

Descartes's Indefinitely Extended Universe

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ABSTRACT: Descartes believed the extended world did not terminate in a boundary: but why? After elucidating Descartes's position in §1, suggesting his conception of the indefinite extension of the universe should be understood as actual but syncategorematic, we turn in §2 to his argument: any postulation of an outermost surface for the world will be self-defeating, because merely contemplating such a boundary will lead us to recognise the existence of further extension beyond it. In §3, we identify the fundamental assumption underlying this argument by comparing Descartes's and Malebranche's respective conceptions of the ontological status of modes of extension.

RÉSUMÉ : Descartes croyait que le monde étendu ne se terminait pas par une borne, mais pourquoi? Après avoir expliqué la position de Descartes au §1, en suggérant que sa conception de l'étendue indéfinie de l'univers devrait être entendue comme actuelle, mais syncatégorématique, nous nous penchons sur son argument dans le §2 : toute postulation d'une surface extérieure au monde sera autodestructrice, parce que la simple contemplation d'une telle borne nous conduira à reconnaître l'existence d'une étendue allant au-delà. Au §3, nous identifions l'hypothèse fondamentale qui sous-tend cet argument en comparant les conceptions respectives de Descartes et de Malebranche quant au statut ontologique des modes de l'étendue.

Keywords: Descartes, extension, imaginary spaces, indefinite, infinite, syncategorematic, mode

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1. Descartes's Theory

1.1 Historical Background

René Descartes believed that the material world was indefinitely large: it just carried on going ever further outwards, nowhere terminating in a boundary. Although it was not until the 1640s that Descartes would pledge himself most explicitly and most forcefully to this doctrine, it was clearly a sentiment to which he had long been attracted. As early as 1629, he was already asking Marin Mersenne to check whether his physical opinions might cause him any difficulties on religious grounds. In particular, he wanted to know “whether there is anything definite in religion concerning the extension of created things, that is, whether it is finite or infinite, and whether in all these regions called ‘imaginary spaces’ there are genuine created bodies. Although I was not keen to touch on this topic, I believe nevertheless I shall have to go into it.”¹

The Church, however, was not keen on the postulation of an infinite universe. Its official position, here as elsewhere, had been developed and entrenched within the scholastic Aristotelian tradition, which strongly favoured a finite extended world. Aristotle himself had even gone so far as to maintain not only that the universe was finitely large, but that it did not even have the potential to be any larger than it actually was. Beyond the last of Aristotle’s 55 celestial spheres, there was literally nothing, neither solid matter, nor empty space, nor even so much as the *possibility* that anything should be there.²

Now, those who followed Aristotle did soften this position a little. Aristotle could take this line because he believed that the heavens had always existed in just the same way as they do now. His medieval followers disagreed. They believed that the heavens had had a temporal creation by God, and—once they had a creator-God in the story—they further argued that God, if he so chose, could continue to augment the universe even now, by creating brand new matter beyond its current boundaries. The schoolmen continued to agree with Aristotle that the universe was actually only finitely *extended*; but considerations like this led them to allow that it might at least be infinitely *extendable*. Moreover, in the year 1277, the Church (through the person of Etienne Tempier, Bishop of Paris) explicitly proscribed the teaching of 219 propositions spanning a wide variety of issues. In particular, it could no longer be taught—on pain of excommunication—that “the first cause cannot make more than one world” or that “God could not move the heaven in a straight line.”³ But any such second world would presumably need to be created beyond the boundaries of the current one, in a place where nothing yet existed; while, for God to move the

¹ Descartes to Mersenne, 18 December 1629 (AT I, 86; CSMK 14).

² Aristotle (1984) I, 462–463 (*On the Heavens* I.9, 279a12–16); I, 352 (*Physics* III.6, 206b21–7).

³ Fortin and O’Neill (1972), 340, 343. For discussion, see Grant (1979).

heavens, there would again need to be some unoccupied place for him to move them into. Imagining bodies where none actually existed, namely those that God could create or move there, led medieval Aristotelians to postulate what they called 'imaginary spaces' beyond the actually finite boundaries of the corporeal world.

But the question was: were these spaces *purely* imaginary, or did they have some kind of extra-mental reality? And, on this, there were differences of opinion. A handful of medieval philosophers were willing to allow that such imaginary spaces might be genuinely extended in their own right, and even infinitely so, despite being (as yet) void. However, this was very much a minority viewpoint. Edward Grant notes that it was the opinion of Hasdai Crescas, for instance, but describes him as a "rare and extraordinary exception" to the general consensus.⁴ According to more standard accounts, imaginary space either only properly existed in the mind (e.g., St Thomas Aquinas), or existed outside it only as a possibility rather than anything actual (e.g., Jean de Ripa), or at any rate not as actually *extended*. This last was explicitly argued by—to name but two—Nicole Oresme in the 14th century and the Coimbra commentator on the *Physics* in the early 17th.⁵ And it is a view to which we will return: for, as we will see, the same position was adopted directly in response to Descartes's own discussion by critics such as Isaac Barrow and Jean-Baptiste de La Grange.

But this was the tradition from which Descartes was consciously and deliberately seeking to distance himself. Crescas's view might admittedly have played into his hands: although Crescas himself wanted to treat the extra-cosmic space as an infinite void, Descartes would have insisted that, from the sheer fact that it was extended, it would itself turn out to be corporeal. But, whether void or corporeal, most of Descartes's predecessors—Nicholas of Cusa and Giordano Bruno being notable exceptions, following the ancient atomists and Stoics—refused to allow that there was any actual extension at all beyond the finite boundary of the corporeal universe. And yet this was precisely what Descartes asserted. For him, it was not just that there *could* be further matter beyond any purported boundary to the world. He really did think that there was *actually existing* matter everywhere, at every possible distance from here, no matter how great.

⁴ Grant (1981), 119; and see 22 and 332 n. 20.

⁵ On Aquinas, see Grant (1981), 118–119. On De Ripa, see op. cit., 132–133. On Oresme, see Grant (1969), 48 and n. 47. On the Coimbra commentator, see Grant (1969), 52 and Grant (1981), 162. Among the many other sources for scholastic (and, for that matter, classical Aristotelian) views in this area, these two works—Grant (1981) and, more succinctly, Grant (1969)—do stand out as especially thorough, erudite, and useful. But another equally masterful treatment, and one that does diverge from Grant's on certain points, is Duhem (1985).

1.2 *The Indefinite and the Infinite*

As is well known, Descartes shied away from describing the universe as ‘infinitely’ large, preferring to call it only ‘indefinitely’ so while reserving the term ‘infinite’ for God alone. He offered two grounds for this distinction, one metaphysical and the other epistemological.⁶

Metaphysically, Descartes regarded God as being unlimited with respect to every possible perfection, whereas created things, where they were unlimited at all, would only be so in some particular respect. In the case of the extension of the universe, he felt that it was boundless in magnitude: but *only* in magnitude, not in power, intelligence, etc.⁷ Even Descartes’s critics, much as they might have taken issue with his contention that the universe was boundless *even* in magnitude, would at least have agreed with the second part of this claim. The same point had been made long before Descartes,⁸ and it was quite uncontroversial: so we need say no more about it here.

Epistemologically, Descartes felt that we could positively understand of God that there were no limits to his perfection, but he suggested that with created things we merely “do not recognize a limit,”⁹ and “acknowledge in a negative way that any limits which they may have cannot be discovered by us.”¹⁰ But this does require a few more words. As they stand, such comments might come across as a declaration of sheer ignorance as to whether there are any limits or not. In my opinion, however, it is important not to overstate the extent of Descartes’s epistemic humility in this matter.

The second of those remarks, about negatively acknowledging that we cannot find any limits should there be such, comes from the first part of the *Principles of Philosophy*. But, at least as far as the material world was concerned, Descartes was there more concerned just to lay out some concepts that might turn out to be applicable to it, rather than to prove anything about it. It was only at the start of the second part that Descartes argued that such a world even existed. But then, once he had done so, he presented the principle of an unlimited universe as just one item in a wider sequence of immediate consequences of his theory of the nature of body as such. One can see this from the section titles alone:

16. It is a contradiction to suppose there is such a thing as a vacuum, i.e. that in which there is nothing whatsoever.

⁶ Perhaps the best source here is Wilson (1986), but many others have followed her lead: see the works cited in n. 17 below.

⁷ See the First Replies (AT VII, 113; CSM II, 81), together with the further gloss on this passage in Descartes’s letter to Mersenne of 31 December 1640 (AT III, 273–274; CSMK 166).

⁸ For example, by John of Bassols: see Duhem (1985), 97.

⁹ First Replies (AT VII, 113; CSM II, 81).

¹⁰ *Principles* I.27 (AT VIII-1, 15; CSM I, 202).

19. The preceding conclusion confirms what we said regarding rarefaction.
20. The foregoing results also demonstrate the impossibility of atoms.
21. Similarly, the extension of the world is indefinite.
22. Similarly, the earth and the heavens are composed of one and the same matter; and there cannot be a plurality of worlds.¹¹

Descartes clearly regarded a finite world as being just as impossible as a vacuum or an indivisible atom, and it would appear that the ground of the impossibility in all of these cases—the fourth in this list as much as the first—was that such hypotheses were contradictory.

In subsequent writings, Descartes would put the point even more forcefully. Writing to Hector-Pierre Chanut in 1647, he began by echoing the same more agnostic tone as in *Principles* I: “we cannot say that something is infinite without a reason to prove this such as we can give only in the case of God; but we can say that a thing is indefinite simply if we have no reason which proves that it has bounds.” However, in the very next sentence, he continued: “Now it seems to me that it is impossible to prove *or even to conceive* that there are bounds in the matter of which the world is composed” (emphasis added).¹² To be unable to prove that the world is bounded might suggest that we cannot achieve certainty either way. By contrast, if we are unable even to entertain the hypothesis of a bounded world, on grounds of inconceivability, then it would seem that we are simply not going to be in a position to assent to it. And so likewise, Descartes told Henry More in 1649: “It conflicts with my conception, or, what is the same, I think it involves a contradiction, that the world should be finite or bounded.”¹³

Now, taken at face value, it might seem that these stronger statements would exclude any kind of epistemic humility at all: if the hypothesis of a bounded universe is inconceivable and contradictory, then surely we *can* rule it out, once and for all, and just leave it at that. But the point is that, rather notoriously, Descartes felt that God had such supreme dominion over the eternal truths and essences of things that he might even be able to make a contradiction true. In a 1648 letter for Antoine Arnauld, Descartes applied that wider doctrine directly to the case of the extension of the universe:

I do not think that we should ever say of anything that it cannot be brought about by God. For since every basis of truth and goodness depends on his omnipotence, I would not dare to say that God cannot make a mountain without a valley, or bring it about that 1 and 2 are not 3. I merely say that he has given me such a mind that I cannot conceive a mountain without a valley, or a sum of 1 and 2 which is not 3; such things

¹¹ *Principles* II.16–22 (AT VIII-1, 49–52; CSM I, 229–232).

¹² Descartes to Chanut, 6 June 1647 (AT V, 51–52; CSMK 320).

¹³ Descartes to More, 15 April 1649 (AT V, 345; CSMK 374).

involve a contradiction in my conception. I think the same should be said of a space which is wholly empty, or of an extended piece of nothing, *or of a limited universe* (emphasis added).¹⁴

At least by the final few years of his life, Descartes was explicitly treating the suggestion that God might create a limited universe as being on a par with the suggestion that he might make $1+2$ unequal to 3. It was not our place to deny God that power: however, we could not grasp what the hypothesis would even *mean*. Even if God's hands were not tied by the laws of logic, our minds still were. And so, to the extent that we could discern a contradiction in such hypotheses, we should feel confident in asserting their falsity after all. As Descartes told More: "It conflicts with my conception to attribute any limit to the world; and I have no measure of what I should affirm or deny except my own perception."¹⁵ We owe it to God to acknowledge that he might somehow recognise an absolute falsity in the hypothesis of an indefinite universe, but only such as will forever be bound to elude our own faculties. And, as Descartes asked in the Second Replies: "Why should this alleged 'absolute falsity' bother us, since we neither believe in it nor have even the smallest suspicion of it? For the supposition which we are making here is of a conviction so firm that it is quite incapable of being destroyed; and such a conviction is clearly the same as the most perfect certainty."¹⁶

1.3 *The Actual Indefinite*

Even if it allowed that the material world is boundless with respect to extension, there is still a question over the nature of such boundlessness. It has often been claimed that Descartes's distinction between the indefinite and the infinite corresponds to the Aristotelian distinction between the potential infinite and the actual infinite. To take just one example of many, Roger Ariew writes: "Descartes equates the indefinite with potential infinity, a continual increase of a finite amount that can never become actually infinite [...]. For these purposes, in a sense, indefinite is classified with finite."¹⁷ On this account, there is no

¹⁴ Descartes for Arnauld, 29 July 1648 (AT V, 223–224; CSMK, 358–359).

¹⁵ Descartes to More, 15 April 1649 (AT V, 344; CSMK 374). See also Descartes to More, 5 February 1649 (AT V, 274; CSMK 364).

¹⁶ Second Replies (AT VII, 145; CSM II, 103). For another example of Descartes confidence in the truth of the hypothesis of a boundless universe, notwithstanding his acknowledgement that God might be able to make it false, see the annotations he made on a copy of his own *Principles* at AT XI, 654. Translations of the passages in question can be found in Garber (1992), 153 and 345 n. 136.

¹⁷ Ariew (1987), 149. See also Koyré (1957), 108; Nikulin (2002), 49–50, 56; Benitez Grobet (2010), 522–523, 525. Other studies that have explored Descartes's position include Laporte (1950) 255–267; Wilson (1986); Kendrick (1998); Ariew (1999) 155–171; Vilmer (2008) and (2010); Broitman (2013).

distance so great that a body *could* not exist there; but there might yet be distances such that no body *actually does* exist there. Others, however, have taken issue with this interpretation. For instance, Françoise Broitman: “Unlike most [of] Descartes’ scholars and historians of the Infinite who take the position that Descartes only conceived the infinity of the world as being *potential*, I show that the Cartesian ‘*indefinite*’ just as it is within his *mathematical physics* is not *potential* but *actual* and effective.”¹⁸ I too would take issue, and likewise contend that the extension of Descartes’s universe was actually, and not just potentially, in(de)finite.

But it is easy to see why the ‘potential infinity’ interpretation of Cartesian indefiniteness has had so much support. When Descartes introduced the concept in *Principles* I.26, he did indeed propose it as a potential: “There is, for example, no imaginable extension which is so great that we cannot understand *the possibility* of an even greater one, and so we shall describe the size of *possible* things as indefinite” (emphasis added).¹⁹ This possibility of ever greater bodies does indeed appear to be all that is actually involved in the concept of indefiniteness as such; any claim of actuality will be an addition to that basic notion. But it is clear from a letter of 1640 that Descartes did not intend to exclude such an addition. He did not regard these ever greater bodies as *merely* possible, but as *at least* possible: “I could not conceive of an indefinite quantity by looking at a very small quantity or a finite body unless the size of the world was *actually or at least possibly* indefinite” (emphasis added).²⁰ And this is the reason why I do not feel that it is helpful to elucidate Descartes’s theory of the indefinite through a distinction between the actual and the potential infinite: it is equally compatible with either. The concept itself is simply silent on that question. If one stops at the possibility asserted in *Principles* I.26, then one will be dealing with a potential indefinite. If, however, one strengthens this by maintaining that these greater and greater bodies really do all exist, then one will be facing an actual indefinite.

And such strengthening is precisely what we find in Descartes. When Descartes returned to the issue in *Principles* II.21, he no longer mentioned possibility: “For no matter where we imagine the boundaries to be, there are always some indefinitely extended spaces beyond them, which we not only imagine but also perceive to be imaginable in a true fashion, that is, real.”²¹ This stronger claim of actual (or ‘real’ and ‘true’) indefiniteness does go beyond the mere concept of indefiniteness as such, and therefore will require further argument in its own right. But I will be claiming in Section 3 below that such argument was indeed available to Descartes.

¹⁸ Broitman (2013), 108; and see 112. See also Vilmer (2008), 504–510.

¹⁹ *Principles* I.26 (AT VIII-1, 15; CSM I, 202).

²⁰ Descartes to Regius, 24 May 1640 (AT III, 64; CSMK, 147).

²¹ *Principles* II.21 (AT VIII-1, 52; CSM I, 232).

Had Descartes been committed only to the weaker claim, there would have been nothing remarkable about his position, and no reason why he should have been worried about controversy. That the extension of the world should have only an infinite potential for increase, with more and more distant bodies being possible but *not* actual, was precisely the traditional scholastic doctrine he was trying to get away from.²² And we can find the same position expressed directly against Descartes by his own critics. Ralph Cudworth, for instance, might not have explicitly named Descartes in his discussion of the issue, but it is hard not to presume that he had him in mind when he wrote that “*Infinite Space*, beyond the *Finite World*, is a thing which hath been much talked of; and it is by some supposed to be *Infinite Body*.” But Cudworth’s own opinion was that “how vast soever the Finite World should be, yet is there a *Possibility* of more and more *Magnitude* and *Body*, still to be added to it, further and further, by *Divine Power*, *Ininitely*; or that the World could never be made so Great, no not by God himself, as that his own Omnipotence could not make it yet Greater. Which *Potential Infinity* or *Indefinite Encreasableness* of *Corporeal Magnitude*, seems to have been mistaken for an *Actual Infinity* of *Space*.”²³ Despite the fact that Cudworth was tying the term ‘indefinite’ to the term ‘potential infinity,’ while also embracing the latter notion, his position—and consequently his own sense of the former term—was wholly opposed to Descartes’s. Notwithstanding its potential for increase, Cudworth was affirming that the world was actually only finitely large.

That this was not Descartes’s view is demonstrated by his 1647 letter to Chanut. There, we see Descartes boldly declaring that “the actual existence [*l’existence actuelle*] of the spaces conceived as surrounding a globe (i.e. surrounding the world as supposed *finite*) is connected with the actual existence of the same globe.”²⁴ We will certainly be returning to that letter and that argument later on, and the other texts we will also be discussing in Section 2 will further underline the actuality of the indefinite extension of Descartes’s universe. Just for now, to illustrate Descartes’s wider willingness to embrace the actual indefinite, I shall turn from the indefinitely large to the parallel case of the indefinitely small.

In the same passage quoted above from *Principles* I.26, after noting the possibility of greater and greater bodies, Descartes continued: “Again, however many parts a body is divided into, each of the parts can still be understood to be divisible and so we shall hold that quantity is indefinitely divisible.”²⁵ To that extent, body possessed what Cudworth might have called ‘potential

²² Several such scholastic opinions and arguments are surveyed in Duhem (1985), 73–131.

²³ Cudworth (1678), 643, 644; see also 766.

²⁴ Descartes to Chanut, 6 June 1647 (AT V, 53; CSMK, 320).

²⁵ *Principles* I.26 (AT VIII-1, 15; CSM I, 202).

infinity or indefinite decreaseableness.' So far, so Aristotelian: see especially *Physics* III.6. However, Descartes also believed that some parts of this matter were divided a great deal further than this. He claimed in *Principles* II.34 that certain circular motions would bring about something that we could not fully understand, even though we perceived that it was true:

what happens is an infinite, or indefinite, division of the various particles of matter; and the resulting subdivisions are so numerous that however small we make a particle in our thought, we always understand that it is in fact divided [*reipsa esse divisam*] into other still smaller particles. [...] And for this to come about, it is necessary that all its imaginable particles, which are in fact innumerable [*revera innumerae*], should shift their relative positions to some tiny extent. This minute shifting of position is a true case of division [*vera divisio*].²⁶

Henry More would pick him up on this, enquiring about these “actually infinite and divided particles [particulas actu & infinitas & diuisas],”²⁷ in response to which Descartes reiterated that he “agreed in article 34 that such indefinite division of certain parts of matter sometimes actually [reuerâ] takes place.”²⁸ I contend that the way Descartes here characterised the division of some parts of matter should also be transposed to apply to the outward extension of all parts of matter. Each of those ever more distant bodies was, for Descartes, as real as such things were ever going to get. This was no mere potential for increase through divine omnipotence, as the schoolmen had tended to favour. The indefiniteness of Descartes's universe was actual.

1.4 The Indefinite as Syncategorematic

The scholastic distinction between actual and potential infinities ultimately had its roots in Aristotle's *Physics* III.4–8. But so too did another scholastic distinction that I feel is more helpful in coming to grips with Descartes's notion of the indefinite: namely the distinction between categorematic and syncategorematic infinities.

I say this while acknowledging that one should always be cautious in applying Aristotelian/scholastic jargon to Descartes, and for two reasons. First, Descartes himself explicitly disavowed it, explaining that “it would be very difficult for me to employ the same terminology [as in the schools], when my own views are profoundly different.”²⁹ Second, even among the schoolmen themselves, there was scant consistency in how terms like these actually got used. Aristotle himself had blended elements of both distinctions together into one,

²⁶ *Principles* II.34 (AT VIII-1, 59–60; CSM I, 239). See Garber (1992), 125–126 and 340–341 n. 36.

²⁷ More to Descartes, 11 December 1648 (AT V, 242).

²⁸ Descartes to More, 5 February 1649 (AT V, 274; CSMK, 364).

²⁹ *Rules for the Direction of the Mind*, Rule Three (AT X, 369; CSM I, 14).

as many set theorists still do today, and as indeed did many of the schoolmen themselves. Ariew, for instance, quotes an explicit identification of the syncategorematic infinite with the potential infinite from Goclenius's 1613 *Lexicon philosophicum*.³⁰ And many scholars of medieval Aristotelianism will still equate them now: Grant, for instance, straightforwardly contrasts "an actual, or categorematic, infinite" with a "syncategorematic, that is, a potential infinite."³¹ However, there were several medieval Aristotelians who thought that these two distinctions could be usefully pried apart. Grant's identification of the syncategorematic/categorematic with the potential/actual might be compared with an equally clear-cut declaration from Pierre Duhem that the "distinction between the categorematic and the syncategorematic senses of infinite is completely independent from the distinction between potentiality and actuality."³² For my part, I agree with Duhem. In particular, and to avoid any potentially misleading ambiguities, I maintain that Descartes's indefinite universe should be understood as actual but syncategorematic, as I shall now define that term.

The syncategorematic/categorematic distinction boils down to the question of whether the items in question—irrespective of whether these should be actual or potential—can be considered collectively or only distributively. Can we affirm anything of the whole lot of them together as one, or only affirm it piecemeal of each one individually? In the case at hand for Descartes, the question is whether there is a place infinitely/indefinitely far from some given place—say, the present location—or merely an infinite/indefinite series of places, each one at some *finite* distance from here.

The distinction is perhaps best exemplified by the set of natural or real numbers. There are infinitely many numbers, because *each* of them is such that there is another greater than *it*. That is to say,

$$(1) \quad (\forall n)(\exists m)(m > n)$$

This is the syncategorematic infinite. And yet each of these numbers individually is still finite. Whatever else it might be, 'infinity' is not a number greater than all the rest: which would amount to a categorematic infinite. It is not the case that

$$(2) \quad (\exists m)(\forall n)(m > n)^{33}$$

Descartes's extended universe was such that every number could represent the distance from here of a place; indeed, of a body. To apply formula (1) to the

³⁰ Ariew (1999), 167 n. 71.

³¹ Grant (1981), 48.

³² Duhem (1985), 50.

³³ Certain complexities here might demand a more convoluted formulation; but the present simplification should, I trust, be sufficient to get the point across.

case at hand, then, we simply need to read the '>' symbol to mean 'more distant than.' And, for each such place or body, there either does or at least could exist a further one. I have suggested that Descartes believed that this indefinite sequence of bodies was entirely actual; but the notion of the syncategorematic as such, just like Descartes's concept of the indefinite, would be just as applicable to their merely potential existence. To capture the latter, we simply need to insert a modal operator into (1):

$$(1') \quad (\forall n)\diamond(\exists m)(m > n)$$

As we saw, (1') is all that Descartes was asserting in *Principles* I.26, with the stronger (1) then being argued for in II.21. But what Descartes never suggested was that a place or body, further away than every other body in this whole indefinite sequence, did or even could exist. That is, it is not *even* the case that

$$(2') \quad \diamond(\exists m)(\forall n)(m > n)$$

Descartes's general distaste for the jargon of the schools notwithstanding, he was certainly familiar with it, and in particular with their notion of the syncategorematic infinite. For it is a term that he did in fact use: albeit only on one solitary occasion, in a letter to Jean-Baptiste Morin of 1638. He was there discussing the various movements to which a body might be subjected, and he wrote: "each body can have several movements, and be pushed by an infinity of diverse forces at the same time; always taking the word 'infinity' syncategorematically [*sincategorematic* (sic)], so that those in the schools should have nothing therein to find fault with."³⁴ I have not come across any instances in Descartes's writings of the opposing term, 'categorematic'; but his use of 'always' in this remark does suggest that he would *never* have been willing to apply that term—or, at any rate, never to do so when the context was restricted, as here, to created things alone—any more than those schoolmen who surely would have found fault with him had he done so.

When we come to look in detail, in Section 2 below, at Descartes's various presentations of his argument for an indefinite universe, it should become abundantly clear that he was pushing for such indefiniteness in precisely this syncategorematic sense. The principle that a place/body should exist beyond *each* other place/body was the very thing that his argument was designed to demonstrate. For instance, and to anticipate, he would tell Henry More: "I cannot but conceive a space beyond whatever bounds you assign to the

³⁴ Descartes to Morin, 13 July 1638 (AT II, 207), my translation. This was marginally before Descartes properly unveiled his considered distinction between the indefinite and the infinite, at a time when he was still prepared to apply the latter term to creatures rather than to God alone; he did not fully articulate that distinction until 1641's *Meditations*.

universe; and on my view such a space is a genuine body.”³⁵ To anyone who might suggest that the universe should come to an end at some particular finite distance from here, Descartes would insist upon the actual or at least possible existence of an additional body one place further out. And yet still only *one* place further out—that is, at a slightly larger but still finite distance. Or, if the same considerations should then be reapplied to this additional body, Descartes would offer yet another body, one place further out still.³⁶

2. Descartes’s Argument

If a limited universe is as contradictory as that the sum of 1 and 2 is not 3, as Descartes eventually came to maintain, then precisely where does the contradiction lie? Descartes came at the issue via a conceptual analysis of the notion of a limit, with a view to showing that such a notion was inconsistent with the notion of extension.

But the argument he adopted was an old one. For example, the ancient atomists had believed that the universe comprised infinite worlds in an infinite void, and this was one of the approaches they took in establishing that conclusion. If the universe was finite, argued Lucretius, it would certainly have a limit somewhere. However, he continued, “clearly a thing cannot have a limit unless there is something outside to limit it.”³⁷ But, of course, there cannot be anything outside the universe, that being by definition the totality of everything that exists. The idea was that it is in the nature of a limit, a boundary, or (three-dimensionally) a surface that it should separate one thing *from another thing*. A finitely extended universe will therefore be unthinkable, because the very act of imagining it as terminating in a boundary will require us to suppose that there is more of it on the other side.

The Stoics also adopted a similar argument, but with a twist. Unlike the atomists (or, for that matter, Descartes), the Stoics did believe that the *corporeal* cosmos was indeed only finitely large. However, they also believed that this

³⁵ Descartes to More, 15 April 1649 (AT V, 345; CSMK 375).

³⁶ The passage quoted earlier from *Principles* II.34 likewise indicates that Descartes regarded the actually indefinite division of some parts of matter in this same syncategorematic way: no particle is so small that *it* is not in fact divided further. Someone else (besides More) who also would pick Descartes up on that remark was Leibniz, who praised him for it, while also suggesting that he should have gone further (Leibniz (1969), 393): for Leibniz’s own opinion was that *all* parts of matter were infinitely divided, not just some. However, Leibniz—always more comfortable with scholastic jargon than Descartes—was quite explicit that such infinity should be regarded as both actual and syncategorematic. I suggest that this Leibnizian conception of the actual syncategorematic—on which, see Arthur (2001); Harmer (2014); Antognazza (2015)—can be usefully transposed to apply to Descartes’s conceptions of both indefinite division and indefinite outward extension.

³⁷ Lucretius (1994), 33 (Book I, lines 960–961).

corporeal world was surrounded by an infinite void: "it is itself necessarily limited, whereas what is outside it is a void that extends without limit in every direction."³⁸ But, again, it was precisely by contemplating the nature of a limit to the corporeal world that they were led to recognise the real existence of further extension beyond it, albeit void extension in their case. The Stoics agreed with the atomists that anything that was limited would need to be limited by something outside itself. What differentiated them was that they then introduced an additional premise: they further claimed that the limiting thing would need to be of a different nature from what it limited. Hence their two kinds of extension, corporeal on this side of the boundary and void on the other.

Descartes, of course, rejected all talk of void, whether beyond a finite corporeal cosmos or even just in gaps between the corporeal constituents of an indefinite one. But the more fundamental principle, that a boundary cannot be one-sided, was precisely that on which his argument depended. There are five passages in his writings where he offered such an argument, the first couple of which we have already seen:

- (1) There is, for example, no imaginable extension which is so great that we cannot understand [*intelligamus*] the possibility of an even greater one; and so we shall describe the size of possible things as indefinite.³⁹
- (2) For no matter where we imagine the boundaries to be, there are always some indefinitely extended spaces beyond them, which we not only imagine [*non modo imaginamur*] but also perceive [*percipimus*] to be imaginable in a true fashion [*verè imaginabilia*], that is, real.⁴⁰
- (3) Now if we suppose the world to be finite, we are imagining [*on imagine*] that beyond its bounds there are some spaces which are three-dimensional and so not purely imaginary [*pas purement imaginaires*], as the philosophers' jargon has it. These spaces contain matter; and this matter cannot be anywhere but in the world, and this shows that the world extends beyond the bounds we had tried to assign to it.⁴¹
- (4) [N]o limit to the world can be imagined without its being understood [*intelligam*] that there is extension beyond it.⁴²
- (5) I think it involves a contradiction, that the world should be finite or bounded; because I cannot but conceive [*concupere*] a space beyond whatever bounds you assign to the universe; and on my view such a space is a genuine body.⁴³

³⁸ Cleomedes (2004), 21–31, at 22.

³⁹ *Principles* I.26 (AT VIII-1, 15; CSM I, 202).

⁴⁰ *Principles* II.21 (AT VIII-1, 52; CSM I, 232).

⁴¹ Descartes to Chanut, 6 June 1647 (AT V, 52; CSMK, 320).

⁴² Descartes for Arnauld, 29 July 1648 (AT V, 224; CSMK, 359).

⁴³ Descartes to More, 15 April 1649 (AT V, 345; CSMK 374–375).

As noted in the last section, passage (1) does not capture the full force of Descartes's position: it suggests that an unlimited sequence of greater and greater extensions is at least possible—albeit only in a syncategorematic sense, such that *each* is possible—but it remains silent on whether these extensions are actual. And perhaps extension can already be said to be indefinite on this basis alone, any claims of actuality being additional to the basic notion of indefiniteness as such. But passages (2) to (5) all make it clear that Descartes was indeed committed to the stronger claim. These spaces beyond the alleged limit are not merely possible: they are truly as we imagine them to be, they contain matter, and are genuine bodies.

It will be observed that Descartes used a variety of epistemological terms in these passages. Passages (2) and (3) both suggest that what we are doing in this thought experiment, at least in the first instance, is *imagining* further extension beyond any supposed boundary. Now, to some degree, Descartes was simply addressing 'the philosophers'—those great scholastic champions of extramundane imaginary spaces—in their own terms, to show how his own opinion differed from theirs. Still, there does seem to be more going on than just that alone. It appears from these passages that Descartes wanted us actually to form a mental *image* of this additional extension beyond any purported limit, to picture it in the mind's eye.⁴⁴

But this does make sense. Earlier in his career—especially in the *Rules for the Direction of the Mind*—Descartes had gone so far as to suggest that such images were essential to our knowledge of extended things.⁴⁵ Admittedly, by the time he was presenting the argument at hand, he had softened that position and come to think that such images were dispensable. In the Second Meditation, for instance, he argued that our knowledge of the wax was not really achieved through imagination at all, but through "purely mental scrutiny."⁴⁶ However, he also made the point to Elisabeth of Bohemia that "body (i.e. extension, shapes and motions) can likewise be known by the intellect alone, but much better by the intellect aided by the imagination."⁴⁷ So perhaps that is what is going on in passages (2) and (3). The images we form of these spaces beyond the alleged limit, even if not absolutely necessary, can still prove a valuable aid, a springboard to launch us towards the ultimate conclusion.

But the fact that Descartes did not think that such images were absolutely necessary is then backed up by passages (4) and (5): for these simply do not mention imagination, and yet Descartes still had no trouble arriving at the

⁴⁴ One work that focuses directly on the role of the imagination in this specific argument is Nikulin (2002): see 49–50 and 193–204. Although I do not agree with everything that Nikulin says, his discussion is well worthy of consideration.

⁴⁵ See Sepper (1993); Clarke (2003), 78–93.

⁴⁶ Second Meditation (AT VII, 31; CSM II, 21).

⁴⁷ Descartes to Elisabeth, 28 June 1643 (AT III, 691; CSMK 227).

same conclusion. Furthermore, (2) and (3) themselves already make it clear that imagination is not only unnecessary; it is also insufficient. We do not *only* imagine these spaces, and they are not *purely* imaginary. However helpful the imagination might be as a starting point, something else is going to need to get in on the act, to enable us to go beyond the mere image and discover the real existence of the thing we are imagining. As Descartes was the first to admit, the unassisted faculty of imagination was a decidedly unreliable resource in the search after truth. It is not at all clear that he would have allowed that mere imagination, obscure and confused as it frequently was, could be used to establish even so much as the possibility of things, let alone their real existence.

However, it is clear that Descartes believed that there was indeed another epistemological faculty available to us here, one with the power to legitimise the move from such a mental image to a recognition of real existence, or even to establish the latter conclusion all by itself. Passage (4) states that we 'understand' that such bodies really exist; and passage (1), notwithstanding the weakness of what it is actually saying, also uses the same term. Neither of these passages mentions the imagination: for this was precisely the role of the understanding in Descartes's epistemology, to give us a direct insight into the eternal truths and essences of things, one that would often not involve images at all, or, even when they did play an assisting role in prompting it into activity, certainly did not depend on them.

In contrast to imagination, Descartes felt that a higher faculty like understanding could at least give us a reliable insight into possibility. He regarded it as axiomatic that possible existence was "contained in the concept of a limited thing,"⁴⁸ and he wrote: "I know that everything which I clearly and distinctly understand is *capable* of being created by God so as to correspond exactly with my understanding of it" (emphasis added).⁴⁹ And yet merely understanding concepts was still going to be of only limited value when it came to establishing the real existence of anything other than the self (via the cogito) and God (from the infinite objective reality of our idea of him). So what might warrant the stronger claim, that these bodies beyond the purported boundary not only do not exist solely in the mind, nor even exist outside the mind solely as possibilities, but are genuinely *real*?

Descartes certainly felt that the real existence of any extension was entirely contingent on God's voluntary decision to create it. God could have decided not to create anything at all. Or he could have created a universe containing nothing but unextended thinking beings, and just left it at that. Moreover, even allowing that God did create extended things, Descartes did not think that our knowledge of their existence could arise directly out of their concept alone, but would depend on God's veracity, coupled with the propensity he gave us to

⁴⁸ Second Replies (AT VII, 166; CSM II, 117).

⁴⁹ Sixth Meditation (AT VII, 78; CSM II, 54).

believe in bodies when presented with sensual perceptions, as outlined in the Sixth Meditation. So, if Descartes's argument for the indefiniteness of the universe was going to get off the ground, it could not start from nothing, but would need to take the existence of *some* bodies for granted. And this was indeed the approach that Descartes took. His argument takes the existence of bodies *within* the alleged boundary as a starting point—established in advance, presumably on the basis of that Sixth Meditation argument—and then seeks to show that these bodies will need to be surrounded by others, and those by further others, and so on indefinitely. For Descartes, it is all or nothing. *Either* nothing extended exists, which he regarded as a false but nevertheless intelligible and non-contradictory hypothesis. *Or* an indefinite quantity of extension exists. The one option he rejected as contradictory was that only a finite quantity of extension should exist.

But it follows that bodies cannot be ontologically independent of one another. The actual existence of *any* matter must entail the actual existence of *all possible* matter. And Descartes did indeed assert an ontological dependence among the parts of space, in the 1647 letter to Chanut. The letter had been prompted by certain theological concerns, expressed by Queen Christina of Sweden and reported to Descartes by Chanut, among which was the fear that, if one admits a world that is infinite in matter and substance, this will undermine its creation in finite time.⁵⁰ If matter must exist *beyond* any imagined spatial boundary, then should it not, by the same token, exist both *before* any imagined temporal creation and *after* any imagined temporal destruction, thereby making matter necessarily existent and independent of God? The same concern about Descartes's position was frequently expressed by others over the next few decades.⁵¹ Indeed, it became especially acute after 1671, when the Cartesian physicist, Jacques Rohault, actually came unnervingly close to *accepting* that conclusion, that matter was uncreated and indestructible.⁵²

However, Descartes attempted to reassure Christina on this point, writing to Chanut as follows:

If we consider the extension of the world in this way [i.e., as indefinite] and then compare it with its duration, it seems to me that the only thought it occasions is that there is no imaginable time before the creation of the world in which God could not have created it if he had so willed. I do not think that we have any grounds for

⁵⁰ Chanut to Descartes, 11 May 1647 (AT X, 620–621).

⁵¹ See, for instance, Barrow (1734), 169; La Grange (1675), 400–401; Leibniz (2001), 25; Babin (1679), 40; Rochon (1685), 27–35; Du Hamel (1692), 209.

⁵² See Rohault (1729) I, 19, 25. It is easy enough to find a way of reading Rohault that does not require us to project that conclusion onto him; but his contemporaries were not always so charitable in their own readings. See Samuel Clarke in the same volume, 24 n. 1 and 30 n. 2; and La Grange (1675), 393–402.

concluding that he really did create it an indefinitely long time ago. For the actual or real existence [*l'existence actuelle ou veritable*] of the world during these last five or six thousand years is not necessarily connected [*necessairement iointe*] with the possible or imaginary existence [*l'existence possible ou imaginaire*] which it might have had before then, in the way that the actual existence [*l'existence actuelle*] of the spaces conceived as surrounding a globe (i.e. surrounding the world as supposed *finite*) is connected [*iointe*] with the actual existence [*l'existence actuelle*] of the same globe.⁵³

Here, Descartes was explicitly contrasting the merely *possible* existence of the world before any given moment of time, and its *actual* existence beyond any given point of space. And his grounds for this distinction lay in a contention that there was a necessary connection between the actual existence of the spaces surrounding a body such as a globe and that of the globe itself, a connection that did not hold across temporal boundaries.

On the face of it, it might seem—and it has been argued in the secondary literature, for instance by Jean Laporte⁵⁴—that this is flying in the face of what Descartes said elsewhere about the real distinction between different regions of the extended world. For instance, in Descartes's principal discussion of the nature of a real distinction, he wrote of extended or corporeal substance that, “if it exists, each and every part of it, as delimited by us in our thought, is really distinct from the other parts of the same substance.” And he spelled out what a real distinction amounted to: it “exists only between two or more substances,” such that God will always retain the power of “keeping one in being without the other.”⁵⁵ Again, Descartes made much the same point in a 1642 letter to Guillaume Gibieuf: “I consider the two halves of a part of matter, however small it may be, as two complete substances.”⁵⁶ As he explained the expression in the Fourth Replies, Descartes meant by ‘complete substance’ that each of these halves, considered as a body in its own right, would require nothing else (apart from God) to sustain it in existence: it could subsist on its own.⁵⁷ There does appear, at least *prima facie*, to be a challenge in reconciling such remarks with Descartes's claims about a necessary connection between one body and other, surrounding bodies.

⁵³ Descartes to Chanut, 6 June 1647 (AT V, 52–53; CSMK, 320). Descartes also considered the same objection, though more briefly, in the annotations he made to a copy of his own *Principles* (AT XI, 656). The passage in question is translated in Ariew (1987), 151.

⁵⁴ Laporte (1950), 264–266.

⁵⁵ *Principles* I.60 (AT VIII-1, 28–29; CSM I, 213).

⁵⁶ Descartes to Gibieuf, 19 January 1642 (AT III, 477; CSMK, 202–203).

⁵⁷ Fourth Replies (AT VII, 220–222; CSM II, 155–157). See also the Second Replies (AT VII, 120–121; CSM II, 85–86).

But the crucial thing to observe is that Descartes never suggested that there was a necessary connection between a body and any *particular* surroundings. All bodies were, after all, supposed to be mobile: but motion, for Descartes, meant precisely that the body would relinquish its spatial relations to its immediate surroundings, and become surrounded by some other set of bodies instead.⁵⁸ *This* body certainly did not need to be connected to *that* body, and the one could perfectly well be conserved in existence without the other. But it might yet need to be connected to *some body or other*. The latter is all that Descartes actually suggested to Chanut (and elsewhere) when rejecting the notion of a bounded universe, and it is not so clear after all that there is any conflict between this weaker claim and the real distinction between bodies. Descartes did not care *which* bodies might turn out to surround a supposedly finite world, but merely insisted that *some* should.

And yet one might still wonder what—if anything—would entitle Descartes even just to the weaker conclusion. After all, many people in his own era, even when writing directly in response to his claims, simply rejected it. They instead fell back on the traditional scholastic line that, although it was perfectly *possible* that further extension should exist beyond the boundary of the finite world, none *actually* did so.

Let us take just two examples. First, Isaac Barrow laid out a theory of space in the 10th of his Mathematical Lectures, delivered in 1665. Most of the first half of the lecture was directed against Descartes's position, following which Barrow proceeded to offer his own alternative proposal. "*Space*," he wrote, "is nothing else but the *mere Power, Capacity, Ponibility*, or (begging pardon for the Expressions) *Interponibility of Magnitude*."⁵⁹ By 'magnitude,' he meant specifically *corporeal* bulk, and by his own neologism 'ponibility' (from the Latin '*ponere*,' to put), he meant simply that it was possible that such bulk should be put into such space. As he explained: "There lies no Body, there is found no actual Dimension beyond the Mass of the Universe; but it is possible for a Body to be constituted and a real Dimension to be extended beyond that itself, *i.e. there is an Ultramundane Space*."⁶⁰ And the important thing to observe here is that Barrow was not only saying that there lies no body beyond the finite universe, but that there are no actual dimensions there at all, not even those of a void. As we noted in the last section, Barrow was taking the same line as figures like Oresme or the Coimbra commentator had done. His ultramundane space was quite unlike the void of the Stoics which, as we noted at the start of this section, extended without limit in every direction. Barrow's space was not actually extended: "it has no actual but only potential Figures,

⁵⁸ *Principles* II.25 (AT VIII-1, 53; CSM I, 233). We will be returning to this point in Section 3 below.

⁵⁹ Barrow (1734), 176.

⁶⁰ Barrow (1734), 176.

Dimensions and Parts consentaneous to its Nature.”⁶¹ Although quantities, measurable in feet or yards or miles, might be assigned to such an ultramundane space, it was not to the space itself that these quantities properly belonged, but *only* to the bodies that could (but did not actually, or did not yet) exist therein.

Second, a few years later, Jean-Baptiste de La Grange argued against Descartes in much the same way, in Chapter 29 of his own *Principes de la philosophie*, a chapter entitled “Place and Space are nothing positive.” La Grange recognised the force of the arguments that seemed to be pressing for the existence of further spaces beyond the boundary of a world imagined as finite, and he was comfortable in embracing that conclusion, just as long as it was rightly understood. But the trick was, just as with Barrow, to regard space as nothing positive, and as possessing no real extension of its own. “Space, properly speaking, is a certain capacity of receiving a body [...]. That being granted, I say that there are true spaces beyond the heavens. That is evident, since there are capacities there, proper for receiving the bodies that God could create there, and God could produce beyond the heavens several other worlds similar to this one.”⁶² However, although it could be truly said that there were spaces out there, and these spaces were indeed real in their own manner, what they did not constitute was a “positive extension.”⁶³ La Grange accepted that space was unbounded, just as (he observed) the Cartesians themselves were well persuaded. He also believed that space could not be produced or destroyed. However, he could not accept either point as applicable to matter, and this was his solution: far from treating space as material, he treated it as a “nothing.”⁶⁴ It was merely the possibility of matter, rather than an actually extended—or even actually *existing*—thing in its own right. It was unlimited, but only in the sense that God possessed an unlimited creative power. It could not be produced, but only in the sense that God did not produce his own power to produce things. And it could not be destroyed, but only in the sense that God did not have the power to take away his own power.

These, then, were the two positions. On the one hand, traditionalists were perfectly happy to allow the possibility of further extension on the other side of the boundary of a limited universe, just as long as this was acknowledged as a *mere* possibility. On the other hand, Descartes insisted that there should *actually* be further extension—and corporeal extension at that—beyond any supposed boundary (entailing, of course, that it was not a genuine boundary after all). Neither side ever managed to persuade the other, and ultimately one might wonder whether this just came down to a battle of intuitions. Descartes felt that, if an extended substance was going to be limited, it would need to be

⁶¹ Barrow (1734), 177.

⁶² La Grange (1675), 403. My translation.

⁶³ La Grange (1675), 406–407.

⁶⁴ La Grange (1675), 408.

limited by another extended substance, really existing beyond itself in order to demarcate its boundary. But opponents like Barrow or La Grange simply did not accept that premise. They did not think that a limited extended substance would need to be limited by anything beyond it at all, neither by further matter, nor even by an actually extended void. Unless some further consideration can be brought to bear, to decide between these two attitudes, we seem to be in a stand-off.

3. Descartes and Malebranche on the Ontology of Modes

Descartes believed that the actual indefiniteness of the extended world was something we understood. Whether or not the imagination might also happen to play an assisting role along the way, it was the understanding that was doing all the real work. So what was it that the understanding was latching onto? Precisely why did that principle, that a limit could not be one-sided but would need to separate one thing from another thing, so appeal to Descartes? I suggest that the answer lies in Descartes's conception of a mode of extension.

To illustrate and explain this, and in hopes of resolving the stand-off between those who accepted the principle and those who simply did not, let us turn to another figure who disagreed with Descartes on this point: namely, Nicolas Malebranche. The reason why this case is especially worthy of attention is because, whereas Barrow and La Grange were avowed opponents of Descartes, Malebranche was in many ways a Cartesian. He drew heavily on Descartes's ideas and arguments, employing them to his own ends in a wide range of different areas of philosophy, and only deviating from the orthodox Cartesian party line when he felt the force of argument required it. But this was one such occasion.

The first difference between Malebranche and Descartes lay in the fact that the former did not think it could be demonstrated that any material extension existed at all. Perhaps faith might warrant such a conclusion, but it could not be established on philosophical grounds alone.⁶⁵ Moreover, even allowing that some kind of extended world had indeed been created, Malebranche was still far from persuaded that it would need to be either infinite or indefinite, even just with respect to its extension alone. He was satisfied that the *idea* of extension was infinite, both in itself (because he regarded it as consubstantial with an infinitely perfect God) and representatively (insofar as it could represent infinitely many possible bodies). But he wrote in his *Méditations chrétiennes et métaphysiques* of 1683: "The idea you have of extension represents it to you as divisible, mobile, impenetrable: judge without fear that it has these properties essentially. But do not judge that it should be either immense or eternal. It might not exist at all, or it might have very narrow boundaries."⁶⁶ By saying

⁶⁵ Malebranche (1997), 571–575.

⁶⁶ Malebranche (1958–1984) X, 100. My translation. See also XVII-1, 286–287.

only that created extension *might* have narrow boundaries, it seems that Malebranche was not closing the door altogether on Descartes's theory of an unbounded universe. But it is also abundantly clear that he was far from committed to the truth of such a theory, and still less to its necessary truth.

Some 30 years after making that remark in his *Méditations*, Malebranche would have occasion to echo it the course of an epistolary discussion of Spinoza's philosophy with Jean-Jacques Dortous de Mairan. At one point, Mairan happened to argue in a Spinozistic way that extension could not be finite: either it did not exist at all, or it existed as infinite. To this end, he established the following lemma: "To be finite in its kind, it is necessary to be delimited by something of the same kind or the same nature." And he illustrated this by reference to bodies: "Let there be *A*, a finite body: it is evident that it is bounded and delimited by all the surrounding bodies *B*, *C*, *D*, etc., which are extended like it or which have extension in common with it, and beyond which it does not extend; and if there were no body, nor anything extended, around *A*, I could not avoid affirming of body *A* that it is infinite in its kind; for to be delimited by nothing, not to be delimited, is to be infinite."⁶⁷ The underlying principle here was coming from Spinoza's *Ethics* (Part One, Definition 2): but, as we have seen, it was also the principle at the heart of Descartes's argument for an indefinite universe. For one extended thing to be limited, it would need to be limited by another extended thing.

Malebranche, however, disagreed. In response to Mairan, he wrote:

Roundness is, according to all the world, the modification of substance, or of the extension of the sphere, because we cannot conceive of roundness without extension. I can conceive the sphere *A*, and it can exist all alone. "No," he would say, "that sphere would be infinite, for what would delimit it?" Nothing, I would say. For to delimit it, nothing is needed: it suffices for it to be as it is. The roundness of the sphere belongs only to the sphere, and does not depend on anything that surrounds it; whether it be the air or nothing, that is the same thing. "But don't you conceive of extension as infinite?" Yes, the idea of extension is infinite, but its *ideatum* possibly not. Perhaps it has in fact no *ideatum*.⁶⁸

The contrast between this 1714 letter from Malebranche to Mairan and the 1647 letter from Descartes to Chanut, quoted above, should be clear. Both were using the example of a solitary sphere; but Descartes was arguing that it could not be so solitary after all, because its own extension would be necessarily connected with the actual existence of further extension beyond it, whereas Malebranche was arguing that, on the contrary, it did not need anything *else* to delimit it. To be defined by a round boundary—and *a fortiori* to have a

⁶⁷ Malebranche (1995), 94–95.

⁶⁸ Malebranche (1995), 104.

boundary at all, that is, to be finite—was simply the way it was. Jean Laporte would draw on Malebranche to argue that Descartes had not been entitled to claim that there was a necessary connection between a finite world supposed spherical, and the real existence of further bodies beyond it. “In taking it for limited,” wrote Laporte, “we are not supposing that it is contained in another thing, but on the contrary that it leaves no space outside itself, either empty or full. So is it limited by nothing? It is limited by the deficiencies of its own substance, which extends as far as it extends and no further.”⁶⁹

What it really comes down to is this: does a mode or modification (such as roundness) belong to one individual body, simply in itself, or does it more properly belong to multiple bodies, to the one that interests us only in relation to others?

Malebranche took the former line. In his opinion, the boundary of an extended thing, together with its particular figure (“since figure is nothing but the boundary of extension”⁷⁰), was in fact identical with the thing itself, existing in a certain way: “the actual roundness and motion of a body are but that body shaped and moved in this or that way.”⁷¹ And so, although a modification/mode could not be perceived without a perception of the substance to which it belonged, it could perfectly well be perceived without a perception of anything *else*. As early as the opening chapter of Malebranche’s first published work, *The Search after Truth*, he was already claiming that “a figure is round when all the exterior parts of a body are equally distant from one of its parts called its center, *independently of any external body*” (emphasis added).⁷² And so likewise at the end of his life, we find him telling Mairan that figures and other such modifications of extended things belong to those things, and are inconceivable without them, in contrast to the things themselves, which, together with their modifications, can be conceived without—and can *exist* without—any other extended things to surround them.⁷³ What impediment, therefore, could there be to a finite universe, confined within a spherical boundary?

Descartes, however, followed the latter path, and thought that a spherical boundary would need to be demarcated by things on *both* sides of it; for, strictly speaking, this one mode was shared between those things. It was, to borrow an expression from Paul Hoffman, a “straddling mode.”⁷⁴ In a discussion ostensibly unrelated to the size of the universe, instead expounding how he thought Transubstantiation might work, Descartes happened to address the ontological status of a surface. He observed that a surface was not a substance in its own

⁶⁹ Laporte (1950), 264. My translation.

⁷⁰ Malebranche (1997), 626.

⁷¹ Malebranche (1997), 218.

⁷² Malebranche (1997), 3.

⁷³ Malebranche (1995), 77, 87.

⁷⁴ Hoffman (2009), *passim*.

right, but “only a mode or manner of being, which cannot be changed without a change in that in which or through which it exists.”⁷⁵ But in or through what did this surface exist? Descartes explained: “This surface intermediate between the air and the bread does not differ in reality from the surface of the bread, or from the surface of the air touching the bread; these three surfaces are in fact a single thing and differ only in relation to our thought.”⁷⁶ For some purposes, perhaps when reflecting on the fact that it could be surrounded by things other than air, we might choose to focus our attention on the outer surface of the bread. On other occasions, when reflecting on the fact that the same air might find itself surrounding something other than bread (e.g., the body of Christ), we might consider the inner surface of the air. And sometimes we might focus on the interface as such between the two things. But the object of our thought would be just the same in all three cases, and this one common surface belonged properly neither to the air alone, nor to the bread alone, but to both together.

What holds for surfaces in general will also hold for their shapes, shape being merely “a function of the boundaries of this extension.”⁷⁷ When arguing against the possibility of a vacuum, Descartes claimed that, if God was to remove the contents of a vessel without replacement, the sides of the vessel would have to touch. In the course of that discussion, he wrote that, “although there is no connection between a vessel and this or that particular body contained in it, there is a very strong and wholly necessary connection between the concave shape of the vessel and the extension, taken in a general sense, which must be contained in the concave shape.”⁷⁸ The similarity between this comment, concerning the necessary connection between the concave inner surface of the vessel and the extension within, and the necessary connection that Descartes described to Chanut between the convex outer surface of a world supposed finite and the extension without, should be clear. Again, a finite world would not need to be surrounded by any particular bodies, but it would need to be surrounded by some bodies or other: for otherwise its spherical boundary—as a mode that should belong equally to the objects on both sides, that being the nature of surfaces in general—would be missing one of its requisite relata.

And this was not specific to surfaces and their shapes. The same point applies, I contend, to all the other modes of extension too: they were *all* straddling. Descartes did not countenance many such things, but only those that were required by his mechanical physics, so we can go through them one by one.

⁷⁵ Descartes to Mesland, 9 February 1645 (AT IV, 163; CSMK, 241).

⁷⁶ Descartes to Mesland, 9 February 1645 (AT IV, 164; CSMK, 241–242). See also the Fourth Replies (AT VII, 250–251; CSM II, 174), and the Sixth Replies (AT VII, 433–434; CSM II, 292–293).

⁷⁷ Third Meditation (AT VII, 43; CSM II, 30).

⁷⁸ *Principles* II.18 (AT VIII-1, 50; CSM I, 230).

In the case of *external place*, for instance, Descartes defined this simply as “the surface immediately surrounding what is in the place.”⁷⁹ As he acknowledged, this was effectively the same as the old Aristotelian definition of the place of a thing as “the innermost motionless boundary of what contains it.”⁸⁰ But, as we have just seen, Descartes believed that such a boundary would properly belong to what was contained as much as to what contained it. He reiterated the same point he had elsewhere made for surfaces considered more generally, but now with specific application to the role that such surfaces would play as external places. The surface that constituted the place, he wrote, was not “any part of the surrounding body but merely the boundary between the surrounding and surrounded bodies, which is no more than a mode. Or rather what is meant is simply the common surface, which is not a part of one body rather than the other but is always reckoned to be the same, provided it keeps the same size and shape.”⁸¹

As for external place, so too for *motion*, that being simply a change of place. For Descartes, the motion of a body would always need to make references to its surroundings. He defined motion as “the transfer of one piece of matter, or one body, from the vicinity of the other bodies which are in immediate contact with it, and which are regarded as being at rest, to the vicinity of other bodies.”⁸² But then it followed that motion, our customary ways of describing it notwithstanding, should be entirely reciprocal. Strictly speaking, it was not so much that a moving body would be leaving its stationary surroundings, but rather that the body and its surroundings would both be *equally* moving in relation to one another. And Descartes was perfectly happy to embrace this conclusion: “For transfer is in itself a reciprocal process: we cannot understand that a body AB is transferred from the vicinity of a body CD without simultaneously understanding that CD is transferred from the vicinity of AB. Exactly the same force and action is needed on both sides.”⁸³ Or again, in the very next paragraph: “whatever is real and positive in moving bodies—that in virtue of which they are said to move—is also to be found in the other bodies which are contiguous with them, even though these are regarded merely as being at rest.”⁸⁴

Of course, the same point also holds for *rest* itself. One might think that this would go without saying; but we should remember that Descartes did not regard rest as simply the limiting case of motion (i.e., a motion where the speed

⁷⁹ *Principles* II.15 (AT VIII-1, 48; CSM I, 229).

⁸⁰ Aristotle (1984) I, 361 (*Physics* IV.4, 212a20); see Descartes to Mersenne, 23 June 1641 (AT III, 387–388; passage omitted in CSMK); Sixth Replies (AT VII, 434; CSM II, 292–293).

⁸¹ *Principles* II.15 (AT VIII-1, 48; CSM I, 229).

⁸² *Principles* II.25 (AT VIII-1, 53; CSM I, 233).

⁸³ *Principles* II.29 (AT VIII-1, 55–56; CSM I, 235).

⁸⁴ *Principles* II.30 (AT VIII-1, 57; CSM I, 236).

happens to be zero), but as a distinct mode in its own right, wholly opposed to it. So, for the record, just as motion was the reciprocal transfer of a body away from its surroundings, rest was the absence of such a transfer.⁸⁵ That is to say, the definition of rest for one body would still make an ineliminable reference to other bodies.

The *size* or *quantity* of a body might look like an exception here, for perhaps that can, after all, be understood solely in terms of the three-dimensional extension that constitutes the body itself, without any reference to surrounding bodies. But then, strictly speaking, size was not a mode of extension. Descartes acknowledged this in *Principles* II.8: “There is no real difference between quantity and the extended substance; the difference is merely a conceptual one.”⁸⁶ And he elaborated in a letter: whereas shape and motion were true modes of corporeal substance, size—together with existence, duration, number and all universals—were rather to be taken as “attributes, or modes of thinking, because [...] the thing itself cannot be outside our thought without its existence, or without its duration or size, and so on.”⁸⁷ Far from being a mode of a corporeal substance, the size of a body just *was* that corporeal substance itself. The two things could be considered apart, but not by a modal distinction—and still less by a real distinction—but only by a distinction of reason.

The same, however, was not the case for *internal place*. Much as Descartes's notion of external place had linked it directly to the two-dimensional (i.e., depthless) surface intermediate between the body and its surroundings, his notion of internal place linked that directly to the three-dimensional extension that constituted the body. And yet, even despite this, the notion *still* managed to involve a reference to the surroundings. Descartes identified the internal place of a body with the body's own extension, but only insofar as it was being considered generically, rather than as something individual. And how, precisely, was that genus defined? According to Descartes, the internal place of a body will remain one and the same, even if the individual body in question should happen to leave it, just as long as the extension that constitutes whatever comes to replace that body “retains the same size and shape and keeps the same position *relative to certain external bodies* which we use to determine the space in question” (emphasis added).⁸⁸

In short, every single one of the true modes of corporeal substance—surfaces together with their shapes, motion and rest, and both internal and external place—needs to be referred not only to the individual body to which we might be accustomed to ascribing them, but to other bodies too. Where Malebranche believed that a mode of a thing was just that thing itself, existing in a certain way, independently of all other things, Descartes believed that modes—at any

⁸⁵ *Principles* II.27 (AT VIII-1, 55; CSM I, 234). See also Descartes's annotations on his *Principles*: AT XI, 656–657, translated in Garber (1992), 167.

⁸⁶ *Principles* II.8 (AT VIII-1, 44; CSM I, 226).

⁸⁷ Descartes to ***, 1645 or 1646 (AT IV, 349; CSMK 280).

⁸⁸ *Principles* II.10 (AT VIII-1, 45; CSM I, 227).

rate, the corporeal ones—were relational in nature. Any property that was *not* thus relational but inhered in the substance itself (“*substantiae inesse*”) would, properly speaking, qualify not as a mode thereof but an attribute.⁸⁹ And that did include size, but it did not include any of these others.

But Aristotle had long since recognised that his own relational definition of place, as the innermost boundary of what contained a thing, entailed that the cosmos as a whole could not have a place, on the grounds that nothing contained it.⁹⁰ Had Descartes followed Aristotle in treating the universe as finite, the same entailment would have held for him too, and not only for place but right across the board. Maybe a single finite body, all alone in the world, could somehow—paradoxically—have a size. But it could not have a place; it could neither move nor be at rest; it could not have a shape; and, most fundamentally of all, it could not have a boundary.

It is this, I contend, that was driving Descartes’s argument for the actual indefiniteness of the universe. Indefiniteness as such might only require the possibility of increase beyond any given point: that is, a syncategorematic sequence of expansions, this potential body beyond that one, and that beyond another, though without any suggestion of anything beyond the whole sequence together. But Descartes went a lot further than this, and made it clear that each of these more and more distant bodies should be not only possible but actual. To recall what he told Chanut, the actual existence of spaces surrounding a supposedly finite world is necessarily connected with the actual existence of that world. We can now see why Descartes was so confident in this, and precisely what he thought the understanding was latching onto here, when we recognised a contradiction in the supposition of a world that was actually only finitely large. To be finite *just is* to be bounded. But the notion of a boundary to the whole extended world will be self-defeating, because the very act of supposing such a boundary will reveal further extension beyond it, actually existing to provide the second relatum that every boundary requires.

Abbreviations

- AT Descartes, René. 1996. *Oeuvres de Descartes*, edited by Charles Adam and Paul Tannery. 11 vols. Paris: J. Vrin.
- CSM Descartes, René. 1984–1985. *The Philosophical Writings of Descartes*, translated by John Cottingham, Robert Stoothoff, Dugald Murdoch. 2 vols. Cambridge: Cambridge University Press.
- CSMK Descartes, René. 1991. *The Philosophical Writings of Descartes, vol. III: The Correspondence*, translated by John Cottingham, Robert Stoothoff, Dugald Murdoch, Anthony Kenny. Cambridge: Cambridge University Press.

⁸⁹ *Principles* I.56 (AT VIII-1, 26; CSM I, 211).

⁹⁰ Aristotle (1984) I, 361–362 (*Physics* IV.5, 212a31–b1, 212b12–b22).

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