Newton's Ontology of Omnipresence and Infinite Space

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The literature on Newtonian space is large and growing. A central topic is its ontic status: is space a substance, an attribute of a substance, or an entity whose mode of being falls outside the traditional categories? To clarify Newton's position it is necessary to consider the intimate connections between his conceptions of Divine omnipresence and infinite space. Fortunately Newton wrote extensively on these topics both in his published and manuscript works. Moreover, Divine omnipresence and its relation to spatial infinity were discussed widely by many of Newton's contemporaries, notably Henry More (1614-1687), Walter Charleton (1620-1701), Ralph Cudworth (1617-1688), Joseph Raphson (1648-1715), and Samuel Clarke (1675-1729). On the Continent, Francesco Patrizi (1529-1597), Tommaso Campanella (1568-1639), and Pierre Gassendi (1592-1655) put forth views similar to Newton's concerning the relation of God to infinite space. Whatever the extent of his involvement in this literature, Newton's thought in many ways is original, and underwent change over time. Among the 'Cambridge Platonists' a doctrine, which Henry More called 'holenmerism' (or 'holenmerianism') and a position he called 'nullibism' were discussed extensively.[1] According to holenmerism, God's being is said to be whole in the entirety of space and simultaneously whole in each of its parts. For More, a nullibist believes that incorporeal entities, such as God and minds, can exist without reference to space and time. In contrast to this, anti-nullibism states that anything which lacks position or place, or which is unrelated to space, is without location and as such cannot be said to exist in *rerum natura*. Anti-nullibists take the spatialization of being as unproblematic. The sorts of beings

[1] The terms 'holenmerism' and 'nullibism' are More's invention, and we will refer to these concepts using More's terminology, regardless of historical period (i.e., we will use these terms with respect to philosophers that predate More).

standardly mentioned as having relation to space are God, minds, and bodies, and Patrizi also cites natures, qualities and forms. This leaves it open what the scope of being is for the anti-nullibists and whether in their view the existence of every sort of thing needs to bear some relation to what is extended.

Anti-nullibism was initially put forward by More as a criticism of Descartes's doctrine that the mind is a thinking, non-extended *res*. Conceived as such, the mind lacks shape, size and position and consequently is without location in the natural order. By the same token, God's omnipresent existence, as a spiritual being, needs to be conceived as having a relation to space. A possible view is holenmerism, which More favored initially. In his later thought, however, More identifies space with God's amplitude of presence and articulates a view of incorporeal extension to fit the ontology of divine being. In what follows we will situate Newton's thought in this intellectual landscape. Facing many of the same problems, Newton accepted More's critique of Cartesian nullibism, but there is no clear evidence that he ever accepted holenmerism. Nor did he articulate, as did More, a specific doctrine of incorporeal extension with which to explain the ontology of divine omnipresence and its relation to space. Indeed, Newton's ontology of space is interestingly different from anything to be found in the work of his contemporaries.

1. OMNIPRESENCE: SOME HISTORICAL BACKGROUND

We begin with traditional accounts of divine omnipresence as they descend from the Middle Ages. Basically the doctrine proclaims that God is present equally in the totality of creation. The abstract terms 'omnipresence' and 'omnipresent' do not occur as such in scripture. But the idea that God is everywhere present is throughout presupposed and sometimes explicitly formulated.

Newton captures the biblical idea nicely in his 'Twelve Articles of Faith': 'The Father is immovable, no place being capable of becoming emptier or fuller of him than it is by the eternal necessity of nature. All other beings are movable from place to place'.[2] In the philosophical tradition God's omnipresence is closely related to the doctrines of omnipotence and omniscience. Since God is everywhere, he is causally active throughout creation and able to know all things immediately. Seen in this light, omnipresence is cousin to the monotheistic conception of God as the infinite creator and conserver of the created world. Standardly, accounts of omnipresence view God as bodiless and on that account cannot be said to 'fill' space as if in a container. A remarkable account of divine omnipresence which appeals to spatial terms is found in the fourteenth-century philosopher Nicolas Oresme. In his *Le Livre du ciel et du monde* (1377), Oresme tells us that 'God in His infinite grandeur [is] without any quantity and absolutely indivisible, which we call immensity, [and] is necessarily all in every extension or space or place which exists or can be imagined. This explains why we say God is always and everywhere (*semper et ubique*) always through his eternity and everywhere through his immensity'.[3] Later in his treatise he elaborates this account:

> Notwithstanding that He is everywhere, still is He absolutely indivisible and at the same time infinite… for the temporal duration of creatures is divisible in succession; their position, especially material bodies, is divisible in extension; and their power is divisible in any degree or intensity. But God's [duration] is eternity, indivisible and without succession. […] His position is immensity, indivisible and

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[2] H. McLachlan, *Sir Isaac Newton*: *The Theological Manuscripts* (Liverpool: The University Press, 1950), 56.
[3] N. Oresme, *Le Livre Du Ciel et Du Monde* [*Livre*], ed. A. D. Menut and A.J. Denomy (Madison: University of Wisconsin Press, 1968), 279.

without extension.[4]

It is notable that Oresme explicitly identifies the divine 'where' and 'when' with the categories of space and time. Of space he says specifically: 'Now this space of which we are talking is infinite and indivisible, and is the immensity of God Himself'.[5] The identification of 'where' with the category of space first occurs in the writings of Eudorus and Philo of Alexandria, both of whom argue that space and time are presupposed by the existence of everything else which falls under the categories of being.[6] Oresme's work lay dormant in manuscript and hence the detailed history of its influence is difficult to trace. But clearly he articulates divine presence in temporal and spatial terms. This conception reaches its culmination in seventeenth-century thought.

In the Middle Ages an influential account of omnipresence is found in Thomas Aquinas. Thomas holds that divine presence is to be understood in terms of God's power, knowledge and essence. He writes: 'God is in all things by his power [*potentiam*], inasmuch as all things are subject to his power; he is by presence [*praesentiam*] in all things, inasmuch as all things are bare and open to his eyes; he is in all things by his being [*essentiam*], inasmuch as he exists in everything as the cause of their being [*ut causa essendi*]'.[7] Here Aquinas explicates God's relation to creation indirectly through the notions of subjection to divine power, direct presence to all things and as the cause of their being. Thus God is present to all things by having power over them; he is present to all things by knowing them immediately; and he is present to all

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[4] Oresme, *Livre,* 721.
[5] Oresme, *Livre,* 177.
[6] J. Dillon, *The Middle Platonists* (Ithaca, NY: Cornell University Press, 1977), 134, 179-180.
[7] T. Aquinas, *Summa Theologiae* [*ST*], Blackfriars edition, 61 vols. (New York: McGraw-Hill, 1964), Part 1a, Question 8, Article 3; vol. 2, 121.

things as the direct cause of their existence. Aquinas also considers how God's location is to be considered. He argues that both corporeal and incorporeal beings can be said to be in a place but the sense of 'being in' has to be carefully distinguished in each case. Accordingly, God

> is in every place giving it existence and the power to be a place [*virtutem locativam*], just as he is in all things giving them existence, power and activity [*operationem*]. Secondly, just as anything is in a place insofar as it fills that place, so God fills all places [*Deus omnem locum replete*]. But not as bodies do (for bodies fill places insofar as they don't suffer other bodies to be there with them, while God's presence in each place does not exclude the presence there of other things); rather God fills [*replete*] all places by giving being to all things that fill those places.[8]

Reasoning in this manner Aquinas concludes that 'incorporeal things are not in place by contact of dimensive quantity, as are bodies, but by contact of power'.[9] On this understanding, God and the angels lack dimensive quantity and as such do not relate to space in the manner of bodies which have length, width and breadth. Nevertheless, since God and the angels can act in places and on the bodies which fill them, they are 'in' space 'by contact of power'.

In his discussion of the place of angels, Aquinas introduces another pair of distinctions.

> [S]o, then, it is clear that to be in a place is ascribed differently to bodies, to angels, and to God. For a body is in a place circumscriptively [*circumscriptive*], since it is commensurate with the place it is in. An angel, however, is not there

[8] Aquinas, *ST,* 1a, Q8, Art.2; vol. 2, 115.
[9] Aquinas, *ST,* 1a, Q8, Art.2; vol. 2, 115.

> circumscriptively, since he is not measured by the place, but definitively [*definitive*], because he is in a place in such a manner that he is not in another: God, however, is neither circumscriptively nor definitively there [i.e., in a place], he is simply everywhere'.[10]

Thus, a body has a circumscriptive place in so far as it is bounded by a region of space; but God is locatable in so far as he is said to be present everywhere in virtue of the nature of his being. Thus, for Aquinas, being everywhere locatable belongs to God

> outright and essentially. By being everywhere outright I mean being everywhere in one's wholeness. For to exist everywhere, but with diverse parts in different places, is not to be everywhere outright [*non esset primo ubique*], since any property of the part is not the outright property of the whole; thus the whiteness of a man with white teeth belongs outright to the teeth, not to him.[11]

In saying that God is 'everywhere in his wholeness', Aquinas subscribes to holenmerism. This becomes clear if we note that for Aquinas God is everywhere *at once* in his wholeness, so that God is present whole in whole and simultaneously whole in each part. Thus being incorporeal in nature, God is not objectively locatable in a place as are corporeal things. Rather, God can be said to 'dwell' among created things in the sense that he is spiritually present to them according to the fullness of his being.

Hobbes is critical of the distinction between circumscriptive and definitive presence. In *Leviathan,* he tells us that 'the circumscription of a thing is nothing else but the determination, or defining of its place; and so both the terms of the distinction are the same'. He goes on to remark

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[10] Aquinas, *ST*, 1, Q52, Art.2; vol. 9, 53.
[11] Aquinas, *ST*, 1a, Q8, Art.4; vol. 2, 123.

that on this understanding the soul would be said 'to be all of it in [a man's] little finger, and yet all of it in every other part (however small so ever) of his body; and yet no more soul in the whole body than in any one of those parts. Can any man think that God is served with such absurdities?'[12] In a later work he tells us that, 'A figure is quantity every way determined' so that 'this *determination* is the same thing with *circumscription;* and whatsoever is anywhere [*ubicunque*] *definitively* is there also *circumscriptively;* and by this means, the distinction is lost, by which the theologers, when they deny God to be in any place, save themselves from being accused of saying he is no where: for that which is no where is nothing'.[13] Hobbes is referring to the Scholastic tradition.

Henry More doesn't use these terms in regard to modes of presence in space. In regard to the mode of presence of spirits he coined the term 'nullibist' to refer to those who, like the Cartesians, denied extension to spirits. For the Cartesians, spirits exist transcendentally and cannot be said to have any direct relation to space in a way that makes them extended. Indeed, in his correspondence with More in 1648 Descartes allows that God is present to extended space by the intensity of his power and denies, in the manner of Aquinas, that God is thereby extended.[14] But, for More, extension characterizes all substances and is not a peculiarity of matter as Descartes would have it. In More's late metaphysics there are two forms of extension—corporeal and incorporeal. Metaphysical or incorporeal extension—pure space—is eternal, infinite, indivisible and immutable, whereas corporeal extension is finite, divisible, and mutable. This means that spirits or incorporeal extensions, are able to penetrate other spirits and bodies, and

[12] Hobbes, *EW* iii. 676.
[13] Hobbes, *EW* vii. 204-5.
[14] Descartes, AT V 248-239, 372-3.

being where these entities are, they can initiate movement. Thus spirits, God included, are present in the same space as bodies or other spirits without thereby losing their independence as substances. Ironically, in regard to the criterion of existence, a common commitment links the thought of Hobbes and the Platonists. Both hold that to exist, a thing must be locatable in space and this demands that it be extended. Only in this way can it be said to be somewhere in the real order. For Hobbes, however, it is physically extended things alone that satisfy this requirement. For More, spirits also satisfy it insofar as they are indivisibly extended and in this manner present to space.

2. HOLENMERISM AND NULLIBISM IN THE SEVENTEENTH CENTURY PRIOR TO NEWTON

An important Renaissance statement of anti-nullibism is found in Patrizi's *Nova de universis philosophia*.[15] Invoking the principle of ontic priority, Patrizi considers which entity was created before all others. He asks about

> that in the absence of which nothing else exists, and which can exist without anything else, [and] is necessarily prior to all other things. But this is space itself. For all things, whether corporeal or incorporeal, if they are not somewhere, are nowhere; and if they are nowhere they do not even exist. If they do not exist they are nothing. If they are nothing, they will then be neither souls, or natures, or qualities, forms, or bodies.[16]

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[15] F. Patrizi, *Nova de universis philosophia* (Venice, 1593).
[16] Quoted from B. Brickman, 'On Physical Space, Francesco Patrizi', *Journal of the History of Ideas,* 4 (1943), 224-45, at 225.

This statement, in effect, can be seen as a manifesto for seventeenth-century opponents of nullibism.[17] It states that space is necessarily prior to the existence of other kinds of beings and depicts anti-nullibism in language similar to that found, for example, in the writings of Henry More and Isaac Newton. Pierre Gassendi knew Patrizi's work and in his *Syntagma* refers to him approvingly as having a position similar to his own on space and time.[18] In England, Gassendi's views were adopted wholesale by Walter Charleton and through him they gained currency. We will consider the work of Gassendi and Charleton below, but first we consider two important English writers who share Patrizi's Neoplatonic background.

An important seventeenth-century discussion of the ontology of extended being which pertains to holenmerism and nullibism is found in the work of Ralph Cudworth, who defends those who assert the existence of incorporeal substance. Besides body, which is divisibly extended, Cudworth argues that there is 'another Substance, that is both Penetrable of body and Indiscerpible; or which doth not Consist of Parts Separable from one another'.[19] This substance 'can Act all of it Entirely, upon either a Greater or Lesser Quantity of Extended Substance or body, and its Several Parts, Penetrating into it, and co-existing in the same Place with it'. According to Cudworth, this substance has an 'internal energy' by which it 'Acteth and Thinketh within it Self', and it possesses 'a certain Amplitude of Active Power… or a sphere of Activity upon Body' and is such that 'this One and the same Indivisible, can at once both comprehend a

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[17] See J. Henry, 'Francesco Patrizi Da Cherso's Concept of Space and its Later Influence' ['Patrizi'], *Annals of Science*, 36 (1979), 549-73, for a discussion of Patrizi's influence.
[18] Henry, 'Patrizi', 368-9; see also, E. Grant, *Much Ado About Nothing* [*Much Ado*] (Cambridge: Cambridge University Press, 1981), 391.
[19] R. Cudworth, *The True Intellectual System of the World* [*System*], (New York: Garland Publishing, 1978), chap. V, 834.

Whole Extensum within it, and be all of it in every Part thereof'.[20] This is, of course, the view of those who adopt holenmerism and its conception of incorporeal substance. Cudworth goes on to discuss other 'Asserters of Incorporeal Substance' who agree with the materialist that what is unextended is nothing, but deny that what is extended must be body:

> they affirm, that there is another Incorporeal Extension, which is both Penetrable, and also Indiscerpible: so that no One Part thereof, can possibly be Separated from another, or the Whole; and that to such an Incorporeal Extension, as this, belongeth Life, Cogitation, and Understanding, Deity having such an Infinite Extension, but all Created spirits, a Finite and Limited one: which is also in them supposed to Contractible and Dilatable.[21]

These last characteristics refer to what Cudworth calls 'internal energy' or power whereby an incorporeal finite thing is possessed of self-motion and thereby is not reduced to mere local motion in space as are corporeally extended things. Although Cudworth doesn't mention him, Henry More is a prominent example of those who support an infinite incorporeal extension against the material extension of the Cartesians, and as such reject the picture of how God relates to the extension of space advocated by holenmerism. In his discussion Cudworth endorses neither view of the relation of divine being to the ontology of incorporeal substance.

We come now to More's conception of divine omnipresence. Jasper Reid has shown persuasively, that More's views develop and change over time. Most importantly, some time in the mid-to-late 1650s, More's view of divine omnipresence shifts from holenmerism to anti-

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[20] Cudworth, *System,* chap. V, 832.
[21] Cudworth, *System,* chap. V, 833.

holenmerism.[22] In *The Immortality of the Soul* (1659),[23] More explicitly denies holenmerism, the view that incorporeal entities can be wholly present in different places at once, so that in this way their presence is reiterated in each individual part of a space or body. Probably in the wake of Hobbes's attack on the absurdity of holenmerism (note the passages we quote above), More came to see that the presence of incorporeal substances in space needed to be defended by better and more positive arguments.[24] He faces this task squarely in his *Divine Dialogues* (1668).[25] The claim that the soul, for example, can be at once wholly in the human toe and wholly in the head, means that if it is wholly 'in the Toe, there is nothing left to be in the head'.[26] From this follows the absurd consequence that God's amplitude is reduced to a minute point, resulting in the instantiation of divine omnipresence in multiple totalities. This, of course, contravenes the essential unity that incorporeal substances must possess.

In the *Enchiridion metaphysicum* (1679),[27] More's mature theory of divine presence emerges. This involved arguing that both God and space are infinite incorporeal extensions. While incorporeal extensions cannot have parts outside parts in the manner of physical extensions, they are for More nevertheless 'intellectually' or 'notionally' divisible into distinct parts, a mental exercise which leaves their essential indivisibility unaffected.[28] Besides being an essential unity, incorporeal extension is penetrable, thus making it unlike corporeal extensions in

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[22] J. Reid, 'The Evolution of Henry More's Theory of Divine Absolute Space' ['Evolution'], *Journal of the History of Philosophy,* 45 (2007), 79-102, at 95.
[23] H. More, *The Immortality of the Soul* (Bristol: Thommes Press, 1997).
[24] Reid, 'Evolution', 98-9.
[25] H. More, *Divine Dialogues* [*Dialogues*] (Glasgow: R. Foulis, 1743).
[26] More, *Dialogues,* 72.
[27] H. More, *Henry More's Manual of Metaphysics: A Translation of the* Enchiridium Metaphysicum *(1679),* Parts I and II [*Enchiridium*], trans. A. Jacob (Hildesheim: Olms, 1995).
[28] Reid, 'Evolution', 100.

a two-fold way. More was now in a position to link God's incorporeal extension with that of space by identifying spatial infinitude as one of God's attributes: 'that *inmost Extension* or *Amplitude* which will necessarily remain after we have imagined all Matter, or whatever else is removeable, removed or extermined out of the World is to be look'd upon as the *Permanent Expansion* or *Amplitude* of the *radical Essentiality of God'*.[29] In this way Space's incorporeality becomes divine and answers to the same names and titles that are attributed traditionally to the being of God.[30]

Joseph Raphson defends the same position i.e., that space is an attribute of the first cause, by different arguments. He proceeds from the principle that space as a created effect must be contained in its first cause. Since 'there can be nothing in *rerum natura* except extended and unextended [things]; and as we have demonstrated that extension is perfection, existing everywhere, and is even infinite, necessary, eternal, etc., it follows necessarily that it must be found in the *First Cause* of extended [things] without which the extended [things] cannot exist'.[31] Like More, Raphson divinizes space, and like More, he accepts a substance/attribute ontology. Given these ontic commitments, space becomes an expression of God's infinite essence and is itself an infinitude. If God is the first cause of infinite extension, God must literally contain that perfection. Here Raphson clearly flirts with Spinozism. He also endorses an anti-nullibist position since he holds that if things exist in *rerum natura* they must have a relation to the prior existence of extended space.

While holenmerism plays no role in the conception of how incorporeal being relates to

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[29] More, *Dialogues,* 449.
[30] More, *Enchiridium,* 57.
[31] Quoted in, A. Koyré, *From the Closed World to the Infinite Universe* (Baltimore: Johns Hopkins University Press, 1957), 196.

space in the thought of Cudworth, Hobbes, or the late More, the idea acquired a certain prominence by the mid-seventeenth century, having an important role in the philosophy of Pierre Gassendi, and his English promoter Walter Charleton. Their line of argument, we point out, owes much to Aquinas' holenmerism, albeit with some interesting departures. The philosophical orientation of Gassendi and Charleton, as will become apparent, helped to shape the content of Newton's ontology of space, even if Newton rejected holenmerism for reasons similar to More's. While rebuffing nullibism, both Gassendi and Charleton advocate a philosophy that parts company with More. Both hold that space is neither substance nor accident, since it is *'more general than those two'*.[32] In his *Enchiridion Metaphysicum,* as we have just indicated, More posits the view that space is an accident of God, and employs the traditional Aristotelian substance/accident scheme to classify space. In stating his position More uses the term 'attribute', rather than the customary 'accident'[33]:

> The real attribute of some real subject can be found nowhere else except where in the same place there is some real subject under it. And, indeed, extension is the real attribute of a real subject. […] Indeed, we cannot not conceive a certain immobile extension pervading everything to have existed from eternity… and really distinct, finally, from mobile matter. Therefore, it is necessary that some

[32] W. Charleton, *Physiologia Epicuro-Gassendo-Charletoniana* [*Physiologia*] (London, 1654), 66. See, also, P. Gassendi, *The Selected Works of Pierre Gassendi* [*Works*], ed. and trans. C. Brush (New York: Johnson, 1972), 384.

[33] This is to be contrasted with Newton's distinctive use of the terms 'attribute' and 'affection' in the *De gravitatione* when referring to space. For Newton, these terms do not signify 'accident', since space (as will be explained below) is not an accident in the traditional substance/accident, or substance/property, dichotomy. Much terminological confusion will ensue if the various uses of the terms by each philosopher are not carefully tracked; e.g., as noted above, More employs the word 'attribute', in place of 'accident', in the *Enchiridion,* thus it should not be equated with Newton's 'attribute'.

real subject be under this extension, since it is a real attribute.[34]

For Gassendi and Charleton, on the other hand, space and time are regarded as additional categories of being ('real things, or actual entities'[35]), such that all substances and accidents, whether corporeal or incorporeal, fall under these categories. This explains their rejection of nullibism, since, as Charleton succinctly puts it, 'no substance can be conceived existent without Place and Time'.[36] In addition, for both More and the Gassendists, a vacuum (i.e., a portion of the world without matter) is a possible state-of-affairs, since either an incorporeal being provides the substratum underlying the accident of extension for these regions (More), or an incorporeal quantity of space, as a distinct entity, remains in matter's absence (Gassendists). This contrasts sharply with Descartes and later Cartesians, who hold that a conceptual distinction alone can demarcate matter from spatial extension, and given that all extension must be corporeal, the existence of the vacuum is ruled out.[37] Hence, given the acceptance of matter-less space, or incorporeal extension, on the part of both the Cambridge Platonists and the Gassendists, God's incorporeal extension could be viewed as securing the spatial extension of these matter-less regions.

From the perspective of holenmerism, however, all beings are extended, but not in the same way. Gassendi, in his *Syntagma philosophicum,* states that 'there is a kind of divine extension', which he qualifies by declaring it *'as if* of extension, lest we imagine that the divine

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[34] More, *Enchiridium,* 56-57.
[35] Gassendi, *Works,* 384.
[36] Charleton, *Physiologia,* 66.
[37] Descartes, *Principles,* II.10 (AT viiia. 45)

substance were extended through space like bodies are'.[38] While this hints at holenmerism, Gassendi espouses the view in his later claim that 'the divine substance is supremely indivisible and whole at any time and any place'.[39] Charleton's position is more elusive, but he seems also to sanction holenmerism in a discussion of the incorporeal substance of angels. After declaring that it is 'generally allowed' that an angel's substance has *'Diffusion* in place', he adds that it is 'constituted *in puncto,* as is also generally conceived'.[40] Despite these specific differences, however, much in Gassendi and Charleton chimes with the general philosophy of More and the other Cambridge Platonists. Indeed, Aquinas' distinction between the circumscriptive nature of corporeal being, and the uncircumscriptive nature of incorporeal being, the latter said to occupy a place only definitively, turns up in Charleton, demonstrating the close kinship, albeit with important differences, among the philosophies surveyed above:

> Moreover, hence also may we understand how *incorporeal substance,* as God, Angels, and the Souls of men, may be affirmed to be *in loco.* For, when God, who is infinite, and therefore uncapable of Circumscription, is said to be in Place; we instantly cogitate an infinite Space. […] [T]hat an Angel may be conceived to be in a determinate place, not *Circumscriptive,* but *definitive, i.e.,* So *Here* as no *where* else: is implicitly and upon inference, to confess the truth of our assertion; since that *Here,* designs a certain part of Space.[41]

Circumscriptive location, which is equated with Aristotle's conception of place (as the boundary

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[38] P. Gassendi, 'The Reality of Infinite Void' ['Void'], trans. M. Capek and W. Emge, in *The Concepts of Space and Time* (Dordrecht: Reidel, 1976), 91-96, at 94.
[39] Gassendi, 'Void', 94.
[40] Charleton, *Physiologia,* 70.
[41] Ibid.

between contained and containing bodies), is thereby summarily rejected by Charleton: 'who dares affirm an Angel to be in a place, that considers his Incorporeity, and the necessity of his circumscription by the superficies [boundary] of the Circumambient [surrounding air or other contiguous bodies], if *Aristotles* Definition of Place be tolerable?'[42] Since God and angels are incorporeal, it follows that the Aristotelian account of place as a corporeal boundary is inapplicable. But, Charleton also critiques circumscriptive location for more general reasons. He first notes that the mere surface area of a body is inadequate for a full understanding of the quantitative or dimensional aspect of space ('there being no part of the body… to which there is not a part of Space respondent in equal extent, which can never be made out from the mere superfice of the Circumambient'[43]). Second he notes that 'the Circumambient can in no wise pretend to this propriety of place, Immobility'.[44] For example, the flux of all material boundaries, such as that between the air and a tower on a windy day, leaves indeterminate which body moved and which remained immobile (the air or the tower), nor can the Aristotelians account for the motion of a body that is relatively at rest in, say, a flowing river (since the body's unchanging boundary should indicate an absence of motion). Incidentally, More had earlier raised these arguments against Descartes's (Aristotelian) hypothesis of place.[45]

3. NEWTON ON HOLENMERISM AND NULLIBISM

In this section, we begin our analysis of Newton's complex stance on the question of God's relationship to spatial extension, and, in particular, the details concerning his anti-nullibism and

[42] Ibid.
[43] Ibid.
[44] Ibid.
[45] Descartes to More, 5 March 1649 (AT v. 312).

anti-holenmerism. These issues are of great importance for understanding Newton's natural philosophy, although his reticent and seemingly conflicting statements may attest to a degree of uncertainty on his part, or at least a shifting or evolving attitude which he never quite resolved. Although much of our discussion will pertain to Newton's unpublished work, *De gravitatione* (circa 1680),[46] other texts will form an important part of our examination as well.[47]

Newton's arguments against nullibism are similar to More's late position. In *De gravitatione* Newton defends the view that all beings relate to space in some manner, asserting that 'Space is an affection of a being just as a being'.[48] This statement has engendered considerable confusion and debate among commentators. We will examine it in detail later, along with a defense of our interpretation. But for now it is useful to point out that Newton makes his anti-nullibism immediately clear: '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'.[49] In other words, extension pertains to all being such that nothing exists, or can exist, which is not in some way related to space.

While Newton makes his anti-nullibism evident, his position on holenmerism is more difficult to pin down, and in fact constitutes the most difficult aspect of his spatial metaphysics.

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[46] I. Newton, *De gravitatione et aequipondio fluidorum,* in A. R. Hall and M. B. Hall (trans. and ed.), *Unpublished Scientific Papers of Isaac Newton* [*Papers*] (Cambridge: Cambridge University Press, 1962), 89-164.
[47] On the dating of *De gravitatione*, see, J. E. McGuire, 'The Fate of the Date: The Theology of Newton's *Principia* Revisited', in M. Osler (ed.), *Rethinking The Scientific Revolution* (Cambridge: Cambridge University Press 2000), 271-96.
[48] I. Newton, *Philosophical Writings* [*Writings*], trans. and ed. A. Janiak and C. Johnson (Cambridge: Cambridge University Press, 2004), 25.
[49] Newton, *Papers*, 103.

There are numerous passages in the *De gravitatione,* in addition to later works, which appear to justify the view that God's omnipresence is comparable to the manner in which material beings are extended. He asserts that '[space and time] are affections or attributes of a being according to which the quantity of any thing's existence is individuated to the degree that the size of its presence and persistence is specified'.[50] Newton states immediately what he means by speaking of the 'quantity' of existence: 'So the quantity of the existence of God is… infinite in relation to the space in which he is present; and the quantity of the existence of a created thing… in relation to the size of its presence, is as great as the space in which it is present'.[51] Notice first that Newton characterizes God's 'quantity of existence' as being 'infinite' in relation to space. This means that divine presence is unbounded and unlimited and is in no respect constrained by space. So the possibility that God is present in space circumscriptively is ruled out. In other words, there is available no common measure with which to compare God's presence in space with that of finite things, since the latter can only occupy space circumscriptively. This leaves it open for Newton to conceives how God's omnipresence relates to space in some other manner, since he nowhere makes clear the precise meaning and implications of the phrase 'quantity of existence'. However, in an important manuscript of the early 1690s, entitled 'Time and Place', Newton does not use this terminology. He says simply: 'Time and Place are common affections of all things without which nothing whatsoever can exist. All things are in time as regards duration of existence, and in place as regards amplitude of presence. And what is never and nowhere is not

[50] Newton, *Writings*, 25. See note 33 above on Newton's use of the terms 'affection' and 'attribute'.
[51] Newton, *Writings*, 25-6.

in *rerum natura*'.[52] Newton's anti-nullibism is again evident. Instead of speaking of the 'quantity of existence' of things, he characterizes their relation to place by the phrase 'amplitude of presence'. This is a traditional way of speaking of God's omnipresence, and is used by More for this purpose. But for Newton 'place' or 'amplitude of presence' are 'common affections' of all things. So when he employs the phrase 'quantity of existence' in *De gravitatione*, it most likely refers to the 'amplitude of presence' of things, which for God is infinitely extended. Furthermore, the phrase does not necessarily connote holenmerism, since Cudworth's notion that incorporeal things are present by their 'internal energy' or power all at once in space as an indivisible whole fits this framework of thought as well.[53]

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[52] J. E. McGuire, 'Newton on Place, Time, and God: An Unpublished Source' ['Time and Place'], *British Journal for the History of Science,* 11 (1978), 114-29, at 117. The manuscript was probably prepared for inclusion in an unimplemented second edition of the *Principia* under preparation by Newton in the early 1690s. Judging from its content and style it may have been part of an intended revision of the scholium on space and time of the first edition of the *Principia* (1687). But it also anticipates the conception of God which appears first in the General Scholium of the 1713 edition. It is possible, then, that Newton planned it as part of a rewrite of the scholium on space and time for the new edition. The manuscript amply attests to the fact that Newton saw no inconsistency in bringing his conception of God's omnipresence together with his views on space and time.

[53] In the General Scholium, however, there is a passage that could be interpreted as retracting Newton's assertions in *De gravitatione,* and elsewhere, that space is simple, and thus potentially indicating a new-found embrace of holenmerism: 'There are parts that are successive in duration and coexistent in space, but neither of these exist in the person of a man or in his thinking principle, and much less in the thinking substance of God' (Newton, *Writings,* 91). Yet, since this passage is neither detailed nor corroborated in any other works, it is difficult to draw any firm conclusions on its implications for the simplicity of space: it could merely signify that we normally think of space as having parts alongside parts (*partes extra partes*), i.e., that we can *conceptually* divide space, but that we cannot conceptually divide mind, or thinking substance, in a similar manner. In the context of the preceding and subsequent discussions that surround this quote in the General Scholium, moreover, there is no hint that any ontological implications are being made for God or minds, as opposed to the being of space, as regards actual divisibility (discerpibility). Consequently, since the real issue is physical versus conceptual divisibility, the ambiguity of this quotation simply does not warrant any drastic reassessment of Newton's long and detailed defense of the simplicity, oneness, and indiscerpibility of both space and God,

These passages raise important questions. Does Newton accept More's view that God and space are both *incorporeally* extended? And does he follow More in identifying the incorporeal extension of God with that of space? These are vexed questions and Newton's texts appear to give opposing answers. Consider the first question. Just after the passage from *De gravitatione* cited above in which Newton speaks of the 'quantity of existence' of God in relation to space's infinity, he seems to draw an analogy between the indivisibility of space and the indivisibility of God. He says, 'lest anyone should for this reason imagine God to be like a body, extended and made of divisible parts, it should be known that spaces themselves are not actually divisible, and furthermore, that any being has a manner proper to itself of being in space'.[54] In his claim that space is not in itself actually divisible, Newton may have in mind More's notion that it is not divisible because it is 'indiscerpible' (i.e., it cannot be torn away from itself[55]). Be this as it may, we get a clear sense of Newton's overall position from an interesting passage in 'Time and Place'. He tells us that

> Space itself has no parts which can be separated from one another, or be moved among themselves, or be distinguished from one another by any inherent marks. Space is not compounded of aggregated parts since there is no least in it, no small or great or greatest, nor are there more parts in the totality of space than there are in any place which the very least body occupies. In each of its points it is like itself and uniform nor does it truly have parts other than mathematical points, everywhere infinite in number and nothing in magnitude. For it is a single being,

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which, as argued above, provides a strong case for the anti-holenmerism position (and which parallels More's similar anti-holenmerism).

[54] Newton, *Writings,* 26.

[55] More, *Enchiridium,* 123-4.

most simple, and most perfect in its kind.[56]

Yet, while Newton's admission of the oneness and simplicity of space lends support to its indiscerpiblilty as a further characteristic, and since More makes similar claims,[57] it is also true that these passages offer no clear support for the notion that space is incorporeal in nature, i.e., that the indivisibility of spatial extension matches the indivisibility of divine unity just because they both share the same type of incorporeal extension. To make these claims Newton would have to make three things explicit: (1) he would have to argue that space is an *incorporeal* attribute (accident) of divine being; that (2) divine being itself is *incorporeally extended*; and (3) he would need to establish that the incorporeal extension of space is identical with God's extension. He does none of these things. The only safe inference that can be drawn from *De gravitatione* and 'Time and Place' is that both God and space are extended and not actually divisible, but this leaves ample 'room' for the manner in which spatial extension relates to, and is dependent upon, God.[58]

Furthermore, although it is beyond the bounds of this essay, it should be noted that Newton offers a conception of body in the *De gravitatione* that strongly supports the notion that he rejects holenmerism. This hypothesis, in which he describes bodies 'as *determined quantities*

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[56] McGuire, 'Time and Place', 117.
[57] More, *Enchiridium,* 58.
[58] Newton's holistic conception of the 'parts' of space, which is a completely uniform and undifferentiated whole everywhere the same with itself, is evident in various portions of the *De gravitatione*: 'The parts… of space are only understood to be the same as they really are because of their mutual order and position; nor do they have any principle of individuality apart from that order and position which cannot consequently be altered' (Newton, *Writings*, 25). The same view is put forth in the scholium on space and time of the *Principia* where Newton speaks of the parts of space 'with reference to the order of position' (Newton, *Writings,* 66).

of extension which omnipresent God endows with certain conditions',[59] presents a number of distinctive features, in particular, the view that God's attribute of extension plays the 'container' role for the presence of corporeal substance. In other words, 'extension takes the place of the substantial subject in which the form of the body [i.e., the determined quantities] is conserved by the divine will'.[60] In brief, corporeal existence is explained as bodily properties, e.g., colors and impenetrability, that God posits and moves through space by the exercise of his will, thereby simulating, in a sense, our experience of bodily phenomena without the need of a concept of corporeal substance that serves to underlie and house those bodily properties. For instance, 'if [God] should exercise this power, and cause some space projecting above the earth, like a mountain or any other body, to be impervious to bodies and thus stop or reflect light and all impinging things, it seems impossible that we should not consider this space really to be a body from the evidence of our senses'.[61] Consequently, since the attribute of extension, which is secured by God's existence, serves (roughly) as the 'subject' of bodily accidents on this model (see note 33 on Newton's use of 'attribute'), it follows that God's extension must fit the category of both the corporeal and incorporeal; or, more accurately, that there is no longer a principled incorporeal/corporeal distinction as regards spatial extension (and, as noted above, Newton does not make use of that dichotomy in his writings). Furthermore, it is important to bear in mind that holenmerism depends on a difference between the way God is extended, on the one hand, and space and material bodies are extended, on the other. Therefore, Newton's hypothesis in regard to the nature of body in the *De gravitatione* has the additional consequence of demonstrating his

[59] Newton, *Writings,* 28.
[60] Newton, *Writings,* 29.
[61] Newton, *Writings,* 27-8.

general opposition to the metaphysics of holenmerism. In other words, there is only one form of extension that applies to both the corporeal and incorporeal, a notion that utterly refutes the approach to God's extension favored by holenmerism. Finally, the hypothesis on the nature of body that Newton puts forward in the *De gravitatione* is not just a passing fancy of his early years. On the contrary, there is good evidence to show that Newton continued to entertain and explore this hypothesis throughout his later, post-*Principia* period, as is witnessed by the report of Pierre Coste in 1710.[62]

Besides the account of body in the *De gravitatione,* there is further evidence which supports the contention that Newton's position differs from More's. In *De gravitatione,* he makes an interesting comparison between the way a temporal moment, and a mind relate to space: 'And just as we understand any moment of duration to be diffused [*diffundi*] throughout all spaces, according to its kind, without any concept of its parts, so it is no more contradictory that *mind* also, according to its kind, can be diffused through space without any concept of its parts'.[63] Newton puts forward a similar view in the General Scholium to the second edition of the *Principia* (1713). He states emphatically that God

> is not duration or space, but he endures and is present. He endures forever, and is everywhere present: and, by existing always and everywhere, he constitutes duration and space. Since every particle of space is always, and every indivisible moment of duration is everywhere, certainly the Maker and Lord of all things cannot be never and nowhere. Every soul that has perception is, though in different times and in different organs of sense and motion, still the same

[62] A. Koyré, *Newtonian Studies* (Cambridge, MA: Harvard University Press, 1965), 92.
[63] Newton, *Writings,* 26, emphasis added.

indivisible person.[64]

Newton's first claim is to deny that God, duration and space are identical and *a fortiori* that space is an attribute of God as it is conceived by More in his late spatial ontology.[65] But he goes further: he says that God 'constitutes' duration and space by existing always and everywhere. By using the term 'constitutes', Newton does not imply that time and space are 'ingredients' of divine nature. Rather, his claim is that God, in virtue of his *very being*, posits the existence of unending time and unbounded space. Thus, there is no time at which God can fail to exist and no place with respect to which he can fail to be present. We will return to this claim later, when we consider passages from *De gravitatione* in which Newton speaks of space as an emanative effect of God's immutable being. In this regard, we will also consider Newton's draft letters written in 1719 as an *avertissement* to Des Maizeaux's 1720 edition of the Clarke-Leibniz correspondence, in which he says that space is an unbounded mode and consequence of God's necessary being. Newton's second claim is that to exist temporally and spatially does not entail that a thing's essential nature is liable to change. Just as a human being remains the same person over time and spatial change, so in greater measure does God's necessary being remain the same always and everywhere. In the manuscript, 'Time and Place' (early 1690s), Newton makes a similar point:

> To exist in time and place does not argue imperfection, since this is the common nature of all existing things. For the Duration of a thing is not its flow, or any

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[64] Newton, *Writings,* 94.

[65] Although he straightforwardly rejects the view that space is an attribute of God, the role that space plays in Newton's overall ontology of space nonetheless makes it very close to a property, albeit with very important qualifications which we discuss below (see, E. Slowik 'Newton's Neo-Platonic Ontology of Space' ['Neo-Platonic'], http://philsci-archive.pitt.edu/id/eprint/4184 (2008)). See the discussion below as well, where space is likened to a second-level predicate.

> change, but permanence and immutability in time. All things endure in so far as they remain the same at any time. The duration of each thing flows, but its enduring substance does not flow, and is not changed with respect to before and after, but always remains the same. […] But neither does Place argue the divisibility of a thing or a multitude of its parts, and on that account imperfection, since space itself has no parts.[66]

Here again Newton states clearly that to exist in time and space does not entail that what does so possesses successive and co-existent (i.e., actually divisible) parts, or that space itself has actually divisible parts.

We can return now to those troublesome texts cited above from *De gravitatione* in which Newton opposes nullibism by stating that all beings are extended and that extension belongs to being as such. In order to counter the Cartesian identification of extension with body Newton sets out to show how the two concepts differ from one another. He begins by arguing that extension is neither a substance nor an accident:

> [1] it has it own manner of existing which fits neither substances nor accidents. It is not substance; on the one hand because it is not absolute in itself, but is, as it were [*tanquam*], an emanative effect [*effectus emanativus*] of God, and an affection of all being which subsists [*subsistit*]; on the other hand, because it is not among the proper affections that denominate substance, such as thoughts in mind and motions in bodies.[67]

He goes on to argue that we have a clear idea of extension as the 'uniform and unlimited

[66] McGuire, 'Time and Place', 117.
[67] Newton, *Papers*, 99.

stretching out of space in length, breadth and depth'. He then enumerates six characteristics of extended space which show what it is. Its fourth characteristic is that

> [2] Space is an affection of being just as being [*Spatium est entis quatenus ens*]. 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 what is neither everywhere nor anywhere does not exist. And hence it follows that space is an emanative effect [*effectus emanativus*] of the first existing being, for whatever being is posited, space is posited.[68]

The sixth and last characteristic is that

> [3] space is eternal in duration and immutable in nature, and this is because it is the emanative effect [*effectus emanativus*] of an eternal and immutable being. If ever space had not existed, God at that time would have been nowhere: hence he either created space later in which he was not present, or else, which is not less repugnant to reason, he created his own ubiquity.[69]

The first thing to notice is that extension is said to be an affection of being, which marks Newton's anti-nullibist position. This would appear to say that no being can subsist (i.e., exist) in *rerum natura* unless it is extended. And since extension is an affection of being, this includes minds as well as God. Does this mean that extension is an intrinsic attribute of beings as such? This would seem to be the case insofar as Newton says that no being can exist unless it is extended, i.e., bears that property.

We should not be too hasty in drawing this conclusion. We need to take seriously

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[68] Newton, *Papers*, 103.
[69] Newton, *Papers*, 104.

Newton's claim that space is eternal and immutable just because it is the 'emanative effect of an eternal and immutable being'. Notice in the first passage above [1] that he says extension does not exist *per se*, i.e., in its own right, because it is, so to speak, an emanative effect of God. Clearly as it relates to God, extension is not an attribute which directly characterizes divine being, but something which itself depends on that eternal being. This is made clear when Newton goes on to say that God does not create space at a time later than his own being. In other words, to avoid the absurdity of supposing that God creates his own ubiquity, we must hold that space exists co-eternally with God's necessary being. Thus, in the case of God, space is not an *intrinsic* attribute of God's being (i.e., like an internal property) but, on the contrary, space is a separate effect of God's creative power, and depends on Divine being for its very existence.

But how do we understand the phrase 'emanative effect'? By Newton's time this language did not automatically invoke the emanationist metaphysics of the Plotinian tradition. The position of Henry More is typical. More, in the *Immortality of the Soul,* defines an 'emanative effect' as 'coexistent with the very substance of that which is said to be the cause thereof'. An 'emanative cause' he understands as 'such a cause as merely by being, no other activity or causality interposed, produces an effect'.[70] Notice More's denial that any action, or any sort of active causal transfer, obtains between an emanative cause and its effect. What is essential here is that the cause and the effect are simultaneous and that the effect occurs because of the being of the cause alone. In other words, without the necessary existence of God, there would be no reason for the existence of space. Accordingly, given that the relationship between God and space is eternal, space's dependency on God can be thought of as either an act of eternal

[70] Newton, *Writings,* 31-5.

causation or as a relation of ontic dependence obtaining between a lesser and a higher entity. On neither account can space be thought of as an accident that inheres in God. It's worth noting that Newton qualifies his use of the phrase 'effectus emanativus' by saying 'as it were'. This may indicate that the relationship of God to space can be thought of in either causal or ontic terms, assuming that there is a difference between the two. However, the relationship can be expressed in other ways. Shortly we will look at alternative ways in which Newton characterizes this relationship and consider how they relate to one another.

Before we proceed, it will be well to raise the following question. Does Newton hold that all being bears some relation to extended space? Certainly, he is in no doubt that God, minds, and bodies fall under this conception of being. Moreover, we can see how the existence of properties, geometrical entities, events, processes, and relations would fall under Newton's analysis. However, the texts do not force the conclusion that for Newton all beings must bear some relation, direct or indirect, to space. It may be open for him to hold that numbers, for instance, have a different mode of being, one that does not bear a relation to space. This point must remain conjectural, however, and it raises issues that lie beyond the bounds of the present paper.

We can return now to passages (1), (2), and (3) quoted above from *De gravitatione*. They raise two important questions: how is the claim that space is an 'affection of being just as being' relate to the claim that 'whatever being is posited space is posited'? What is the relationship between these two claims and the claim that 'space is an emanative effect of the first existing being'? Newton first states [1] the relationship between the immutable being of God and that of space since that relationship has ontic priority over the existence of created minds and bodies. He

tells us that [2] 'God is everywhere', and by contrast, minds and bodies are somewhere. Immediately he adds: [2] 'And hence it follows that space is an emanative effect of the first existing being'. This is an important qualification. It relates the content that follows in the passage to the previous three sentences of [2]. Thus, the final clause in [2], 'for whatever being is posited space is posited', does not explain the *meaning* of 'emanative effect'. Rather, this final clause, as a restatement of Newton's claim at the beginning of [2], namely, that 'space is an affection of a being just as a being', *follows* from the fact that space is an emanative effect of God (the 'first existing being'). In other words, since space is an affection of God, as well as created beings, Newton is thereby provided with a justification for positing space as an emanative effect of an infinite (omnipresent) 'first existing being'. To claim that space could be a consequence of the existence of any being, as some have argued, runs afoul of the tenor of *De gravitatione,* which specifically criticizes the Cartesians and the Scholastics for 'ascribing to corporeal substance that which solely belongs to the divine'.[71] In this connection, Newton argues at length in *De gravitatione* that the uncreated extension of space is co-eternal with divine existence and cannot be conceived, in Cartesian fashion, to be the essence of body.

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[71] Newton, *Writings,* 32. For example, H. Stein ('Newton's Metaphysics', in I. B. Cohen and G. E. Smith (eds.), *The Cambridge Companion to Newton* (Cambridge: Cambridge University Press, 2002), 256-307), and A. Janiak (*Newton as Philosopher* (Cambridge: Cambridge University Press, 2008) have erroneously alleged that the term 'emanative effect' is equivalent to 'space is an affection of a being just as a being', and that 'first existing being' means any first existing being, regardless of what sort. For a detailed analysis and case against these readings, see, Slowik, 'Neo-Platonic'. As regards the latter, there are numerous instances, from Aristotle to More, of the phrase 'first existing being' being used to pertain exclusively to God. Further background and analysis are provided in, e.g., J. E. McGuire, 'Predicates of Pure Existence: Newton on God's Space and Time', in P. Bricker and R. I. G. Hughes (eds.), *Philosophical Perspectives on Newtonian Science* (Cambridge, MA: MIT Press, 1990), 91-108; and J. E. McGuire, 'A Dialogue with Descartes: Newton's Ontology of True and Immutable Natures', *Journal of the History of Philosophy,* 45 (2007), 103-25.

What we are claiming is this: infinite space 'emanates' from God and not from any other being. The claim that 'whatever being is posited space is posited' does not in itself gesture to a relation that uniquely yields infinite space. For this reason the emanation relation can be ascribed only to the divine being who has the power to sustain an infinite space that is eternal with that being. Thus, Newton's emanation relation cannot be underwritten by any being except God. If we take emanation to denote either a causal or an ontic relation, it is difficult to understand, on either view, how a body or a mind, given their finite nature, could be said to be the source of the space in which they themselves exist! But how, then, do we understand Newton's claim that to posit a being is to posit space? It comes to this. The actual existence of being (as Newton understands it) necessarily presupposes an independent space, and hence God is necessary to secure the infinite and unchanging space in which lesser beings can reside. In other words, the eternal and immutable space which co-exists with the necessary and immutable being of God is the infinite space into which minds and bodies come to exist by God's creative act. It is in this context that the phrase 'whatever being is posited space is posited' is to be understood: for the content of that phrase (or hypothesis) is grounded in the fact that space, for Newton, is an emanative effect of an eternal and immutable being, as clearly stated in [3]. Hence, what is posited as the emanative effect of God's being is not just any space but precisely the existence of infinite (or absolute) space, the space whose priority Newton wants to establish. But the priority of infinite space cannot be secured if Newton is interpreted to mean that whenever any body is posited space is posited. It is well to remember that Newton is in the atomistic tradition and believes that space is a 'receptacle'. Thus, his claim that space is posited along with created things means that things come into being, according to their kind, with a specifiable relation to

the pre-existence of the *infinite*, 'receptacle' space; but it is God's eternal omnipresence alone that can secure the prior existence of the infinite space necessary—given Newton's anti-nullibist position—for the actual existence of lesser beings. In short, to claim that space and beings are posited together simply means that created beings could not exist absent an appropriate relation to an infinite space that is already there: it does not mean that any being, by its sheer presence alone, is able, in and of itself, to posit the space of its own existence. Accordingly, divine omnipresence and infinite space exist co-eternally the latter dependent on God's necessary being.

We can now be more precise regarding Newton's meaning when he characterize space as an affection of being. Notice again that the beings whose existence bears a specific relation to extended space are God, minds, and bodies. Thus, space, understood as a general condition of existence, is not a real property of things attaching to them in virtue of inherence, nor does it bear properties in the manner of substance. In speaking of space and time as 'common affections' of any existing thing, Newton is mobilizing a tradition which divides modes of predication into internal and external. Space and time are said to be *external* affections in which things are contained, whereas accidents are *internal* affections which inhere in them. (The distinction is in Magirus 1642,[72] a work from which Newton made notes.) Thus, space and time are presupposed by each kind of existing thing and, as such, are distinct from them. Accordingly, in order to have actual or real existence, created beings require reference to the independent and prior existence of space and time (God, of course, is the exception, since space and time are co-eternal with God, as befits the relationship between an emanative cause and its effect). A similar claim, for the singular role of space and time, is made by Pierre Gassendi: 'there is no substance and no

[72] J. Magirus, *Physiologiae peipateticae contractio,* lib. 1, cap. 8 (Cambridge, 1642).

accident for which it is not appropriate to say that it exists somewhere, or in some place, and exists sometime, or at some moment, and in such a way that even if the substance or the accident should perish, the place would continue, nonetheless, to abide, and the time would continue to flow'.[73] Charlton, as we have noted (§2), takes the same position. Indeed, by claiming [1], that space and time are neither substances nor accidents, the view that More upholds in the *Enchiridion,* namely, that space is an accident of God, is straightforwardly refuted.

4. SPACE AND TIME: PREDICATES OF PURE EXISTENCE

Fortunately Newton gives a more nuanced account of his position on space and time in relation to God in his *Avertissement au Lecteur* sent to Des Maizeaux for inclusion in the latter's edition of the Clarke-Leibniz correspondence which Des Maizeaux was compiling in 1719. Newton's *Avertissement* was not printed as such, but is quoted by Des Maizeaux in his preface to the edition published in 1720. Newton was apparently motivated to write the *Avertissement* upon realizing the danger of being misunderstood because of Clarke's rather loose use of terms such as 'quality' and 'property' in speaking of the relation of space and time to God. Also, as we have noted, Newton wished to dissociate himself from More who makes space a direct attribute of divine being.

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[73] Gassendi, 'Void', 94. The conception of space put forward in this passage might appear to assert its independence, as a special form of entity, from all other existing entities, God included. Indeed, Edward Grant seems to offer this very interpretation, when he comments that, for Gassendi, space is 'coeternal with and independent of God' (Grant, *Much Ado,* 212). Yet, Gassendi also insists that God 'necessarily exists in all time and in every place' (Gassendi, 'Void', 94). Thus, it is quite problematic to read the passage quoted above, which pertains to substances and accidents that could 'perish', as also including God. The more plausible reading of Gassendi's overall ontology is that God and space are co-existent, and, needless to say, this greatly mitigates the form of independence that can be ascribed to space.

There are five drafts in Newton's hand of the *Avertissemen*t which are largely similar in content. We quote first from draft B:

> The reader is desired to observe, that whenever in the following papers through unavoidable narrowness of language, infinite space or immensity& endless duration or eternity, are spoken of as *Qualities* or *Properties* of the sub*stance wch is Immense or eternal,* the terms *Quality & Property* are not *t*o be taken in that sense wherein they are vulgarly, by the writers of *Logick* & *Metaphysiks* applied to *matter*: but in such a sense as only implies them to be modes of existence in all beings, & unbounded *modes* & consequences of the existence of a substance which is really necessarily & substantially Omnipresent and eternal: Which existence is neither a substance nor a quality, but the existence of a substance with all its attributes properties & qualities, & yet is so modified by place & duration that those modes cannot be rejected without rejecting the existence.[74]

The first thing to which Newton calls attention is that when the terms 'quality' and 'property' are predicated of God, the eternal and omnipresent substance, they cannot be understand as they are when predicated of material things. Thus, Newton wishes to contrast how we understand 'property' and 'quality' when they are predicated of God with their meaning when predicated of matter. In subsequent drafts the contrast between God and matter is broadened and becomes that between God and all *finite and created beings.* But what is this contrast? What does it mean to say that 'immensity' and 'eternity' are not straightforward properties but the 'unbounded modes and consequences of the existence' of God? In the first place we need to understand how Newton

[74] A. Koyré and I. B. Cohen, 'Newton and the Leibniz-Clarke Correspondence' ['Newton'], *Archives internationales d'histoire des sciences,* 15 (1962), 63-126, at 96-7.

uses the term 'mode' in this context. Traditionally it means way or manner of being. So Newton states first that having properties and qualities are ways in which finite things exist, e.g., they have characteristic shapes, colors and take positions in space and time. But God's mode of existing in space and time is 'unbounded' since God is infinitely omnipresent. Immediately Newton makes it clear that he is not referring to God's existence as such but to the existence of divine substance together with each of its intrinsic characteristics all of which are intimately tied to infinite space and time.

Although Newton does not use the term it seems to us that he is thinking of space and time as *propria* of God's substantial existence.[75] *Propria* function as properties or attributes but with an important difference. A *proprium* is not part of something's essence or defining nature, but it is compatible with that thing according to the way it is. Take, for example, the sentence 'man is able to laugh'. Being able to laugh is not part of the definition or essence of 'man'; nevertheless, it can be predicated *per se* of man as a *proprium*, because it signifies something that can stand for 'man'. It does so by invoking the 'ability to laugh' which, though it is not intrinsic to what it is to be a human being, nonetheless is uniquely appropriate to being human. Newton seems to have in mind a similar relation when he says that God's 'existence is neither a substance nor a quality, but the existence of a substance with all its attributes properties &

[75] The concept, *propria,* is endorsed by J. Carriero ('Newton on Space and Time: Comments on J. E. McGuire', in P. Bricker and R. I. G. Hughes (eds.), *Philosophical Perspectives on Newtonian Science* [Cambridge, MA: MIT Press, 1990], 109-34, at 127) in reference to the relationship between space and God, although little background and analysis is provided of the specific meaning of this term, or how it fits into Newton's overall ontology. In this same context, Vailati interprets Carriero as claiming that Newton was unhappy with Clarke's use of the term 'property' which 'intimated that space and time are divine *propria,* that is, necessary but nonessential accidents of God' (E. Vailati, *Leibniz and Clarke: A Study of their Correspondence* [Oxford: Oxford University Press, 1997], 200, n. 40). On the whole, it is quite incorrect to interpret propria as 'nonessential accidents'.

qualities, & yet so modified by place & duration that those modes cannot be rejected without rejecting the existence'. Thus understood, space and time are not intrinsic parts of the substantial nature of God; they function as predications appropriate to God's way of existing as an eternal and omnipresent being. In other words, they function as '*external* propria', characteristics that stand as external affections of divine being. Thus to speak of space and time as 'consequences' of God's existence indicates their dependency on divine being. Construed in this way the relationship is open to either a causal or an ontic interpretation. Similarly, to speak of space and time as external *propria* of God's substantial existence throws light on Newton's claim in the General Scholium that by 'existing always and everywhere' God 'constitutes duration and space'. In other words, space and time owe their being to the necessary existence of God. Consequently, Newton's central point in Draft B is this: to speak of divine omnipresence with reference to space and time is compatible with the necessary existence of God as an eternal being. However, space and time considered as *propria* are not unique to God's being. According to the anti-nullibist position that Newton espouses, beings are spatio-temporally locatable. It's God's spatio-temporal infinitude which demarcates his presence from that of other beings, not just the fact that space and time are external *propria* of divine being. Moreover, the infinitude of space is in no way comparable to the infinitude of divine omnipresence.

In Draft C, Newton characterizes infinite space and time 'in such a sense as if the Predicaments of *Ubi & Quando* should be called qualities or properties when applied to the existence of a Being wch is omnipresent & eternal.' In Draft D he clarifies this. He notes that writers of logic and metaphysics 'comprehend time & place under the Predicaments of *Quantitas Ubi & Quando*, wch are not qualities in a proper sense, but denote only places & times of the

existence of beings conteined in them: nor is existence the quality of anything but the existence of the thing with its qualities'.[76] The first thing to note is that for Newton to characterize God's existence as omnipresent and eternal is not to ascribe to him a 'property' or a 'quality'. It merely answers the questions: where is God located (*ubi*), namely, 'everywhere', and when does God exist (*quando*), namely, 'always', just as we say of a finite being that it is located 'here' or 'there' and endures 'today' or through 'last year'. In this sense, then, space and time are said by Newton to be common affections of all things to the extent they specify the where and when of a thing's location. But he clarifies this point further when he claims that 'existence is not the quality of anything', but pertains to the existence of anything together with all its qualities. In other words, existence does not fit the ontology of internal properties. Rather, its role is to function as the referent of second level predicates that denote the sheer actuality of things, the fact that they are located in space and time. But space and time are modes of anything's existence together with all its characterizing and defining features. In this role, they pick out the conditions of spatial and temporal location that must be satisfied if anything, God included, is to be denoted as an actually existing thing. This, too, specifies the sense in which existence is a transcendental or second-level predicate. Thus, existence together with its modes of space and time, provide conditions of individuation according to which things can be identified apart from explicitly specifying them as a definite sort or kind. This means, however, that a thing must be locatable in space and time in a way that is ultimately appropriate to its nature. In this regard God's being is everywhere, not *qua* a spatio-temporal instance of a kind, but in virtue of the sheer infinitude of divine being. It is interesting to note that in this late period Newton no longer

[76] Koyré and Cohen, 'Newton', 99.

uses the vocabulary of emanationism and the Spinozistic overtones that it harbors.

It is clear that Newton is influenced by Henry More's view that divine omnipresence is explained in virtue of its relation to the infinitude of space. But he does not accept More's solution that space is an incorporeal attribute of God's underlying substance. Significantly, Newton's position chimes with those who, like Gassendi and Charleton, make space an external condition of the existence of things and their properties, God included. This conception of divine presence was also embraced by Continental thinkers such as Patrizi and Campanella. Moreover, as noted, it can be traced back to Oresme, and is found in the work of Crescas (1340-1410).[77] Thus, the seventeenth-century's penchant for spatializing and temporalizing the modes of existence of divine being has notable precursors. It was not, however, until the early modern period that this view of divine omnipresence entrenched itself within the larger cultural context of European thought. There are, in Newton's writings, traditional conceptions of God's relation to creation. For example, God is depicted as having immediate knowledge of all things (Newton's sensorium talk), and as the being in whom all things have their existence; i.e., 'Time and Place'). His principal strategy, however, is to privilege God's omnipresent relation to infinite space. This he does by conceiving space as an unlimited mode of God's existence, an external *proprium* which signifies God's eternal presence in creation, but does not function as an internal accident of divine being itself. Thus understood, space is a dependent consequence of God's necessary being. This manner of articulating the ontology of divine omnipresence is unique to

[77] H. A. Wolfson, *Crescas' Critique of Aristotle* (Cambridge, MA: Harvard University Press, 1929).

Newton, and represents a high-water mark in its varied history.[78]

[78] We would like to thank Jasper Reid, Zvi Biener, John Henry, Geoffrey Gorman and an anonymous referee for comments on earlier drafts of this article.