorham claims a powerful advantage for his interpretation: it implies that Newton solves the mind-body problem, avoiding problems about mental causation 'by embracing a quasi-idealistic ontology of matter'.⁵¹ Yet his interpretation requires us not only to accept that conditions (1) and (2) of Newton's definition are superfluous, but also that condition (3), the power to produce perceptions in minds, is not merely necessary for body-hood but also sufficient. Gorham reaches this latter conclusion partly through his reading of the comment that Newton adds to this third condition – that it is not surprising that bodies have the power to cause perceptions in minds, 'since the description of their origin is founded on this'.⁵² Yet there is a natural reading of that remark which does not require either dismissing the definition's first two conditions as superfluous or supposing the third to be sufficient. That natural reading, which I explained earlier, is simply that if bodies lacked the power to produce sensations, we could never have any ideas of them. The remark is an instance of Newton's oft-repeated acknowledgement that we can know only perceived qualities, not the 'essential and metaphysical constitution' of things.⁵³

Since I reject the occasionalist interpretation, I also reject Gorham's conclusion that 'Newtonian bodies do not seem to qualify as self-standing substances'.⁵⁴ On my interpretation, Newton considers bodies to be created substances. This is a desirable result, since bodies would have to be substances in order for Newton to accept a substantial distinction between mind and body – and he does, as we shall see in the next section.

The substantial mind-body distinction

If Newton accepts a substantial distinction between mind and body, his would be a dualism very different from that of Descartes, who takes minds to be transcendent, denying that they share any properties with bodies. For as noted

earlier, Newton takes spatial location to be an existence condition for any being, and he takes immaterial spirits to be immanent and spatially located, a view with precedents in thinkers ranging from Thomas Aquinas to Henry More.⁵⁵ While he cautions that as an indivisible thing, mind is present in space in its own way, Newton is not speaking analogically or metaphorically when he describes it as being ‘diffused through space’.⁵⁶ But does he accept the substantial distinction between mind and body? This section addresses that question, since certain passages of *De gravitatione* have led some commentators to a negative response.

Does Newton defend a substantial mind–body distinction? Two negative responses

Newton’s discussion of mind contains an interesting fragment that one commentator interprets as a move towards substance monism. Concerning ideas of extension and thinking, the fragment reads, ‘the distinction between these ideas will not be so great but that both may fit the same created substance, that is, but that a body may think, and a thinking being extend.’⁵⁷ The latter possibility, that thinking beings are extended, is not the interesting one, since Newton clearly asserts some sort of spatial extension of thinking beings, and that is compatible with a certain sort of substance dualism.⁵⁸ The first possibility, however, ‘that a body may think’, calls to mind Locke’s discussion of the possibility of thinking matter⁵⁹ and Hobbes’s overt materialism. One commentator, Liam Dempsey, interprets the fragment mentioning that possibility as a move toward monism.⁶⁰

Body is not the metaphysical antithesis of mind; indeed, it is far better that ‘the distinction between these ideas [extension and thinking] will not be so great but that both may fit the same created substance, that is, but that a *body may think, and a thinking being be extended*’ (*ibid.*, p. 31; my emphasis). This is an intriguing and prescient gesture toward mind–body substance monism.⁶¹

Dempsey’s opening observation – that Newton does not take body to be the ‘metaphysical antithesis of mind’ – poses no threat to the claim that he accepts substance dualism.⁶² It is rather the possibility that ‘a body may think’ that would conflict with dualism.⁶³ The question to answer, therefore, is whether Dempsey is correct in taking Newton actually to endorse that possibility. Before turning to that question, however, we should note that Newton’s commitment to the mind–body distinction has also been questioned on quite different grounds.

According to Howard Stein, it is not that Newton denies the distinction between mind and body; it is that he is simply uninterested in it.⁶⁴ For Stein, focal statements include this cautionary remark, ‘It would be rash to say what may be the substantial basis of mind’,⁶⁵ and especially Newton’s comment, mentioned earlier, about attributes: ‘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.⁶⁶ In Stein's view, such remarks indicate that Newton is setting aside the question about dualism or monism, with respect to minds and bodies, in order to focus solely upon research questions about mental attributes and their relationship to corporeal attributes.⁶⁷ Although Newton does suggest in another text that mental attributes may be investigated as internal phenomena, via the sense of reflection,⁶⁸ Stein sees the 'Newtonian Style' in *De gravitatione*.⁶⁹ He takes Newton to be restricting his gaze to empirically tractable questions alone.

Three truths of metaphysics

The remarks mentioned above, which might seem to cast doubt upon Newton's commitment to the substantial mind-body distinction, occur during the course of his attacks upon Descartes and upon the Scholastics. Throughout those attacks, his main goal is to show that his account of body is better able than either of those competitors to confirm three truths of metaphysics. Just before launching his attacks, then, he claims the advantage.

Lastly, the usefulness of the idea of body that I have described is brought out by the fact that it clearly involves the principal truths of metaphysics and thoroughly confirms and explains them. For we cannot posit bodies of this kind without at the same time positing that God exists, and has created bodies in empty space out of nothing, and that they are beings distinct from created minds, but able to be united with minds. Say, if you can, which of the views, now common, elucidates any one of these truths or rather is not opposed to all of them, and leads to obscurity.⁷⁰

Thus Newton sees his account as confirming the following metaphysical truths. (1) God exists. (2) God has created bodies *ex nihilo* in empty space. (3) Minds and bodies are distinct, and specifically, there is a substantial distinction between them (as opposed to the mere distinction in reason that would be compatible with substance monism). The first truth, closely connected to the second, will number among Newton's desiderata for an account of substance; he holds that nothing dependent upon God could be truly understood independently of the deity, and will attack competitor accounts for implying that body could be understood independently of the deity and thus that they could actually be independent.⁷¹

In light of Newton's explicit assertion that bodies 'are beings distinct from created minds', it would seem difficult to maintain either that he is indifferent to the substantial distinction, or that he is turning away from it in favour of monism. Still, there does seem to be some tension between that assertion and the remarks quoted earlier that the commentators find so telling. It will therefore be interesting to see whether closer inspection of those remarks might effect a reconciliation. Those remarks occur in connection with Newton's arguments that the Cartesian and the scholastic accounts cannot uphold the three truths of metaphysics.

The fragment that caught Dempsey's attention will be considered directly. Although that discussion should refute not only Dempsey's conclusion about the substantial distinction but Stein's as well, Stein also suggests that Newton may be eliminating the concept of substance entirely; so I will reserve my discussion of the remarks that Stein focuses upon for a subsequent section, 'Newton's reductive account of substance'.

Newton and the mind-body distinction

The fragment that led Dempsey to conclude that Newton is moving toward substance monism occurs during the course of his attack upon Descartes. Newton has already indicated that he thinks Descartes's account of matter compromises the first truth, by identifying matter with the one thing conceivable apart from God, space.⁷² And trouble for the second truth follows; if space is eternal and can be conceived independently of God, then asserting that bodies are nothing more than regions of space undercuts the claim that God created them *ex nihilo*. The passage containing the fragment continues the attack by arguing that Descartes's view forces him into the horns of a dilemma, in which he must abandon either the second truth of metaphysics or else the third. Newton's charge implicitly relies upon a tenet that he accepts, namely, that whatever God creates is eminently contained within him; and he then uses Descartes's claim that the ideas of thinking and extension are mutually repugnant against him.

Moreover, if the distinction of substances between *thinking* and *extended* is legitimate and complete, God does not eminently contain extension within himself and therefore cannot create it; but God and extension will be two substances separate, complete, absolute, and having the same significance. But on the contrary if extension is eminently contained in God, or the highest thinking being, certainly the idea of extension will be eminently contained within the idea of thinking, and hence the distinction between these ideas will not be so great but that both may fit the same created substance, that is, but that a body may think, and a thinking being extend.⁷³

The first horn of the dilemma is the theologically intolerable claim that bodies were not created by God. This is set out in the extended sentence that opens the passage, with Newton reasoning as follows. Descartes seeks a 'complete' distinction between minds and bodies, according to which only bodies are spatially extended. But if extension cannot be associated with thinking things, then it cannot be eminently contained within God.⁷⁴ Further, if extension is not eminently contained in God, and if, as Descartes holds, body is nothing more than extension, then since everything that God creates is eminently contained within him, body is not divinely created. So Cartesian body is elevated to being a substance in the same, absolute sense that God is substance, in violation of the second truth of metaphysics.

The second horn of the dilemma, set out in the long, second sentence of the passage above, contains the fragment at issue. This horn of the dilemma is the admission that minds and bodies are not distinct in the sense of sharing no properties whatsoever – which for Descartes would imply that they are not substantially distinct. Newton reasons as follows. If Descartes wants to avoid the first horn of the dilemma, so as to preserve the truth that God created bodies *ex nihilo*, he can do that only by agreeing that extension is eminently contained in God. But if Descartes agrees to that, it follows that ‘the idea of extension will be eminently contained within the idea of thinking’ – and that contradicts his claim that the ideas of extension and thinking are mutually repugnant, which is the very basis of his dualism. Thus if Descartes tries to avoid the dilemma’s first horn, he will be forced into the second horn, violating the third truth of metaphysics by admitting both the possibility ‘that a body may think’ and the possibility that ‘a thinking being extend’.

Thus Newton is not endorsing the possibility of thinking matter, as Dempsey thought, but is rather trying to show how Descartes can be driven to admit that possibility.⁷⁵ Contrary to Dempsey’s conclusion, then, Newton is not advancing towards monism. The fragment and the surrounding remarks are fully consistent with Newton’s earlier advocacy of the third truth of metaphysics, and thus with some manner of substance dualism. The dualist reading is reinforced by other remarks, not least this: ‘Created mind (since it is in the image of God) is of a far more noble nature than body.’⁷⁶ In light of Newton’s commitment to a substantial mind–body distinction – and his reliance upon such non-empirical concepts as eminent containment – Stein’s claim that Newton is uninterested in the distinction can now be rejected, along with Dempsey’s monism. Yet the remarks that caught Stein’s attention remain puzzling. I will address them in the next section, since they pertain not only to mind but also to God and to substance generally.

Newton’s reductive account of substance

There is still a lingering question about whether Newton might mean to eliminate substance in *De gravitatione*. Although my preceding discussion already intimates a response, in this section I will address the question directly by investigating Newton’s remarks about ascribing substantial reality to attributes, remarks which suggest a positive account of substance generally and of the immaterial substances, God and minds.

Attributes, substantial reality, and the question about eliminativism

The context of Newton’s remark about substantial reality, which indicates his positive view, is his attack upon the Scholastics’ account of body, for he sees their notion of substance as the source of their troubles, notably their inability to confirm the three truths of metaphysics. They cannot confirm the third truth, he

reasons, because they suppose an 'unintelligible reality that they call substance' to reside in bodies, and yet distinguishing the substance of mind from the substance of body requires that the latter be intelligible.⁷⁷ Yet more to the point here are the first and second truths of metaphysics.

According to Newton, the correct account of created substance will imply the deity's existence, because anything that could not exist without God cannot be conceived without God. Created substances are intermediate between accidents and God – intermediate in their degree of dependence and hence their 'degree of reality', since they sustain accidents yet are themselves sustained by God. In particular, bodies have only a 'derivative and incomplete reality', not the absolute, independent reality properly ascribed only to God. Newton's own account, as we have seen, implies the deity's existence by defining bodies in terms of the perception-stimulating qualities that cannot be conceived apart from God. But the scholastic account of bodies fails to imply their created, dependent state. This is because it relies upon the notion of bare substance, which, as a property-less thing, is a 'subject which we cannot conceive as dependent'.⁷⁸ The charge can be expressed in terms of two traditional concepts of substance, the first being the Scholastics' concept, *that which is a subject of inherence*, and the second being *that which is self-subsistent*. Newton charges that by employing that first concept, the Scholastics fail to classify substances correctly according to the second concept; whereas an account should imply that God alone is fully self-subsistent, their account improperly implies that bodies are as well.

Here we arrive at the remark in question. It will be useful to consider it together with some comments that follow.

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 . . . we reflect that we can conceive of space existing without any subject when we think of a vacuum. And hence some substantial reality fits this . . . In the same way, if we should have an idea of that attribute or power by which God, through the action of his will alone, can create beings, we should readily conceive of that attribute as subsisting by itself without any substantial subject and [thus as] involving the rest of his attributes. But while we cannot form an idea of this attribute, nor even of our proper power by which we move our bodies, it would be rash to say what may be the substantial basis of mind.⁷⁹

In the opening sentence, Newton indicates that substantial reality – self-subsistence – can be ascribed to certain attributes. He next suggests that space, which he clearly denied is a substance, is an attribute, and one having some substantial reality. He then proceeds to attribute full substantial reality to God's

power to create, suggesting that the deity might be conceived in terms of an attribute alone; and he closes the passage by expressing ignorance about the mind's substantial basis.

Is Newton suggesting here that the very concept of substance should be eliminated? Stein seems to draw that conclusion with respect to God. He first notes, 'Newton goes so far as to suggest that even God might be conceived entirely in terms of his attributes, if only we could form clear "Ideas" of these.' Stein then infers that Newton rejected the Trinity because he rejected the concept of substance altogether: 'the view of substantial reality described here would make not so much false, as entirely unintelligible, the proposition that God is "three persons, but one substance"!' ⁸⁰ Eliminativism simply does not fit, however, with Newton's claims throughout the manuscript. For one thing, he considers the entities of his creation story and associated definition to be substances, as we saw earlier, asserting that they are no less real than bodies, 'nor (I say) are they less able to be called substances'. ⁸¹ Additionally, he asserts a substantial distinction between mind and body, as we saw in the previous section, and that distinction implies the concept of substance. Finally, we should note Newton's criticism of the scholastic account of body: 'The same word, substance,' he writes, 'is applied univocally in the schools to God and his creatures.'⁸² Implicit in this criticism is an acceptance of the distinction between the strong and weak concepts of substance, and thus of the concept of substance itself.

A reductive account of substance

Since Newton accepts the concept of substance, it seems that by ascribing substantial reality to attributes, he is giving a reductive account of it, by identifying a substance with its characteristic attributes. This is not immediately evident, perhaps, since he devotes part of his discussion to something that he already denied is a substance, space. Space is implied to be an attribute, in the passage, though this is consistent with his earlier claim that it is an affection of every kind of being, not an accident in a subject. Interestingly, even though space is not a substance, it has more substantial reality than the created substances, as indicated by its being independently intelligible. Yet this is consistent with Newton's claim that space has its own manner of existing, and it makes sense of the attention he devotes to it. From the passage as a whole, we can extract his reductive account of substance.

Newton's position is clearest in the case of the divine substance. God's power has full substantial reality, and so only that attribute is fully self-subsistent. The divine power to create is thus a substance, and the only substance in the strong sense. There must of course be a caveat: this is a concept of the substance insofar as we can know it, for as he indicated earlier, we do not know the 'essential and metaphysical constitution' of things. ⁸³ This was so in the account of body, and it is all the more true of God, since we are not capable of formulating a clear idea of the

divine power. Nevertheless, Newton indicates, we would recognize the power as self-subsistent, 'if we should form an idea of that attribute'; in other words, we recognize that the power is self-subsistent, even though we do not understand how it is so. Thus in Newton's view, the divine substance just is the power to create. He is certainly not the first to embrace such a reductive concept, which identifies God with attributes. Precedents for that reach back to the medieval nominalists, and also include Descartes, who identifies substances generally with their attributes, which must themselves be identical to one another.⁸⁴ Although Newton does not mention other divine attributes, such as omniscience, his view presumably includes the belief that God is identical to that attribute, which is in turn identical to omnipotence and creative power. But space is not among the attributes identical to the divine substance. If space were identical to God, it would be difficult to account for Newton's claim that space is the one thing conceivable apart from God.⁸⁵ Even more significantly, space is not a substance, as Newton unequivocally stated earlier and implies anew in the above-quoted passage. Space is not absolute in itself, whereas God, the one being that is fully self-subsistent, the one substance in the strong sense, is absolute in himself. Moreover, space does not act, whereas God acts, by creating and sustaining the world. Thus space is an effect of God, as Newton indicated earlier; it is neither a divine attribute nor God himself.⁸⁶

Turning to the mind, there is compelling reason to think that Newton means to identify this created substance too with attributes, even though his remarks are spare. At the end of the passage, he indicates that we do not know the mind's substantial basis (*substantialie fundamentum*), since we do not understand the 'proper power' by which it moves the body. Here his point seems to be that to understand an entity's substantial nature is to understand its characteristic attribute or power.⁸⁷ A contrast is implied to the case of body, in which we can associate its characteristic attribute, impenetrability, with a tendency to be reflected in a law-governed way. We lack such knowledge about the mind, and if the substance just is the attribute, then failing to understand the mind's power to move the body is to fail to understand its substance.⁸⁸ Still, much as Newton thinks we know that God's power is self-subsistent, without knowing how, we also know that the mind consists in this power, though we cannot explain how it works. So though our knowledge of the mind is incomplete, we can claim to know something about it, namely, that it is present in space; that it is immaterial, being substantially distinct from body; and according to my interpretation, that its weakly independent substantial existence consists in certain powers, present in space. This reductive account of the mind agrees with his reductive account of the divine substance. He has identified God with a power, and he has also said that mind, which is nobler than body, is created in 'the image of God'.⁸⁹

My reason for preferring Stein's term for the account of body, 'creation hypothesis', over Slowik's term, 'determined quantities of extension hypothesis',

should now be clear: the latter term does not apply to bodies alone, but may also be applied to minds, since minds too are powers present in space. Minds do not have parts outside parts, but instead are spatially located and extended in virtue of the presence of their constituent powers in space, the one thing that does have parts outside parts. The space in which the mind's powers are present will presumably be the same as that in which the body's powers are distributed, since Newton takes the mind's spatial location to make its union with the body intelligible and possible.⁹⁰ One question remains. If both minds and bodies consist in powers present in space, such that they equally lack parts outside parts, how are we to understand the distinction that Newton draws between them? He distinguishes them clearly, remarking that 'any being has a manner proper to itself of being present in spaces'. Continuing, he compares the presence of a moment of duration and of a mind in space to one another, while contrasting them to body: just as a moment of duration is 'diffused throughout all spaces . . . without any concept of parts', so a mind 'can be diffused through space without any concept of its parts'.⁹¹ While this certainly seems to imply that bodies do have parts outside parts, it may refer to our phenomenal experience of them. We experience bodies as having parts outside parts, because of their impenetrability powers. Moreover, those powers differ from the powers comprising immaterial substances, both in the effects they produce and in their domain. Each power belonging to a body might correspond to only a single point in space; yet the power comprising a spirit may be a unity, even as it is present in multiple points of space.

Conclusion

As we have seen, eliminativism does not square with Newton's claims in *De gravitatione*. He retains the concept of substance, in both strong and weak senses, but gives a reductive account of it, on which a substance is identical to its characteristic attributes. Bodies consist in mobile sets of powers. They are not constructed from regions of actual space, and there is nothing but the divine arm to accomplish the unifying task that the Aristotelians assign to substrate. God's providence thus includes the continual, direct action of sustaining bodies' constituent powers in certain configurations. Yet it does not extend so far as any sort of occasionalism, for none of the conditions figuring in Newton's definition of body is superfluous; powers of mutual impenetrability belong to bodies no less than do powers of producing sensations in minds.

Although Newton's account of body is grounded in experience, he cannot be said to be focusing exclusively upon empirically tractable questions, as his interest in the substantial distinction between mind and body indicates. Still, perhaps a different connection to his physics can be drawn. Perhaps the account of body he develops might have indirectly helped facilitate a concept belonging to his later rational mechanics, that of point mass. On the interpretation I have given,

De gravitatione's concept of body has as its conceptual ancestor a spirit which consists in causal powers, which lacks parts outside parts, and which is extended only in the derivative or parasitic sense that its constituent causal powers are present in some extension. An entity consisting in spatially present causal powers, as opposed to one possessing parts outside parts, may more easily be conceived as existing in a larger or smaller area – even as contracted to a point. Thus the bodies of *De gravitatione*, which consist in powers of mutual impenetrability or resistance, might have helped facilitate Newton's realization that mass can be considered at a point. Or at least, because they lack parts outside parts, such bodies would not stand in the way of that realization.

As for the immaterial substances, minds are substantially distinct from bodies, and consist in the power of thought and of moving the body. When Newton remarks that we are ignorant of their substantial nature, he is not disavowing a reductive account for the mind but is rather acknowledging our ignorance of the attribute in which that substance consists. God is the one substance in the strong sense, as the one fully self-subsistent attribute. That attribute is not, and cannot be identified with, space. Space, and space alone, has parts outside parts; God has no such parts, and that is another reason to think that Newton rejects More's claim that space is an attribute of God, or that space and God are one. Furthermore, as Newton emphasizes, space is not a substance in part because it does not act, whereas the divine substance just is the active power to create.⁹²

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Notes

1. Works discussing the manuscript include: Hall & Hall (1962, introduction to part II); McGuire (1978); Bennett & Remnant (1978); Gabbey (2002); Stein (2002); Benjamin Hill (2003); Dempsey (2006);

Janiak (2008); Kochiras (2009); Slowik (2009); Henry (2011); Biener & Smeenk (2011); Brading (2011); Gorham (2011a, 2011b).

2. Stein himself does not use Cohen's terminology (see Cohen (1999), 60–61) in making his arguments, but it is a convenient means of referring to the method and research focus that Stein sees Newton to be taking.
3. Newton occasionally employs Henry More's term, 'indiscerpible', to refer to that which cannot actually be divided, even if parts may be distinguished within it, for instance when discussing atoms in his Trinity Notebook; see McGuire & Tamny (1983), 341. More explains the term as follows: 'By *Actual Divisibility* I understand *Discerpibility*, gross tearing or cutting of one part from the other' (More (1925), 63).
4. See Newton (2004), 27: 'I am reluctant to say positively what the nature of bodies is, but I would rather describe a certain kind of being similar in every way to bodies'; and 28: 'And hence these beings will either be bodies, or very similar to bodies. If they are bodies, then we can define bodies as *determined quantities of extension which omnipresent God endows with certain conditions.*'
5. See Stein (2002), 275. Slowik (2009), 438, refers to that account of bodies as the 'Determined Quantities of Extension' or 'DQE' hypothesis. I follow Stein's terminology in part to avoid reifying the quantities of extension, and in part for a reason concerning minds, as discussed at the end of a subsequent section, 'Newton's reductive account of substance'.
6. Newton (2004), 21.
7. Pointing to the manuscript 'Tempus et Locus' (c. 1692–1693) as providing 'Newton's most succinct statement of how place and time relate to existing things', McGuire explicates that statement as follows:

Newton answers the question: what is it for anything to exist in nature? It is to exist in a place and at a time. As the text implies, existing in place and time is what counts as actually existing, in contrast, for example, to existing in the manner of an abstract entity or as a number. This contention is supported by Newton's use of the phrase 'rerum natura' ... (McGuire (1978), 465)

8. Newton (2004), 25.
9. *Ibid.*, 21–22. The ultimate source of Newton's view that space is neither substance nor accident is the Renaissance thinker Francesco Patrizi da Cherso (1529–1597). Patrizi additionally held space to be wholly distinct from body, indeed a condition for matter's existence, and to be immutable, indivisible, and immobile. See Patrizi, translated with a commentary by Brickman (1943), esp. 224–245. As Grant (1981, 206–207) explains, Patrizi is also the source of a surprising explanatory remark following Newton's claim that space has distinguishable parts, whose common boundaries may be called surfaces. Newton then goes on to explain that in space there are everywhere all kinds of figures, everywhere spheres, cubes, triangles, straight lines, everywhere circular, elliptical, parabolical, and all other kinds of figures, and those of all shapes and sizes, even though they are not disclosed to sight ... so that what was formerly insensible in space now appears before the senses. ... We firmly believe the space was spherical before the sphere occupied it, so that it could contain the sphere ... And so of other figures. (Newton (2004), 21–22)
10. *Ibid.*, 22. See also *ibid.*, 21: as 'an affection of every kind of being', it is not a 'proper affection', which is to say an action.
11. See *ibid.*, 31:

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?

On space's inability to produce effects, see *ibid.*, 21–22, 34.

12. *Ibid.*, 21. That space is not a substance cannot fully be explained by its dependence upon God, in virtue of being an emanative effect of God. For as will be emphasized later, Newton accepts not only the strong sense of substance but also the weak sense, which applies to things dependent upon God, in particular, created minds and bodies. Although I cannot here address the question of how Newton understands an emanative effect, I am sympathetic to McGuire's view that the relation of space to God is one of 'ontic dependence'; see McGuire (1978), 480: 'the relation between the existence of being and that of space is not causal, but one of ontic dependence'. McGuire's view provides an alternative to the

three that Gorham (2011b) identifies as 'Independence', 'Causation', and 'Assimilation'.

Gorham defends Assimilation, arguing that space and time are attributes of God, and indeed identical to God (and thus to one another); see Gorham (2011b), especially 289–292 and 298–304.

13. As I argue in the section entitled 'Newton's reductive account of substance', Newton takes God to be identical to his attributes, and fundamental to his creative power, that is, omnipotence; yet in doing so Newton does not eliminate substance but rather gives a reductive account of it. I note here that I reject the interpretation recently advanced by Geoffrey Gorham, though his arguments are intriguing. According to Gorham, God is identical to his attributes, but his attributes include space and time, and hence he is identical to space and time. See Gorham (2011b), especially 289–292 and 298–304. In the aforementioned section, I indicate the difficulties I see with that view.
14. Newton (2004), 22, 25, 26.
15. *Ibid.*, 27.
16. Newton means to emphasize that we cannot know matter's 'essential and metaphysical constitution' (*ibid.*, 27), or indeed the essence of any substance. This conviction reappears in later writings, including the General Scholium, where he writes,

We certainly do not know what is the substance of any thing. We see only the shapes and colors of bodies, we hear only their sounds, we touch only their external surfaces . . . But there is no direct sense and there are no indirect reflected actions by which we know innermost substances. (Newton (1999), 942)

In this respect his account of body is strongly empirical.

17. Newton (2004), 28.
18. *Ibid.* In an otherwise quite different thought experiment, which appears in *Le Monde*, Descartes imagines bodies that move 'in accordance with the ordinary laws of nature'; see CSM 1, 90. Of interest here is Brading (2011).
19. 'For it is certain that God can stimulate, our perception by means of his own will, and thence apply such power to the effects of his will' (Newton (2004), 28).
20. *Ibid.*, 28.
21. *Ibid.*, 28–29. A definition given in 1678 by Robert Hooke contains some intriguing similarities. After asserting that the universe consists in body and motion, he writes, 'I do therefore define a sensible Body to be a determinate Space or Extension defended from being penetrated by another, by a power from within.' He also speculates that body and motion might ultimately be 'one and the same'; see Hooke (1678), 338–340. How near the similarity really is, however, is a question I will not pursue here.
22. Geoffrey Gorham interprets this remark very differently. On his view, Newton's remark that the description of bodies' origin is founded upon sensations indicates that he takes the capacity to produce sensations to be both necessary and sufficient for body-hood. In connection with that claim, Gorham argues that Newton ultimately sees his conditions of mobility and impenetrability as superfluous; these 'do no independent work of their own' (Gorham (2011a), 24). I contest Gorham's conclusion about those conditions in conditions in a subsequent section, 'The account of body and the extent of God's providence'.
23. Here I disagree with Geoffrey Gorham, who argues that Newton actually intends his third condition, the capacity to produce sensations in minds, to resolve a problem about distinguishability (a problem that has concerned several commentators but did not, in my view, concern Newton, for reasons I indicate later in this section). On Gorham's view, if Newton did not intend his third condition to resolve that problem, it would be superfluous:

If the DQE's are impenetrable, they will be solid to touch, reflect light, perturb the air when struck, and so on. Since these are the means by which the senses perceive familiar bodies, why the need for God to affix also the special power to produce sensations? The answer seems to be that impenetrability alone is inadequate to distinguish bodies from the unfavored portions of absolute space. (Gorham (2011a), 23)

Yet, as I have argued, Newton does not see the production of sensation as reducible to impenetrability, either in the context of matter's first creation, when no human bodies would exist even if minds did, or in his actual context, in which human bodies do exist. He takes a line similar to that

found in Locke's *Essay*. Despairing of the ability of the mechanical hypothesis to reduce sensations to the shapes, sizes, and motions of particles, Locke suggests that the production of sensations must be attributed to God. Or, on an interpretation associated with Ayers, Locke thinks that we invoke superaddition because our powers of understanding are too limited to grasp how God might have enabled matter to produce sensations; my thanks to James Hill for discussion of the point.

24. Newton (2004), 31; the quote is provided in note 11, above. Interestingly, Newton's language in that passage suggests the strong mental exercise that Descartes calls 'exclusion', as opposed to the weaker one of abstraction. For Descartes, a successful attempt to conceive something while actually separating or excluding another reveals that the two are really distinct, as opposed to being merely conceptually distinct but really identical; see Pr I.62, CSM, 214. Newton's phrase, 'supposing God not to exist', suggests the strong mental act of exclusion; he suggests that space may be conceived while actually excluding God, by supposing him not to exist.
25. Newton (2004), 32.
26. Conn (1999), 316, n. 23. Alan Gabbey allows the possibility without committing to it, in the following passage:

But alternatively, and of equal possibility, the properties of bodies might be the result of God choosing to 'inform' extensions, parts of absolute space, with corporeality and mobility. The parts of absolute space that God can and perhaps does endow with the properties of bodies are as empty of matter as the *materia prima* of the scholastics is void of intelligibility, or bereft of existence. But there is a crucial difference. Each of these parcels of empty extension is a *quid*, and a *quale*, and a *quantum*, whereas *materia prima* is none of these. (Gabbey (2011), 438)

I implied this myself in an earlier article; Kochiras (2009), 269.

27. See Gorham (2011a), 22: 'Newton proposes that God creates bodies by imposing three conditions on certain regions of space or "determinate quantities of extension" (DQE).') See also Gorham (2011b), esp. 297, where he speaks of 'a favored portion of extension'.
- As a result of taking this line, Gorham understands Newton's account of body as intended to respond to a problem of distinguishing the favoured regions of space from the normal ones. The problem, a variant of which was raised by Bennett and Remnant (1978), may be described by the following two claims. (i) Newton claims that the parts of space are immobile, and therefore the favoured portions of space must be distinguishable from the normal parts of space in order to become mobile; yet (ii) the property of impenetrability cannot accomplish the task of making the favoured portions of space distinguishable from the normal parts of space, because the normal parts of space are themselves impenetrable to one another precisely because they are immobile. This problem, and the need to resolve it, then motivates Gorham's interpretation of Newton's account of body. In Gorham's view, Newton intends the third condition of his account, i.e. the capacity to produce sensations, to resolve the problem, for in his view, that condition would be superfluous if not intended for that purpose. (Gorham writes, 'Condition (3) solves this problem by ensuring that the favored regions of space stand out because God superadds to them something lacking from the unfavored regions: the power to produce sensations' (Gorham (2011a), 23).)
- But the third condition would not be superfluous absent that problem, as I argue in in a subsequent section, 'The account of body and the extent of God's providence'. Nor is it clear that the problem about distinguishability, which motivates Gorham's account, is genuine. For one thing, if God did modify parts of actual space, surely he himself could distinguish them from one another (as indeed he would have to be able to do, if he were to confer any properties at all upon them). For another thing, as I argue, Newton's creation story and its associated definition of body do not suppose parts of space itself to be modified. And there is an even more important consideration: even if the problem were genuine, why should we allow the need to resolve it to colour our interpretation of Newton's account, given that he himself is not addressing such a problem? Even if the problem were genuine, it should be invoked only to evaluate Newton's account, not to interpret it, since again Newton himself is not addressing that problem.
28. It should be noted that despite taking parts of space itself to figure in Newton's account of body, Gorham ultimately defends a soft occasionalist interpretation, on which Newton takes the regions of space to be modified only to the extent of temporarily assuming powers to produce sensations in minds.

For as noted in a subsequent section, ‘The account of body and the extent of God’s providence’, Gorham argues that the first two conditions of Newton’s definition turn out to be superfluous, and the ‘favoured’ parts of space, instead of being made actually impenetrable and actually torn away from the ‘normal’ regions of space, are simply ‘spatial occasions’ for God to produce perceptions in minds. Denying that Newton takes the parts of space to be altered and torn apart seems especially important for Gorham since he also argues that space is ultimately identical to God. Therefore, allowing that space could be altered would not only conflict with Newton’s claim that space is immutable, it would also imply that God is not immutable; Gorham avoids that implication by arguing that conditions (1) and (2) of the definition ‘do no independent work’.

29. Newton (2004), 31.

30. *Ibid.*, 28.

31. At one point, for instance, Newton speaks of the form that God ‘imparts to space’ (*ibid.*, 29). Because of such instances, commentators must choose between (i) accepting the surface meaning of such remarks and thus understanding bodies as mobile, solidified regions of space, while paying the price of implying a serious conceptual problem (the question of what would remain, if regions of space could be torn out) as well as conflicts with Newton’s own claims (i.e. that space is immutable and immobile, and that his definition concerns definite quantities, not the numerical parts of space); and (ii) avoiding any conflict with his claims that space is immutable and immobile, while paying the price of implying that some of his locutions are abbreviated or careless. I argue for the latter option, as indicated throughout.

32. My interpretation can be reconciled with the definition that Newton gives of body at the outset of *De gravitatione* (and I thank Eric Schliesser for reminding me, at the conference at Ghent, of the need to reconcile them). As is well known, the bulk of *De gravitatione* consists in a lengthy digression, in which Newton attacks Cartesian physics and addresses various metaphysical questions, including those focused upon here. But Newton begins the manuscript with the intention of treating the weight and equilibrium of fluids and of solids in fluids, and while still engaged in that project, he defines body as ‘that which fills place’ (Newton (2004), 13). On the interpretation that I develop, that definition can be retained, since a set of spatially distributed powers of mutual impenetrability will repel any other such set; and while such sets do not fill place by actually having parts outside parts, the phenomenal effect is the same.

33. The phrase is from Newton’s second letter to Bentley (17 January, 1692/93; in Newton (1959–1971), 240: ‘Secondly I do not know any power in nature w^{ch} could cause this transverse motion without y^e divine arm.’

34. This claim appears in the second of the four explanatory remarks following Newton’s definition of body (Newton (2004), 29).

35. For a discussion of concepts of spirits and space, see Kochiras (2012).

36. Newton (2004), 29. I thank an anonymous referee for urging me to explain how my interpretation can accommodate that remark. The referee also suggests that the following remark may conflict with my claim that the powers comprising bodies are maintained by the divine will:

I do not see why God himself does not directly inform space with bodies, so long as we distinguish between the formal reason of bodies and the act of divine will. For it is contradictory that it [body] should be the act of willing or anything other than the effect which that act produces in space. (Newton (2004), 31)

Newton makes this remark while considering the question of whether God creates bodies directly, as opposed to delegating the task to some intermediary, and he is concerned to distinguish God’s action from its effects. The interpretation that I have given does not contravene that distinction. For the powers that God creates, which constitute the body, are the effect of his action and distinct from it; and his action of maintaining those powers in certain configurations is distinct from both the prior action and its effect.

37. Newton (2004), 29. These passages are the first and third explanatory remarks following Newton’s definition of body. The original of the third explanatory remark (i.e. the second quoted here) reads:

Inter extensionem et ei inditam formam talis fere est Analogia qualem Aristotelici inter materiam primam et formas substantiales ponunt; quatenus nempe dicunt eandem materiam esse omnium

formarum capacem, et denominationem numerici corporis a forma mutuari. Sic enim pono quamvis formam per quaelibet spatia transferri posse, et idem corpus ubique denominare. (Newton (1962), 107)

38. An interesting interpretation of *De gravitatione* has been given by Benjamin Hill (2003), who does not see the mere structural similarity that I take Newton to assert between his view and the scholastic one, but rather sees significant scholastic content in Newton's ideas. One point of agreement between my view and Hill's is that we both deny that the determined quantities of extension figuring in Newton's account of body are regions of actual space. Apart from that, however, our views differ in a number of ways. For one thing, Hill understands the account in terms of *extensio* interpreted as potentiality. He argues that Newton retains 'the metaphysical structures of the Scholastics' hylomorphism but substituted into those structures extension for prime matter and impenetrability + mobility for substantial form' (Hill (2003), 317). On Hill's analysis, these substitutions are possible because Newton's *extensio* (which is a quantity, and thus distinct from space itself) is similar to the Scholastics' prime matter in a crucial way: 'In Newton's thought, extension was, like prime matter, *pura potentia*' (*ibid.*, 318); see also *ibid.*, 321: 'Although he did not strictly adhere to it . . . Newton seems to have distinguished *extensio* from *spatium*. *Spatium* denoted physical space whereas *extensio* denoted the abstract and metaphysical extensive quantity.'
- Although his interpretation is ingenious, I am not convinced by it, and the difficulties I see are instances of an objection he anticipates and addresses, namely, that he has exaggerated Newton's scholasticism (see Hill (2003), 320–321). Specifically, I am not convinced that Newton distinguishes *extensio* and *spatium*, as Hill claims, or that he understands the former as *pura potentia*. In connection with this, Hill's interpretation does not easily accommodate Newton's claim that the scholastic notion of prime matter is unintelligible. If we suppose that Newton understood prime matter as *pura potentia*, it is not clear why he would attack it as unintelligible (particularly if we also suppose that Newton understood the determined quantities of extension figuring in his own account of body as *potentia*). His charge that prime matter is an unintelligible notion is explained, however, if we suppose that he understands and represents it uncharitably (as he often represents Descartes) as a propertyless substrate that is an actual component in substances; and his attack upon the scholastic account suggests that that is the way he understands it, as I indicate in a subsequent section ('Newton's reductive account of substance'). For instance, Newton writes: 'Further, they attribute no less reality in concept (though less in words) to this corporeal substance regarded as being without qualities and forms, than they do to the substance of God; abstracted from his attributes' (Newton (2004), 32). Here Newton takes the Scholastics to explain bodies in terms of a propertyless, corporeal substrate, and he criticizes them for attributing reality to this concept.
39. See, for instance, Newton (2004), 31–32. It may be remarked that the unintelligibility of Aristotelian substratum is due at least in part to Newton's portrayal of it as something already complete in itself, as opposed to an incomplete material principle, which together with a substantial form contributes to the production of a complete, accident-bearing substance. Also, Newton's representation of prime matter as lacking all qualities overlooks the view, held by all Scholastics other than strict Thomists, that prime matter possesses the capacity for extension (*extensio in potentia*), a point I owe to Dennis Des Chene. And the Scholastics did grapple with the question about prime matter's intelligibility. It may also be remarked that although Newton sometimes uses the term 'inhere' (or its cognates) in his own assertions – notably in Definition 3 of the *Principia*, which defines the *vis insita* (inherent force), also called the *vis inertia* (force of inertia) – he is not there employing the scholastic sense of the term. For as is eventually made clear via the explanatory remarks at the end of Rule 3, Newton means to contrast the *vis insita/vis inertiae* with relational forces, notably the gravitational force. Unlike gravity, the *vis insita/vis inertiae* is monadic – it belongs to the body itself.
40. This reading is supported by his remark, at the end of the first passage, that the form denotes each dimension in which it is produced. That is to say, the form or spatially configured set marks out the same dimension (quantity of space), as it moves through numerically distinct parts of space. To borrow *Principia* terminology, the set of powers provides a sensible measure of each space it occupies, by reflecting other such sets, including light.
41. Alan Gabbey (2011), 432, commenting upon both this passage and a similar remark that Newton makes in a much later text (Add 3965 (no. 13), fo. 422r), writes: 'Right to end of his life Newton saw an analogy

between the Peripatetic couple, *materia prima* and *forma substantialis*, and the Newtonian couple, the endlessly transmutable matter common to all bodies and their properties, phenomena available to one or other of the senses' (Gabbey (2011), 434).

I do not mean to imply that Gabbey accepts my interpretation of Newton's account of body, but I find his remark illuminating.

42. Since matter can assume all forms, Newton implies, then if matter rather than form individuated substances, there would be only a single substance persisting, no matter how dramatic the change in qualities. As a point of clarification that I owe to Dennis Des Chene, Newton incorrectly implies in this passage that there was agreement among the Scholastics about the principle of individuation. Des Chene further explains (in correspondence) that there was some agreement among them that 'substantial form *would* individuate corporeal substance, were it not that matter can exist, by the absolute power of God, without form and even without quantity'.
43. Newton (2004), 29.
44. See Newton (1952), 388–389. An illuminating discussion of Locke and the foundational problem about cohesion may be found in James Hill (2004).
45. Newton to Burnet, 1680; Newton (1959–1971), II, 334.
46. See Kochiras (2009, 2011).
47. Gorham (2011a, 25) indicates that he sees Newton as belonging to a tradition that locates the ground of causation in God's will.
48. See *ibid.*, 24.
49. *Ibid.*
50. See *ibid.*, 24: 'The continuous creation of matter amounts simply to the distribution within space of God's power to produce sensations'; and *ibid.*, 25: 'various quantities of extension are the mere "spatial occasions" for God to bring out our perceptions in the successive and law-like ways we associate with moving bodies.'
51. *Ibid.*, 30.
52. Newton (2004), 29. There is another passage that Gorham interprets as showing that Newton takes condition (3) to be sufficient as well as necessary for being a body. In that passage, Newton is attacking the Cartesian view of matter:

Let us abstract from body (as he demands) gravity, hardness, and all sensible qualities, so that nothing remains except what pertains to its essence. Will extension alone then remain? By no means. For we may also reject that faculty or power by which they [the qualities] stimulate the perceptions of thinking things. For since there is so great a distinction between the ideas of thought and of extension that it is not obvious that there is any basis of connection or relation [between them], except that which is caused by divine power, *the above capacity of bodies can be rejected while preserving extension, but not while preserving their corporeal nature.* (Newton (2004), 33–34; emphasis added.)

Commenting upon this passage, and quoting the italicized portion, Gorham writes:

So, the capacity to produce sensations in minds is sufficient and necessary for a quantity of space to possess the nature of body. This explains why Newton privileges condition (3) when he introduces his theory of creation: 'The description of their [bodies'] origin is founded on this' (*De Grav* 29). (Gorham (2011a), 24)

I do not see how Newton's remarks imply that condition (3) is sufficient as well as necessary for body-hood, as Gorham takes it to do. There is certainly a way of understanding the passages that does not imply any such thing. As I read the passage, Newton is saying that if one mentally abstracts qualities such as hardness away from a body, one has abstracted away only something that is necessary to body, not everything, since bodies also have the power to produce sensations. He is saying that condition (3) is necessary to body-hood, but he is not saying that it is sufficient.

53. Newton (2004), 27; cf. Newton (1999), 942.
54. Gorham (2011a), 24.
55. One might also mention Patrizi, Gassendi, and Charleton. In each case, various objections might of course be raised. Aquinas ultimately understood God's spatial presence (and indeed any description of the deity) metaphorically; so here one might object that although Aquinas is truly dualist, his deity is

not truly immanent. At the other end of the spectrum, Henry More's late view took spirits to have 'parts outside parts' – so their spatial presence is not in doubt – but has been charged with being drawn towards materialism, despite his best intentions; see Henry (1986), 176. Here the objection mentioned in connection with Aquinas may be raised again, because certain qualifying remarks raise questions about whether the spirit is genuinely present in space; Gassendi, for instance, speaks of 'a kind of divine extension', but in order to emphasize that divine extension differs from bodily extension, he also explains that it is 'as if of extension'. Despite such potential problems, it remains true that there are precedents for taking minds to be both immaterial and spatially present, and therefore there is no reason to suppose that by asserting mind's spatial presence Newton means to depart from dualism. (Gassendi's remarks appear and are discussed in McGuire and Slowik (forthcoming), §2.)

56. Newton (2004), 26.

57. Here I have used the Halls' translation (Newton (1962), 143), which conveys the point (i.e. that the ideas of thinking and extension could apply to a single created substance) more clearly than the translation by Johnson and Janiak, which reads as follows: 'the distinction between these ideas will not be such that both may fit the same created substance, that is, but that a body may think and a thinking being be extended' (Newton (2004), 31). I thank Dennis Des Chene for discussion of this passage and for communicating his own translation of the fragment, which reads as follows: 'the distinction of [the two] Ideas will not be so great that both could not apply to the same created substance – that is, not so great that a body could not think nor thinking things be extended' (Des Chene, personal correspondence of 26 and 27 May 2011). The meaning conveyed by Des Chene's translation is similar to that of the Halls' translation, except that he corrects their use of the active 'extend' with the passive 'be extended'. In a recent article, Geoff Gorham provides a similar translation, the relevant section reading as follows: 'and hence the distinction between these Ideas will not be so great [*non tanta erit*], indeed so that it would be possible for both [*quin ut ambae possint*] to coincide in the same created substance, that is, for bodies to think or for there to be extended thinking things' (Gorham (2011a), 29).

58. While it is not compatible with a dualist view that takes extension to entail impenetrability, it may be compatible with views denying that entailment.

59. Locke, *Essay*, IV.iii.6; 540–541.

60. Although part of Dempsey's intent is to show, in connection with other texts, that Newton accepted mortalism, I will not concern myself with that claim here, in part because one may consistently hold that the mind dies with the body without identifying the two, and in part because I focus here only upon *De gravitatione*.

61. Dempsey (who quotes Newton 2004) also takes Newton to hold that 'the mind is necessary for, and coextensive with, activities in the body' (Dempsey (2006), 425). Dempsey's reference of 31 refers to the translation given there in Newton (2004).

62. Dempsey also takes Newton to hold that 'the mind is necessary for, and coextensive with, activities in the body' (Dempsey (2006), 425). This presumably refers to Newton's claim that it is unintelligible to suppose that the mind could be united with the body if it were not substantially present anywhere:

On Descartes's view we must 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 totally unintelligible and impossible. (Newton (2004), 31)

Newton clearly takes the mind to be coextensive with some or all of the body, as Dempsey notes, and he also thinks the mind must be present in space in order to be united with the body and thus to move it. Yet I do not see how those claims favour an interpretation of substance monism; that the mind must be present in space in order to exist, and that it must be present where the body is in order to move that body does not indicate that they are one and the same, nor that they are 'ontologically coupled' in the sense that the one could not exist without the other. (See Dempsey (2006), 425: 'For Newton, then, mind and body do not possess independent existence. In other words, mind and body are not only causally, but also ontologically, coupled. Human minds exist only in living human bodies, and human bodies owe their life and motion to the minds with which they are coupled.')

63. It would conflict, that is, with dualism as commonly understood, on which thinking things are not corporeal. One could in principle assert a dualist theory on which some thinking things are corporeal while others are not.
64. Cf. Gorham (2011a), 26–27; according to Gorham, Stein does take Newton to deny substance dualism.
65. Newton (2004), 33.
66. *Ibid.*, 32–33.
67. Stein writes:

The reach of Newton's suggestion ... bears explicitly upon the so-called 'mind-body problem' – or, perhaps better put as Newton put it: upon the problem of understanding 'the substantial foundation of minds.' Just as in the theological case, the suggestion sets aside the distinction of 'kinds of substance': mind-body dualism or monism, in favour of the programme: *to seek to understand mental attributes and their relation to corporeal ones*. When these relations are sufficiently understood, Newton implies, we may expect to know all that there is to know about the 'substantial foundation of minds'; *before* they are sufficiently understood, 'it would be rash to say what is the substantial foundation of minds.' (Stein (2002), 282)

Towards different ends, another commentator, Slowik (2009), 451, describes Newton as having an 'aversion to the very idea of substance', one so great that he considers conceiving God in terms of attributes alone, rather than as a substance. Elsewhere, I made a suggestion that I now mean to correct, namely, that Newton sometimes considers dispensing with the concept of substance altogether:

Some of Newton's remarks suggest that he considers dispensing with the notion of substance altogether. He dispenses with the notion of prime matter, and even suggests in *De Gravitatione* that one attribute, the will by which God creates, should perhaps be conceived as 'subsisting of itself, without any substantial subject.' (Kochiras (2009), 278, n. 82)

68. What is taught in metaphysics, if it is derived from divine revelation, is religion; if it is derived from phenomena through the five external senses, it pertains to physics ['ad Physicam pertinere']; if it is derived from knowledge of the internal actions of our mind through the sense of reflection, it is only philosophy about the human mind and its ideas as internal phenomena likewise pertain to physics. (Cohen, *Guide*, in Newton (1999), 54)
69. Here I am employing I. B. Cohen's term (e.g. Cohen (1999), 60–61). As Cohen observes, in the *Principia* Newton set aside such questions as the causal means by which gravitational effects are produced, so as to solve such problems as the mathematical proportions of the force of gravity.
70. Newton (2004), 31.
71. *Ibid.*, 32.
72. See *ibid.*, 31; the quote is provided in note 11, above. On space's inability to produce effects, see *ibid.*, 21–22, 34.
73. Newton, *De gravitatione*, the Halls' translation (Newton (1962), 143). The original reads:

Praeterea si legitima et perfecta est distinctio substantiarum in cogitantes et extensas; tum Deus extensionem in se non continet eminenter et proinde creare nequit; sed Deus et extensio duae erunt substantiae seorsim completae absolutae et univoce dictae. Aut contra si extensio in Deo sive summo ente cogitante eminenter continetur, certe Idea extensionis in Idea Cogitationis eminenter continebitur, et proinde distinctio Idearum non tanta erit quin ut ambae possint eidem creatae substantiae competere, hoc est corpora cogitare vel res cogitantes extendi. (*ibid.*, 109)

An interesting discussion of this and related passages may be found in Gorham (2011a), 27–30; see esp. 29. Although Gorham and I reach different conclusions about some central interpretive questions for *De gravitatione*, there are some similarities between our analyses of these passages. Additionally, Gorham attends closely to the question of how Newton understands eminent containment (see again *ibid.*, 29).

74. 'If the distinction of substances between thinking and extended is legitimate and complete, God does not eminently contain extension within himself and therefore cannot create it' (Newton (2004), 31).

75. It is of course true that Newton himself should admit the possibility of thinking matter, given his endorsement of eminent containment and his voluntarist theology. But for Newton, allowing that possibility does not amount to a system-undermining concession, as he takes it to do for Descartes, and there is no pressure for him to do more than allow the mere possibility; there is in fact no thinking matter if God does not associate powers of impenetrability with powers of thought. I thank James Hill for urging me to clarify this point.
76. Newton (2004), 30. Developing the same thought, he suggests that in virtue of being nobler, created mind might 'eminently contain' body in itself. This does not provide created minds with the power to create bodies, Newton clarifies; but since he also notes that by moving our bodies we 'simulate the power of creation', perhaps he is wondering whether our power to move our bodies derives from a relationship of eminent containment. It is at least clear from that relationship that created minds have a greater reality than bodies, and are higher than bodies in the hierarchy of being, which in turn implies that minds and bodies are distinct.
77. See Newton (2004), 32:

Since it [the substance they claim to reside in body] cannot be understood it is impossible that its distinction from the substance of mind should be understood. For the distinction drawn from substantial form or the attributes of substances is not enough: if bare substances do not have an essential difference, the same substantial forms or attributes can fit both, and render them by turns, if not at one and the same time, mind and body. And so if we do not understand that difference of substances deprived of attributes, we cannot knowingly assert that mind and body differ substantially.

Newton's representations can be uncharitable, and the Scholastics might respond by pointing out that Newton is mistaken in supposing that they take the same underlying stuff to be joined to both incorporeal and corporeal forms. The underlying stuff - matter - joined to corporeal forms has the *capacity* for such things as quantity and divisibility. This is not the case for underlying stuff joined with spiritual forms - if there is any. And if there is any, it is distinct from the stuff that can be joined with corporeal forms even though it lacks properties, because it has different *capacities*. According to Suarez, purely spiritual substances, such as angels, are not composites of matter and form except by analogy. I thank Dennis Des Chene for this point.

78. Newton (2004), 32. Newton makes a similar point earlier on the same page:

Further they attribute no less reality in concept (though less in words) to this corporeal substance regarded as being without qualities and forms, than they do to the substance of God, abstracted from his attributes. They conceive of both, when considered simply, in the same way; or rather they do not conceive of them, but confound them in some common apprehension of an unintelligible reality. And hence it is not surprising that atheists arise ascribing to corporeal substances that which solely belongs to the divine.

79. Newton (2004), 32–33. I thank Dennis Des Chene for some illuminating remarks about this passage.
80. Stein, (2002), 281–282.
81. Newton (2004), 20.
82. *Ibid.*, 32.
83. *Ibid.*, 27; cf. Newton (1999), 942.
84. Descartes, *Principles of Philosophy*, §51–58, 62; see also Nolan (1997). Newton of course does not belong to the same tradition, for the thinkers mentioned take spirits to be transcendent. It should be noted McGuire (1978) denies that Newton identifies God with his attributes. He emphasizes the *Principia's* General Scholium, as well as some draft sheets that Newton wrote c. 1719, following the Leibniz–Clarke correspondence (the Des Maizeaux drafts), but also sees continuity with *De gravitatione*. McGuire writes:

As he denies that God is Eternity and is Infinity, so he denies that God is identical with Wisdom and Power. In other words, he opposes those theologians who hold that God's attributes are strictly one and the same with Divine essence and existence, as well as identical among themselves. (McGuire (1978), 479)

85. Gorham has recently argued that though Newton's ideas differ from More's, he does identify God with space and time in *De gravitatione*; see Gorham (2011b), esp. 289–292 and 298–304. In accordance with

that view, Gorham argues that when Newton suggests that space is conceivable apart from God, he is referring to the Cartesian view of space, not space as he himself understands it; see Gorham (*ibid.*), 287.

86. Even Henry More, after once suggesting that space is identical to God, appears to backtrack. In §4–6 of the 1655 Appendix to *An Antidote against Atheism*, More writes:

If after the removal of *corporeal Matter* out of the world, there will be still *Space* and *distance*, in which this very matter, while it was there, was also conceived to lye, and this *distant Space* cannot but be something, and yet not corporeal, because neither impenetrable nor tangible, it must of necessity be a substance Incorporeal, necessarily and eternally existent of it self: which the clearer *Idea* of a *Being absolutely perfect* will more fully and punctually inform us to be the *Self-subsisting God*. (More, in Koyre (1957), 137)

There is some disagreement about whether this identification of space with the ‘self-subsisting God’ was a one-off occurrence. According to Jasper Reid, it was: ‘After that isolated remark in the Appendix to *An Antidote Against Atheism*, More subsequently shied somewhat away from declaring space to be the very substance of God, but he was at least willing to identify it with one of His attributes’ (Reid (2008), 101). John Henry, by contrast, holds that More implicitly made the identification elsewhere too:

This identification is implicit in the *Divine dialogues* (1668, London), vol. 1, 106, where space is considered to be ‘a more general and confused apprehension of the divine amplitude,’ and it is a space in which all things are ‘necessarily apprehended to live and move and have their being’ (107). (Henry (1979), 571)

87. Understanding this to be Newton’s point does imply that he is changing the subject, since previously he was focused upon identifying those attributes having independent existence, without needing to be predicated of a subject. Yet the alternative, which takes him to stick with the same subject, is implausible. If in saying that we do not understand the mind’s power to move the body and consequently its substantial nature, he meant to say that he does not know whether the mind’s power belongs in the same class as the attributes of extendedness and divine power, he would in effect be saying that he does not know whether the mind is created. Since he does take the mind to be created, as he states, for instance at 30, it seems that he is changing the subject. I also note that Stein understands Newton as saying that to understand the mind’s nature is to understand its characteristic attribute, and I agree with him on that point, even though I reject his associated suggestions that Newton is uninterested in the question about a substantial distinction between mind and body and that his characterization of God eliminates the concept of substance.
88. Although here Newton cites the power to move the body as characterizing the mind, earlier, when asserting that actions are the ‘proper affections’ of substances, he pointed to thought as a proper affection of the mind. So he seems to take both to characterize the mind, or identifies them; see Newton (2004), 33 and 21, respectively.
89. *Ibid.*, 30.
90. This point is implicit in Newton’s criticism of Descartes’s transcendent view of the mind: to ‘say that mind has no extension at all, and so is not substantially present in any extension, that is, exists nowhere . . . 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’ (*ibid.*, 31).
91. *Ibid.*, 26.
92. This article, begun during a postdoctoral fellowship at the University of Pittsburgh’s Center for Philosophy of Science, was substantially revised during my stay as a European Union Institutes of Advanced Study Fellow at Bucharest’s New Europe College. I gratefully acknowledge the funding and support of both of those institutions, as well as the financial contribution of the European Community’s Seventh Framework Programme within the EURIAS Programme. As always, shortcomings of this article are my own, and I would like to thank Dennis Des Chene, Alan Nelson, and Nicholas Rescher for comments on an earlier draft. Special thanks are due to an anonymous referee for this journal, who provided extensive comments. I also benefited from the discussion following my presentation of that draft at the University of Ghent’s conference on Isaac Newton and his reception, and from an ensuing exchange with James Hill.